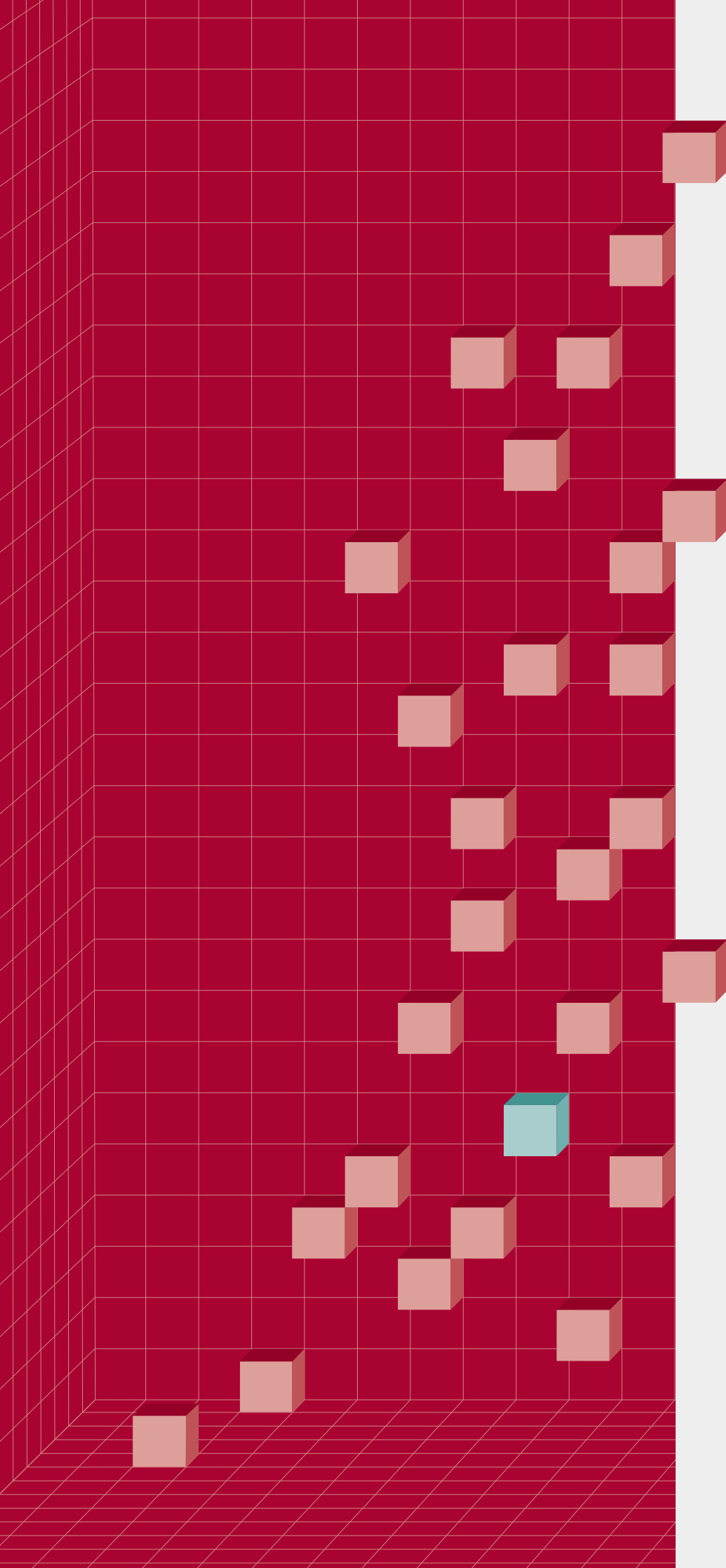


# productivity report 2021





**Productivity growth is almost everything  
in the post-Covid recovery**

Megan Greene, Harvard Kennedy School,  
Financial Times, 30 September 2021



**Productivity Report 2021**  
**(Poročilo o produktivnosti 2021)**

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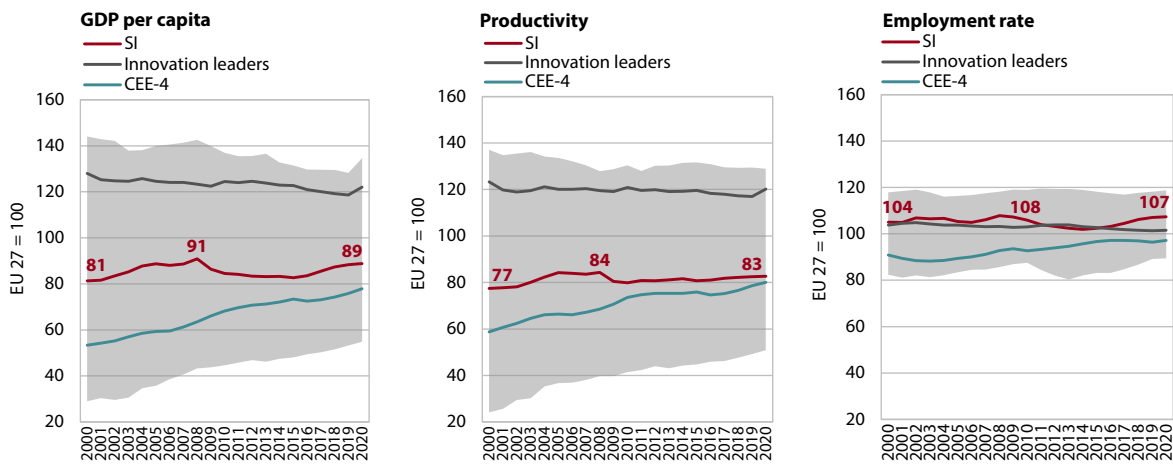
# Key messages and guidelines

## WHAT: current situation and trends ...

### ... in Slovenia's productivity and competitiveness

The decade before the COVID-19 epidemic was characterised by slow productivity growth; after a sharp decline in 2020, productivity exceeded pre-epidemic levels in 2021. In Slovenia, the average annual labour productivity growth (measured as GDP per person employed) slowed from 3% in 2000–2008 to 0.6% in 2009–2019 (or to 1.4% in times of buoyant economic growth between 2014 and 2019). The outbreak of the COVID-19 epidemic led to a sudden decline in economic activity, especially in the early period, while employment remained at a relatively high level, partly thanks to government measures. This led to a sharp (temporary) decline in the labour productivity index measured as GDP per person employed, which exceeded pre-epidemic levels in 2021. With the deceleration of productivity growth, the pace of convergence with economically more advanced countries has also slowed since 2008. In 2020, Slovenia reached 89% of the EU average in GDP per capita in purchasing power standards. The gap is mainly due to lower productivity, as the employment rate was above the EU average throughout the period analysed.

Figure 1: The deceleration of productivity growth has also halted the closing of the productivity gap with the EU average in the last decade



Source: Eurostat (2022); calculations by IMAD. GDP per capita and productivity (GDP per person employed) are expressed in purchasing power standards. The shadowed field shows the range between the EU Member States with the lowest and the highest indicator values, excluding Luxembourg and Ireland. For the definition of innovation leaders (SE, FI, DK, BE), see Section 4.2.1. CEE-4: CZ, HU, PL, SK.

With the exception of ICT services and construction, long-term trends in most business sector activities are relatively favourable, but they should be accelerated in order to achieve a faster closing of the productivity gap. Over the last decade, ICT services have had the fastest growth of productivity at the EU level, while the growth of these services in Slovenia has been comparatively very modest. The lack of progress towards the EU productivity average is also evident in the construction industry, whose potential in Slovenia declined significantly during the global financial crisis. The manufacturing sector increased its productivity relatively quickly, partly due to increased robotisation and strong exposure to international competition. In this area, Slovenia was relatively successful in narrowing the

productivity gap with the EU average and the innovation leaders, especially in high-technology manufacturing industries, but also in industry in general, since it achieved faster growth. The same is true for traditional market services (trade, transportation, and accommodation and food service activities) and, with the exception of a slight deterioration in the last two years, for other market services (professional, scientific and technical services and administrative and support service activities).

**In the case of the COVID-19 epidemic, the impact of the crisis on export competitiveness has so far been less severe than in the previous crisis, but there are signs of pressure on competitiveness building up in 2021.** Although unit labour costs statistically increased significantly in 2020 and 2021, we estimate that the actual cost pressure faced by firms remained at the (relatively high) pre-epidemic level thanks to government measures. At the same time, cost pressures started to build up in 2021 due to the sharp increase in prices of metals and other commodities and energy on global markets. As a result, industrial producer prices rose by an average of almost one-tenth in manufacturing and 25% in the manufacture of metals and fabricated metal products in September 2021 compared with December 2020. Despite a sharp decline in the initial phase of the COVID-19 pandemic, Slovenia's export market share in the world goods market increased slightly on average in 2020, while its most important export groups of *services* (travel and transportation) were severely affected by the COVID-19 crisis.

### ... in productivity and business performance

**Enterprises with high productivity growth are more profitable, their profitability increases faster, they invest more, they have 23% higher wages on average and increase their wages twice faster than other companies, and they are above-average employers.** Of the 5% fastest growing enterprises in terms of productivity in 2014–2019, 99% come from the SMEs group, of which 43% are micro, 49% are small and 7% are medium-sized enterprises, with smaller enterprises also recording higher productivity growth. These enterprises are active in all sectors, suggesting that company-level (rather than sector-level) factors play an important role, although the share of such companies in the high-technology sector appears relatively low at 9%. Successful companies with high productivity growth can be found in all market, often niche segments, from high-technology to service and manufacturing activities that produce final and intermediate products. More than half of the fastest growing 25% of large enterprises are in manufacturing, but this group lacks export-oriented, knowledge-intensive large service enterprises. Successful large enterprises are both domestic- and foreign-owned, more focused on final products and more profitable from an economic perspective, but at the same time they have lower capital investments than the most successful 5% of companies.

**In 2020, in spite of the outbreak of the COVID-19 epidemic, the financial situation of companies was relatively favourable thanks to government measures (low indebtedness and high liquidity despite a sharp decline in profitability), but the situation has deteriorated significantly in service activities, which were most severely hit by the epidemic.** Given the stable situation in the banking system, most debt indicators decreased in 2020. Both total and financial debt remained below 2007 levels and bank debt even below 2005 levels. The ability of companies to repay their debts improved according to most indicators and recorded the most favourable figures in the entire period analysed (i.e. since 2006). Over-indebtedness rose slightly in 2020 for the first time since 2009 but remained near its lowest level. According to all indicators, the liquidity of the corporate sector also improved in



2020, reaching the most favourable levels in the entire period analysed. However, profitability indicators deteriorated significantly as a result of the crisis. The financial situation also deteriorated, especially in some market service activities, which were shut down, at least for some time, as part of the measures to prevent the spread of the virus (e.g. accommodation and food service activities, administrative and support service activities, and creative, arts and entertainment activities).

**The solvency of Slovenian companies did not deteriorate in 2020 and 2021, but there is a risk that the number of insolvent business entities will increase after all the measures to mitigate the impact of the epidemic expire and that the share of the most problematic over-indebted and zombie companies will rise.** Numerous government intervention measures to mitigate the impact of the epidemic in 2020 and 2021, financial stability, and good business results of all business entities in the years before the epidemic are the reasons why the solvency of Slovenian companies did not deteriorate in 2020 and 2021. But the scale of the shock caused by the COVID-19 crisis and the experience of the past global financial crisis that the effects on business indicators tend to show with a lag indicate that there is a risk that, after all the measures taken to mitigate the economic consequences of the epidemic expire, the number of insolvent business entities will increase, especially in severely affected sectors. Already in 2020, the share of companies at risk of insolvency (i.e. the most problematic over-indebted and zombie companies) increased. In 2020, such companies accounted for 21% (17.8% in 2019) of all companies, generated 1.7% (1.3%) of the value added of all companies and employed 6.4% of all employed persons (5.7%), which is more than during the period of economic growth (2014–2019), but at the same time much less than during the global financial crisis (2008–2013). The over-indebtedness of these companies accounted for 47.8% of total over-indebtedness and their bank debt for 6.9% of total corporate bank debt, while their productivity in 2008–2020 was three-quarters below the level of the business sector as a whole. Despite the relatively lower long-term growth and development potential of the most problematic over-indebted and zombie companies, in the case of appropriate economic policy measures, especially the restructuring of over-indebted companies, their productive resources can contribute to growth and are not necessarily permanently lost.

## WHY: key factors of productivity growth ...

### ... in terms of investment

**The low level of investment was a key factor in the decline in trend productivity growth even before the COVID-19 epidemic.** The share of investment in GDP was 19% in 2020, the sixth lowest in the EU, which has been an important reason for the decline in trend productivity growth since the global financial crisis. Slovenia is one of the countries with the lowest share of investment in construction, especially in housing. On the other hand, (tangible) investment in machinery and equipment in Slovenia is relatively high from a productivity point of view, while (intangible) investment in intellectual property products is low. From institutional perspective, household and business investment in Slovenia are lower than government investment. Overall investment will have to increase not only to ensure productivity growth, but also in view of the large investment needs related to future challenges, especially the green transition. With the outbreak of the COVID-19 pandemic, investments – particularly from the business sector – initially fell sharply again, then gradually recovered later in 2020 and exceeded pre-epidemic levels in early 2021. However, they still fall short of the level forecast before the COVID-19 crisis.

**In terms of productivity, in addition to investment in human resources and softer forms of intangible capital, cumulative investment in research and development, ICT, and other machinery and equipment is crucial. Here, Slovenia was among the top performers in the EU before 2009 but has ranked only around the EU average since 2014.** From a productivity perspective, however, Slovenia's lag in investment in intellectual property products is key: the gap with the innovation leaders in R&D is one percentage point of GDP per year and corresponds to the gap in investment in ICT. Productivity growth is also significantly influenced by investments in other machinery and equipment, which are also important and necessary for smart transformation and digitalisation. The analysis of cumulative investments in all three types of investments shows that (i) until the outbreak of the global financial crisis in 2009, Slovenia spent 2 p.p. of GDP more than the EU average on the investments mentioned above (ranked 5th); (ii) between 2009 and 2013, it reduced its investment advantage over the EU to 0.9 p.p. of GDP, ranking 7th in the EU; (iii) since the rebound in economic growth in 2014, Slovenia's investment for these purposes has been around the EU average (ranked 12th). Slovenia also lags behind in the no-less-important investments in human resources<sup>1</sup> and has regressed from being one of the top investors in softer forms of intangible capital to an average investor, though this cannot be quantified uniformly for methodological reasons.

**These findings are supported by the dynamics of public investment in smart, digital-innovation transformation, on which Slovenia spends 0.5 p.p. of GDP less than the EU average and 2 p.p. of GDP less than the top five countries, with the gap widening over time.** In 2017–2019, Slovenia ranked 19th in the EU, with a share of government expenditure for these purposes of 1.7% of GDP. The share of this public expenditure in GDP has decreased over the last 20 years, while it has increased in most other countries. Having been an average investor in smart transformation in terms of public funds in 2001–2003 in the EU, 20 years later Slovenia lags behind and invests 0.5 p.p. of GDP less than the EU average and 2 p.p. of GDP less than the top five countries, the gap being unrelated to the size of the public sector, as the same dynamics in the share of smart investment can be observed when comparing to all public expenditure. General government expenditure on smart transformation as a share of GDP is characterised by pronounced cyclicity related to EU funds, while expenditure from national funds has been stagnating in the last decade and even declining as a share of the 2018–2020 budget.

### **... in terms of structural changes**

**Global changes are reflected in rapid changes in the demand for new knowledge and skills, which is already changing in the short term, but to which Slovenia is not responding adequately.** In some areas that are crucial for strengthening competitiveness, such as ICT, Slovenia not only has relatively low skill levels, but at the same time businesses face one of the largest skill shortages in the EU, indicating a lack of adequate responsiveness. The major changes in needs are moving in the direction of increasing technological skills, including digital and entrepreneurial skills, while social and emotional skills, along with the ability to work with others, quick learning skills, problem-solving skills, critical thinking and creativity, will also come to the fore. At the same time, the unclear picture of specific future needs in Slovenia prevents effective career orientation and sufficient enrolment in programmes

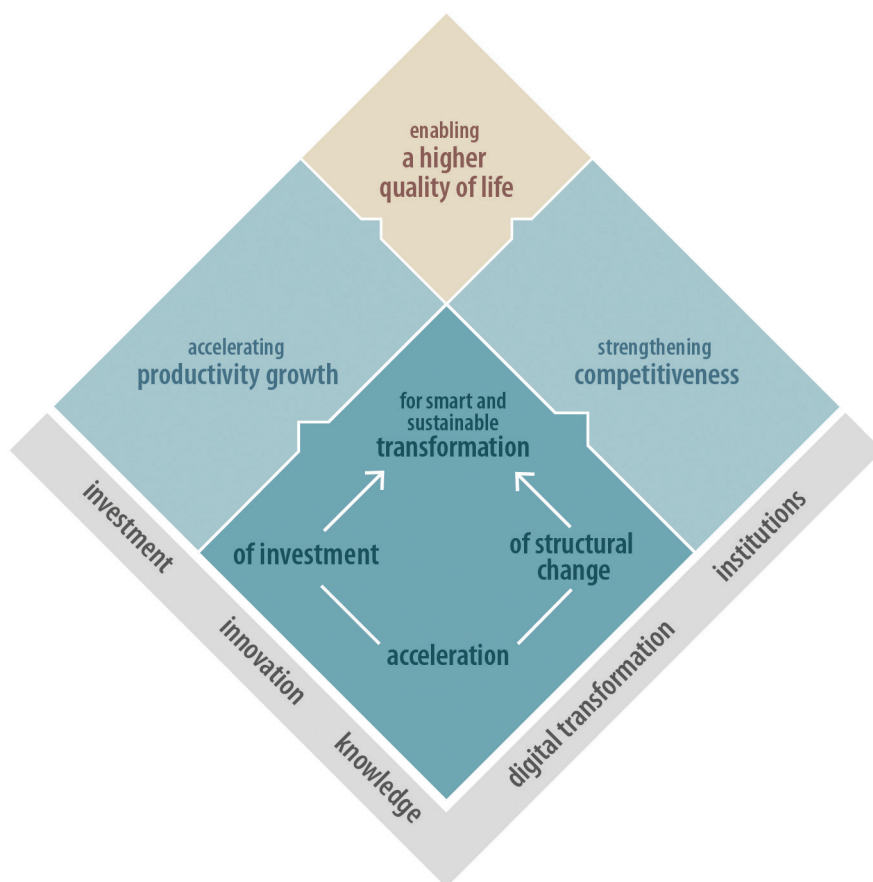
<sup>1</sup> In terms of public spending on formal education, for example, Slovenia's gap with innovation leaders is 1.8 p.p. of GDP.

that are important for meeting the medium-term needs of the economy, which leads to young people being encouraged to enrol in educational programmes for occupations for which demand is expected to decrease in the future.

**Although the corporate sector is still in a relatively favourable position in terms of digitalisation, it is gradually losing its comparative advantages and, above all, is too slow to respond to the changing nature of innovation, especially in the introduction of new business models and breakthrough and disruptive innovations.** According to Eurostat's Digital Intensity Index, 25% of companies in Slovenia had a high or very high digital intensity index score in 2021. This puts the Slovenian business sector in tenth place in the EU, which is a relatively strong position, but one that is deteriorating due to only average progress compared to the EU overall. In the early stage, the COVID-19 epidemic accelerated informatisation and digitisation, while the pace of adoption of more sophisticated digital projects, including digital transformation, seemed to have slowed. The transition to the fourth industrial revolution is changing the nature of the innovation process, where new business models are becoming increasingly important, including mass customisation and a greater emphasis on breakthrough and disruptive innovation, where Slovenia is facing significant challenges. Indeed, the data show that companies are too slow to change the way they are organised and operate in order to move to more agile and open approaches, that they lag behind in adapting products and services to the customer needs, and that the proportion of small and medium-sized enterprises that innovate their or are at least familiar with digital business models is low. All this is reflected in the structure of innovations, which are still insufficiently based on breakthrough and, especially, disruptive innovations.

**The functioning of institutions remains a challenge: people's attitudes towards entrepreneurship and digitalisation are becoming more positive, but at the same time, Slovenian society's openness to change, new ideas and globalisation remains relatively low, as is the government's effectiveness in promoting development.** Slovenia's ability to attract new talent is lower than in most economically developed EU Member States and Slovenia is in the bottom half of EU Member States in this area. Companies have been paying more attention to this area in recent years, but the gap with the innovation leaders remains wide. As regards institutional competitiveness, this has improved since 2013, but international comparisons show that Slovenia lags behind the innovation leaders and that, in particular, the government's effectiveness in supporting the functioning of the business environment and promoting development is relatively low. In 2021, under the influence of coping with the consequences of the COVID-19 epidemic, some indicators of institutional competitiveness worsened, and Slovenia, as in previous years, was ranked below average in 18th place in the EU. People's attitudes towards entrepreneurship and, increasingly, towards digitalisation are positive, but businesses at the same time estimate that Slovenian society is less open to new ideas, changes and different cultural patterns, i.e. less open, agile and flexible. Despite the small size of the domestic market, firms estimate that support for globalisation in Slovenia is lower than among innovation leaders.

## HOW to move forward: through smart and sustainable transformation<sup>2</sup>



### Priority government measures

#### I. Active PROMOTION OF CHANGE:

1. **Raising awareness** of the consequences of global megatrends and pointing out that a proactive and timely response, supported by welfare state measures, can lead to an increase in the quality of life.
2. **Promoting greater openness** to change, which is an increasingly important factor for development in the context of globalisation and, for example, the intense struggle for talent or the green transition.
3. **Managing the transformation** and strengthening safety nets, adapting social security systems to the new realities, striking the right balance between security and flexibility of work, and providing adequate remuneration and access to lifelong learning, all based on close dialogue with social partners and civil society.

<sup>2</sup> "Smart" refers to knowledge-intensive and innovation-based growth. "Sustainable" refers to the transition to a low-carbon and circular economy, including an inclusive and equitable transition. "Transformation" refers not only to the introduction of technological innovations, but also to a changed way of doing business, organising and thinking, including the upgrading of institutions and the introduction of new business models.

## II. Building KNOWLEDGE and skills of the population:

4. **Accelerating education and (re)training** for the skills of the future, including digital skills and introducing the circular economy aspect, and promoting the inclusion of adults in education and training programmes so that they are able to successfully meet future challenges, including workers whose jobs will be more exposed to automation and change.
5. **Based on modernised and future-oriented education and training systems**, which must become more flexible in the future. To ensure complementarity of knowledge, interdisciplinary approaches and cross-cutting skills such as entrepreneurship, innovation and creativity are becoming increasingly important. Therefore more attention needs to be paid to both the content and methods of teaching, which should focus more on the skills of the future and be based on a responsive and partnership-based system for predicting future needs.

## III. Increasing general government sector INVESTMENT:

6. **In smart and sustainable transformation, including with EU funds:** as Slovenia invests less than other countries, at least in the area of smart transformation, it should increase these key investments in order to increase productivity. The gap will not narrow under the Recovery and Resilience Plan, including due to the low intensity of EU aid, as Slovenia will invest on average 0.7 p.p. of GDP less in digitalisation than other Eastern and Southern European countries. This makes it all the more important to increase the share of funds intended for smart transformation in the 2021–2027 cohesion policy and thus move closer to the advanced countries such as Ireland and Finland. Depending also on the strategic orientations of other countries, Slovenia would thus position itself around the EU average in terms of the intensity of investment in digitalisation and smart transformation as a share of GDP.
7. **Ensuring infrastructural conditions**, especially those that have a strong **medium-term impact** on productivity in addition to the short-term impact. This includes in particular (i) digital infrastructure, both in terms of enabling digital accessibility in rural areas and in terms of the growing importance of next generation technologies; (ii) education and R&D infrastructure; and (iii) green infrastructure, including the transition to a low-carbon circular economy, e.g. through measures related to electricity production from renewable sources or the regulation of sustainable mobility infrastructure.

## IV. Further improvement of the BUSINESS and INNOVATION ENVIRONMENT:

8. **Further strengthening the scientific research, innovation and digital ecosystem**, which promotes collaboration and leads to joint investment, risk sharing and more intensive international cooperation, which in turn leads to more innovation, including breakthrough innovations, and faster productivity growth.
9. **Promoting a dynamic business environment that ensures efficient resource allocation.** Future measures should be even more focused on stopping the financing and thus the preservation of zombie companies (so-called unhealthy cores of the economy), which hinders both productivity and economic growth, and on concentrating on healthy cores that are not over-indebted in the long term and have high growth potential.

10. **Improving the effectiveness of government in providing support services and promoting development**, e.g. when it comes to enabling investment, the responsiveness and flexibility of the regulatory framework, a more open and joint action with social partners and experts, and coordination with the government's development-related activities.

## Priority business sector measures

11. **Accelerating investment in human resources, digital transformation and research, development and innovation, and machinery and equipment.** Such investment is not just about investing in traditional modernisation, such as use of robots in the production process, but accelerating investment in a mix of key drivers for digital and innovative business transformation, from data and analytics, systems and technologies, to talent and organisational capital, which are key to advanced, smart, data-driven companies, an area that is particularly challenging for SMEs.
12. **Accelerating the introduction of new business models, breakthrough and disruptive innovations, and upgraded business processes and organisation, including domestic and international networking.** Smart transformation means establishing a new, digital mindset, culture and organisation, with accelerated experimentation and a greater emphasis on agile, multidisciplinary and open, collaborative approaches. This is one of crucial dividing lines between successful and unsuccessful businesses, because only companies capable of such transformation can reap the benefits of the fourth industrial revolution through the introduction of new business models, mass customisation, servitisation, extremely rapid innovation, especially breakthrough and disruptive innovation, and rapid response to market changes.
13. **Reducing emission intensity, accelerating the circularity of the economy and developing green skills for new green jobs.** The transition to a low-carbon circular economy is becoming an increasingly important factor in ensuring long-term productivity growth and resilience. Increasing efficiency and the circular use of energy and raw materials are crucial for reducing production costs, which is also linked to the rapid increase in the price of energy and raw materials, which is expected to continue in the future. The green transformation of the economy represents an opportunity to create new jobs through the systematic development of new skills, innovation and sustainable investment in clean technologies.

# 1

## Introductory remarks

In 2018, the Institute of Macroeconomic Analysis and Development (IMAD) started to carry out the functions of a National Productivity Board in accordance with the Council Recommendation on the establishment of National Productivity Boards (OJ C 349, p. 1). The Recommendation provides for the publication of annual productivity reports, the main function of which is to provide an objective, neutral and fully independent analysis of productivity and competitiveness in the Member State concerned in order to improve its economic policy, taking into account possible recommendations under the European Semester.

Why is productivity important? Productivity is the fundamental and driving force for a thriving economy and higher economic development, but it is not a goal in itself. It is therefore the basis for creating material conditions that, in combination with appropriate public policies for income redistribution, enable higher incomes for the entire population, widely available public services and sustainable financing of social protection systems, thus improving the standard of living and welfare of the population. Accelerated productivity growth is gaining importance in the face of global megatrends, particularly demographic change and climate change, as well as recovery and resilience-building from the COVID-19 epidemic (IMAD, 2020a). Addressing these challenges will require substantial major investment, which, combined with an ageing population, means that in the coming period, in order to maintain or improve their standard of living, every working person will have to create higher value added on average than in the past and in a more sustainable way than in the past.<sup>3</sup>

Despite expectations at a global level that productivity growth will accelerate, first through the introduction of information and communication technologies and later through a profound process of digital transformation and the transition to the fourth industrial revolution, this has not yet happened. Declining productivity growth is not only a challenge for Slovenia, but also a global challenge (Dieppe, 2021), which Solow has already described as a paradox (1987). Expectations for the future vary: on the one hand, there are pessimistic forecasts about the further strengthening of factors that have a negative impact on productivity growth, for example in connection with increasing inequality or underinvestment (see e.g. Gordon, 2016; Summers, 2020); on the other, there are optimistic predictions that the introduction of new technologies, especially artificial intelligence, will finally lead to accelerated productivity growth, for example by gradually reaching the critical development of a number of complementary enabling technologies (IMAD, 2020a) or by overcoming existing difficulties in measuring productivity (Brynjolfsson et al., 2020).

Regardless of which scenario will prevail globally in the future, the challenges ahead, and especially the transition to the fourth industrial revolution, will bring both opportunities and risks for countries like Slovenia. Slovenia can use these processes for a developmental transformation and a departure from the traditional course of development. In the case of inaction, it could also face lagging behind, loss of jobs and accompanying greater territorial and social inequalities (IMAD, 2020a).

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<sup>3</sup> In the Productivity Report, unless otherwise stated, the term productivity refers to labour productivity, which simply measures how much value added is created on average by each worker, although this is not the only measure of productivity. Total factor productivity is a measure of the speed of technological progress and new business models, while controlling for human and tangible capital deepening, which in principle can be more informative. However, as the quality of data in Slovenia does not allow for a sufficiently credible assessment (see IMAD, 2019), the Report focuses on labour productivity.

Therefore, in addition to an analysis of the current situation and trends in productivity and competitiveness in Chapter 2, the Productivity Report 2021 pays special attention to selected aspects that were identified in last year's Report as key to productivity growth (IMAD, 2020a). Chapter 3 analyses in more detail the impact of the COVID-19 epidemic on the financial situation of companies, including the importance of intervention measures. It also examines in detail which are the fastest growing companies in terms of productivity in Slovenia. Chapter 4 looks at the status and trends of the main drivers of productivity growth, from investment to innovation, digital transformation and knowledge, including social and institutional capital. Additional attention is paid to digitalisation and all aspects of intangible capital, including the softer parts such as design or organisational capital, whose importance for productivity is constantly increasing. This is followed by an in-depth analysis of three aspects for a successful transition to a new normality, namely (i) workforce development and skills of the future, (ii) the role of public finance in promoting smart and digital-innovative transformation, and (iii) sustainable transformation to a low-carbon and circular economy (Chapter 5).



## 2 Current situation and trends in productivity and competitiveness

### 2.1 Productivity

**The decade before the COVID-19 epidemic was characterised by slow productivity growth; after a sharp decline in 2020, productivity in 2021 was again above pre-epidemic levels.** In Slovenia, the average annual labour productivity growth (measured as GDP per person employed)<sup>4</sup> slowed from 3% in 2000–2008 to 0.6% in 2009–2019 (and to 1.4% in the period of economic expansion 2014–2019).<sup>5</sup> The outbreak of the COVID-19 epidemic led to a sudden decline in economic activity, especially in the early period, while employment remained at a relatively high level, partly thanks to government measures. This led to a sharp (temporary) decline in the labour productivity measured in GDP per person employed (-3.7% on average in 2020), which in 2021 was again above pre-epidemic levels. With the deceleration of productivity growth, the pace of convergence with economically more advanced countries has also slowed since 2008. In 2020, Slovenia reached 89% of the EU average in GDP per capita in purchasing power standards (PPS). The gap is mainly due to lower productivity (83% of the EU average in PPS; 2008: 84.3% of the EU average in PPS), as the employment rate<sup>6</sup> in Slovenia was above the EU average throughout the period analysed.

■ *GDP per capita and productivity of innovation leaders are well above average, while their employment rates are average and the number of hours worked per employee is relatively low.*

**Labour productivity measured as GDP per hour worked did not decrease in the year of the outbreak of COVID-19.** The discrepancy between the two productivity indicators (-3.7% and +0.6% on average in 2020) is as expected in the light of job-retention schemes. Measures such as subsidies for temporary layoffs and short-time work saved most of the jobs (employment fell by only 0.6%), while the adjustment to lower economic activity (-4.2% on average in 2020) was mainly through reduction in hours worked per employee, which fell by 4.2% in Slovenia in 2020, and 5% in the EU on average. The downward trend in the number of hours worked per employee has been observed in Slovenia as well as in most EU Member States for several years, with the number of hours worked per employee varying significantly between countries. In general, the number of hours worked is lower in those EU Member States with a high employment rate. On the other hand, the GDP per capita and productivity of innovation leaders<sup>7</sup> are well above average, while their employment rates are average and the number of hours worked per employee is relatively low. In Slovenia, the number of hours worked per employee is close to the EU average. In view of demographic trends that put constraints on comparatively already high employment rates, the potential for a further increase in economic growth will be increasingly dependent on the ability to increase value added per hour worked.

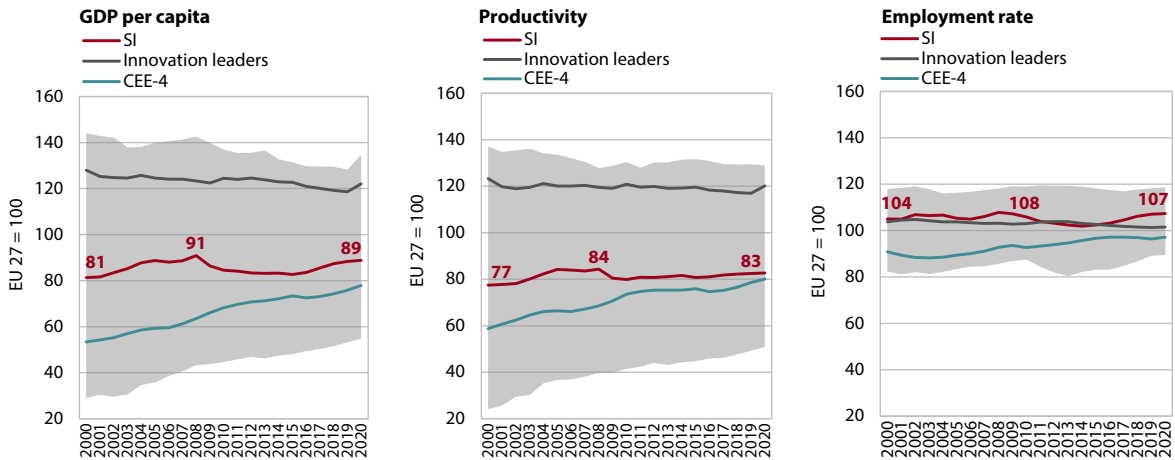
<sup>4</sup> This report focuses mainly on labour productivity and occasionally also on total factor productivity (TFP). For *comparisons over time* in this report, labour productivity is expressed as GDP at *fixed prices* per hour worked or per worker; for *international comparisons*, labour productivity is expressed as GDP in *purchasing power standards*; for sectoral analyses, labour productivity is expressed as value added per hour worked. For more on different measures of productivity and their use, see Sargent and Rodríguez (2000), Schreyer (2001) and OECD (2021f).

<sup>5</sup> Average annual productivity growth measured as GDP per *hour worked* slowed from 3.4% in 2000–2008 to 1% in 2009–2019 (2% in 2014–2019). Somewhat stronger growth in productivity measured in terms of hours worked is a consequence of a declining trend in hours worked per employee (see also Figure 2). Labour productivity measured as GDP per person employed enables a more direct link with the GDP per capita indicator. Further on in the report, labour productivity is expressed as GDP or value added per hour worked.

<sup>6</sup> An increase in GDP per capita can be achieved by higher productivity or a higher employment rate.

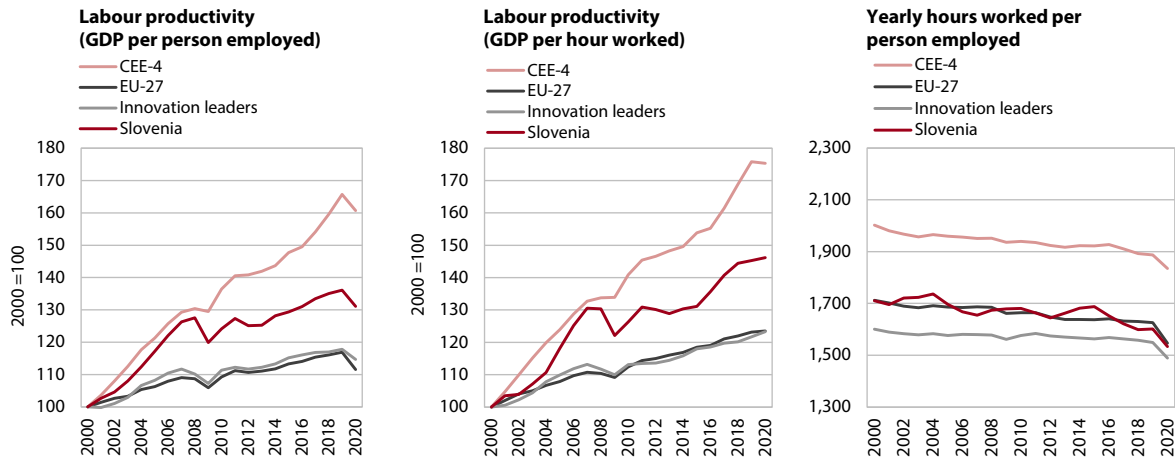
<sup>7</sup> For the definition of innovation leaders (SE, FI, DK, BE), see Section 4.2.1.

**Figure 2: The deceleration of productivity growth has also halted the closing of the productivity gap with the EU average in the last decade**



Source: Eurostat (2022); calculations by IMAD. GDP per capita and productivity (GDP per person employed) are expressed in purchasing power standards. The shadowed field shows the range between the EU Member States with the lowest and the highest indicator values, excluding Luxembourg and Ireland. For the definition of innovation leaders (SE, FI, DK, BE) see Section 4.2.1. CEE-4: CZ, HU, PL, SK.

**Figure 3: Large discrepancy between the two productivity indicators in 2020 and declining trend in the number of hours worked per person employed**

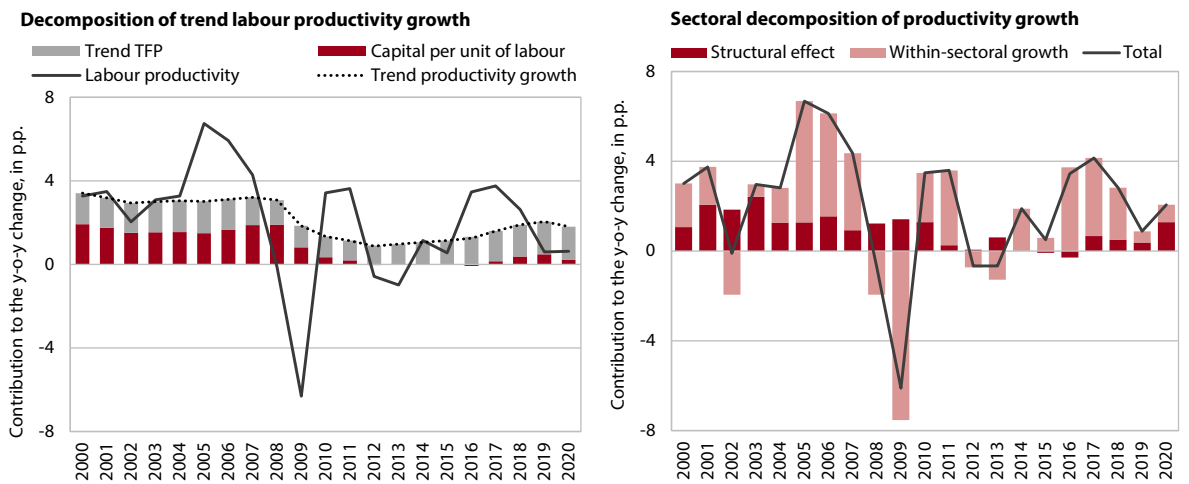


Source: Eurostat (2022); calculations by IMAD.  
Note: Labour productivity indices are expressed in constant prices. Innovation leaders: SE, FI, DK, BE; CEE-4: CZ, HU, PL, SK.

**The pre-pandemic decline in trend productivity growth has been mainly a result of modest capital deepening, the contribution of total factor productivity was also slightly smaller.** Labour productivity is driven by investment and efficiency of the use of inputs, which is reflected in total factor productivity (TFP). The contribution of capital deepening to trend productivity growth fell sharply during the global financial crisis and remained low even in years when the environment and the ability of companies to invest had already improved considerably. With the outbreak of the COVID-19 pandemic, which again created great uncertainty in the economy, investments, particularly from the business sector, initially fell sharply. Later in 2020, investments gradually recovered and exceeded pre-epidemic levels in early 2021. However, they are still below the levels forecast before the COVID-19 outbreak. The COVID-19 pandemic is affecting productivity growth in many ways (e.g. through human capital, investment, resource reallocation, frictions to global value chains, etc.)

and is likely to leave scars (D’Adamo et al., 2021). Along with cohesion policy funds, the emergency EU instrument for recovery and resilience could also help to alleviate these problems.<sup>8</sup> In addition to the intensity and efficiency of EU investment in smart and sustainable transformation, accelerating the growth of business investment is also crucial to address the consequences of the epidemic, accelerate productivity growth and increase resilience. So far, the COVID-19 crisis has on average had a much smaller impact on the business performance and the financial situation of companies than the global financial crisis, to which the previously high liquidity and profitability of companies as well as extensive government measures have made an important contribution.<sup>9</sup> The accelerated digital transformation, further stimulated by the COVID-19 crisis, could make a particularly positive contribution to productivity growth and TFP in particular.

**Figure 4: In the crisis year 2020, the modest capital deepening continued; the impact of structural changes on productivity growth was the highest in the last decade**



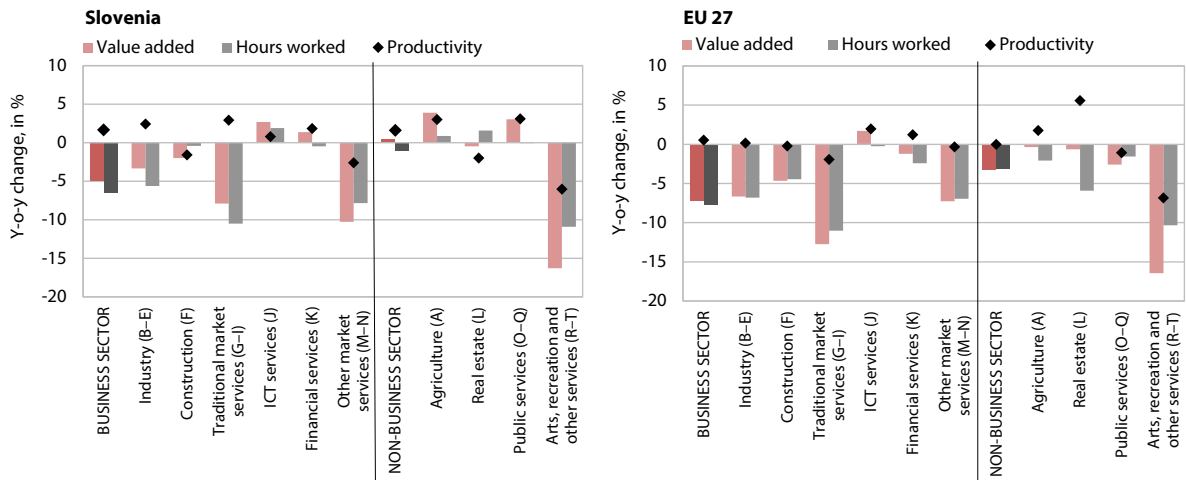
Sources: Eurostat (2022), SURS (2022); calculations by IMAD.  
Notes: Trend productivity growth is growth that is adjusted for the business cycle. It is defined as potential GDP relative to potential employment expressed in hours worked. Potential GDP is calculated using the production function method, while potential employment is employment under the assumption of normal utilisation. Sectoral decomposition of productivity growth (value added per hour worked) is based on annual data of the most detailed 64-level NACE classification. For more on the sector decomposition methodology, see IMAD (2019). The difference between productivity growth measured by GDP per hour worked and value added per hour worked, used in the sectoral decomposition, is the result of a sharp drop in net taxes on products, which contribute to GDP in addition to value added, in 2020.

**The impact of the COVID-19 crisis was highly asymmetrical, and, due to the nature of the crisis, those with lower levels of productivity were hit harder.** The sectors differ greatly in terms of productivity levels (value added per hour worked), mainly due to their different capital (or, conversely, labour) intensity. *Changes in the sectoral composition* of the economy towards the reallocation of workers to activities with higher levels and/or faster productivity growth can thus additionally foster aggregate productivity growth. This co-called structural contribution has been small over the last decade, as elsewhere in the EU. The COVID-19 crisis had a highly asymmetrical impact on activities and thus had the potential for greater structural impact. After more than a decade, the structural effect strengthened significantly again in 2020<sup>10</sup> and was the main driver of productivity growth. This was due to

<sup>8</sup> See Section 5.2.3.  
<sup>9</sup> See Section 3.3.  
<sup>10</sup> When Development Report 2021 was prepared (IMAD, 2021c), the data available did not yet suggest a noticeable structural impact. However, more detailed and revised SURS data show that this expected impact on productivity has materialised in 2020.

higher demand and a higher share of employment (measured in hours worked) in highly productive ICT services and, on the other hand, a decline in the share of some labour-intensive activities which were most heavily hit by the containment measures, i.e. accommodation and food service activities, recreation, and culture. The structural effect on productivity growth is most likely, at least in part, temporary. In the long run, however, productivity growth must be based on the exploitation of each sector’s growth potential,<sup>11</sup> which is reflected in the *within-sectoral contribution* to productivity growth. In 2020, the latter remained at the level of the 2009–2019 average (0.8 p.p.) and was mostly lower than in the previous decade (1.7 p.p on average in 2000–2008) also in cyclically favourable years of the last decade.

Figure 5: The impact of the COVID-19 crisis was highly asymmetric across activities in 2020

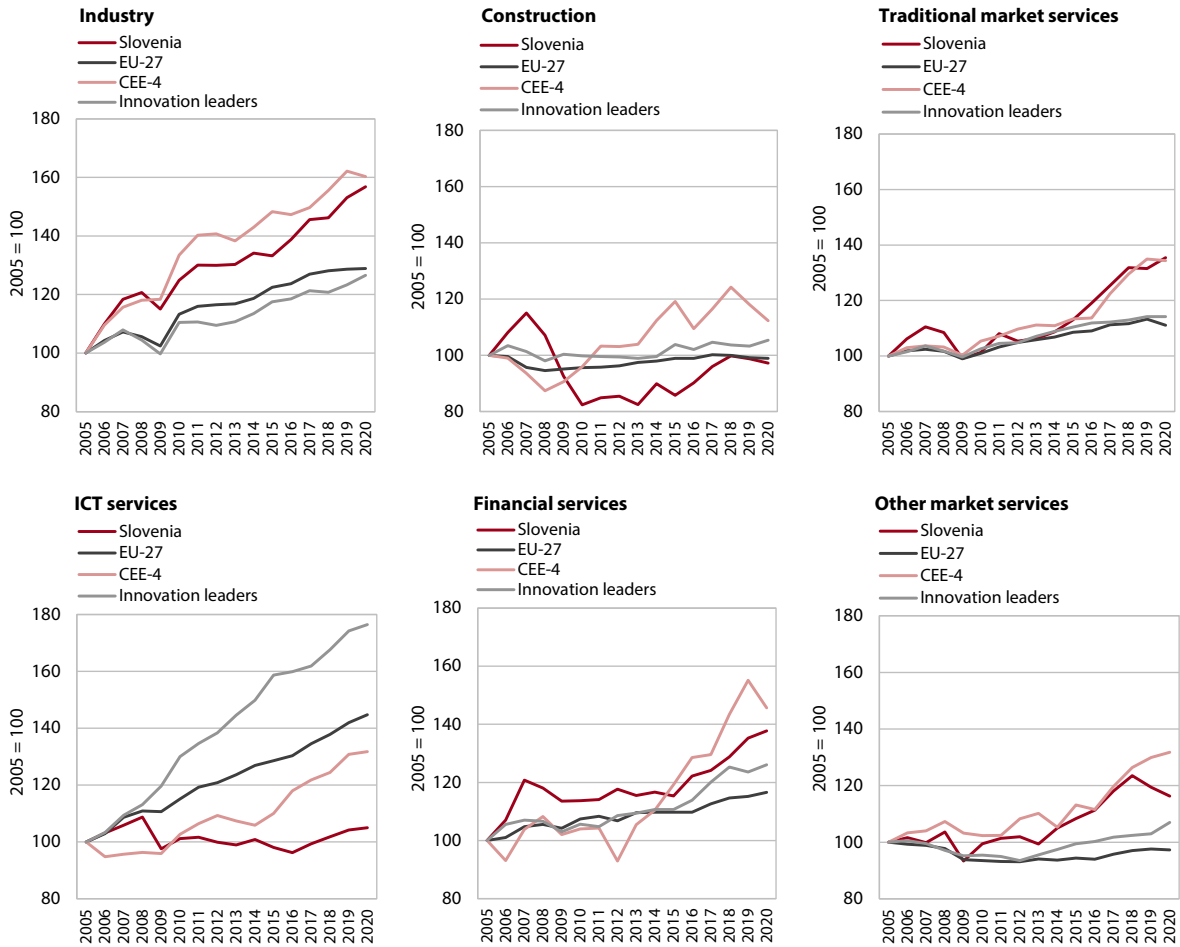


Source: Eurostat (2022); calculations by IMAD.

**With the exception of ICT services and construction, long-term trends in most business sector activities are relatively favourable but they should be accelerated in order to achieve a faster closing of the productivity gap.** Not only the level but also the rate of productivity growth varies greatly depending on the activity. Over the last decade, ICT services have had the fastest growth of productivity at the EU level, while the growth of these services in Slovenia has been relatively modest. ICT services is rather small sector that has limited direct impact on aggregate productivity; however, they have a greater indirect impact, as they enable the adoption of new technologies and processes to companies in various sectors, thus contributing positively to their productivity growth. The lack of progress towards the EU productivity average is also evident in the construction industry, whose potential in Slovenia declined significantly during the global financial crisis. The manufacturing sector increased its productivity relatively quickly in the past, partly due to increased robotisation and strong exposure to international competition.<sup>12</sup> Here Slovenia was relatively successful in narrowing the productivity gap with the EU average and the innovation leaders, especially in high-technology manufacturing industries, but indeed in industry in general – it achieved faster growth. The same is true for traditional market services (trade, transportation, and accommodation and food service activities) and, with the exception of a slight deterioration in the last two years, for other market services (professional, scientific and technical services and administrative and support service activities).

<sup>11</sup> Successful companies in terms of productivity growth exist in all sectors (see Section 4.1.), and a high level of productivity is also achieved by companies in sectors where productivity is generally lower (see IMAD, 2020a).  
<sup>12</sup> For more on the links between productivity, competitiveness and exports, see IMAD (2020a).

**Figure 6: Compared to productivity developments in EU Member States over the past decade, trends in Slovenia are less favourable only in construction and ICT services**



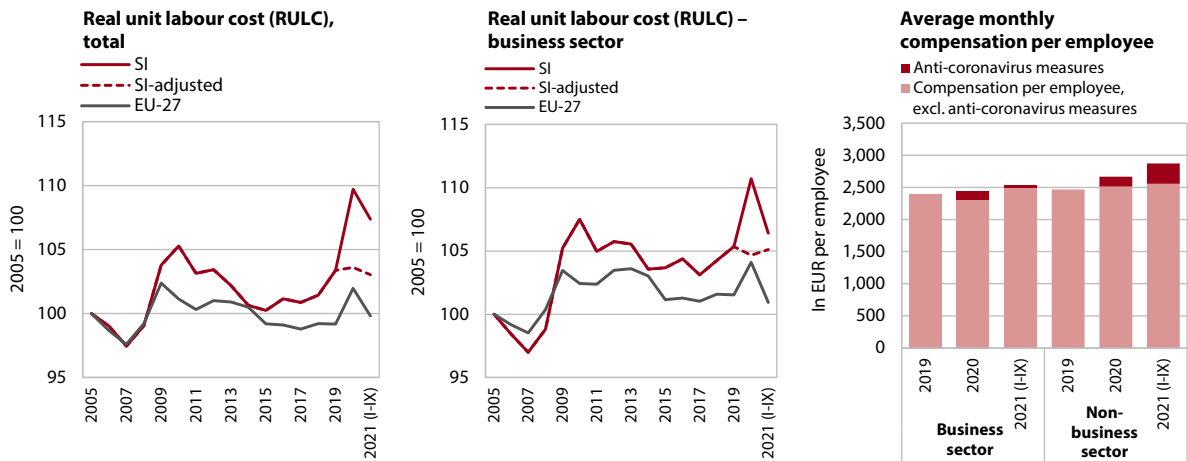
Source: Eurostat (2022); calculations by IMAD.  
Note: Figure shows change in real productivity (value added at constant prices per hour worked). Business sector includes **industry**: mining and quarrying (B), manufacturing (C), electricity supply (D), water supply, sewerage, waste management and remediation activities (E); **construction** (F); **traditional market services**: trade (G), transportation (H), accommodation and food service activities (I), **ICT or information and communication** (J); **financial services** (K); **other market services**: professional, scientific and technical activities (M), administrative and support service activities (N).

## 2.2 Competitiveness

The COVID-19 crisis has made monitoring cost-competitiveness indicators very difficult, but we estimate that the impact on export competitiveness has so far been less severe than in the previous crisis. Unit labour costs (ULCs) show the ratio between productivity and compensation of employees per employee (hereinafter simplified as wages). Productivity growth allows wages and/or profits to increase without jeopardising a company’s competitive position in the market. However, the disturbed balance between them can have longer-term consequences, as we saw in Slovenia during the global financial crisis (see IMAD (2019) and (2020a)). The first year of the COVID-19 crisis was different in this respect. The impact on productivity was lower and high wage growth (in sense of economic circumstances, international comparisons and the past crisis) was supported by extensive government measures. According to our estimates, the 3.5% increase in nominal wages or compensation of employees per employee in 2020 was borne entirely by the state budget, while

the actual labour costs of enterprises fell largely in line with the decline in value added. The adjusted ULCs, where budget expenditures are not taken into account and thus better reflect the actual cost pressures faced by businesses, remained at the (high) level of the previous year in 2020, while statistically this indicator increased by 6.1% (overall) and 5.1% (business sector) in 2020. Since measures to retain jobs and workers' incomes vary across countries both in scope and orientation, the comparison of statistical ULC statistical measures and consequently real effective exchange rates deflated by ULC (REER\_ulc) is very limited, especially for 2020, and does not reflect the change in the cost-competitiveness of exporters.

**Figure 7: Last year's increase in labour costs burdened the state budget, not employers**



Sources: SURS (2022), MF (2021), ESS (2021a), FURS (2021); calculations by IMAD.  
Note: The adjusted RULCs exclude the part financed by the state budget and not by employers under the anti-coronavirus measures (subsidy for part-time work, temporary layoff, payment of pension and disability insurance contributions for employees who worked, payment of social contributions for temporarily laid-off employees, quarantine, allowances for work with COVID-19 patients, allowances for work in hazardous conditions, crisis allowances (Dec. 2020 and Jan. 2021), subsidised part of the minimum wage, and certain other minor expenses).

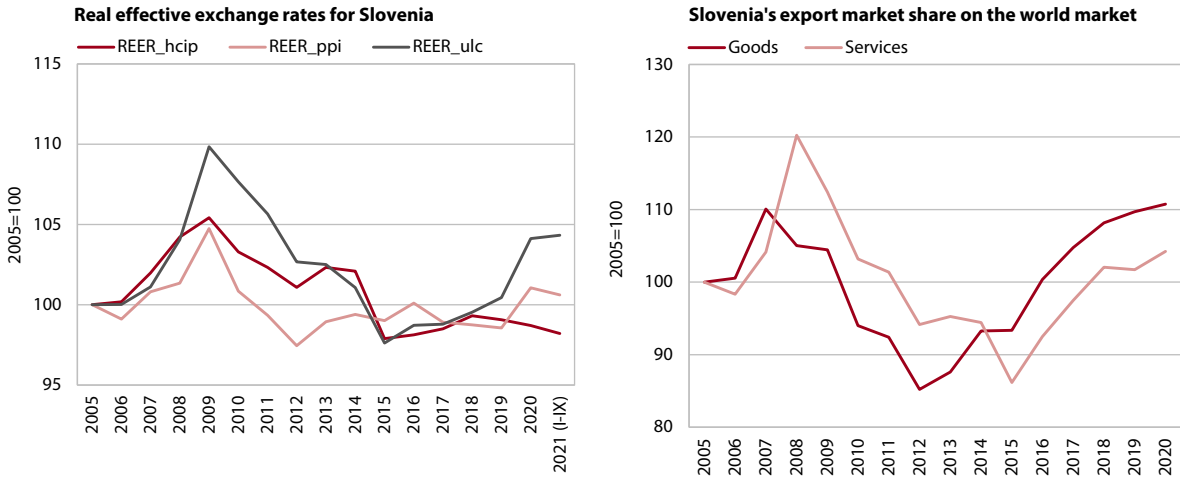
**However, there are signs of pressures on competitiveness in 2021.** In the first three quarters of 2021, expenditure on anti-coronavirus measures affecting compensation of employees remained high, but it was much more concentrated in the public sector. Subsidies to the business, market-oriented part of the economy were lower than in 2020. With wage growth no longer as strongly supported by budget expenditure, the adjusted unit labour costs of the business sector did not fall despite the strong (temporary) increase in productivity – they were close to their high pre-epidemic levels. The increase in cost pressure was also caused by the sharp rise in prices of metals and other raw materials and energy<sup>13</sup> on the global markets since the end of 2020 (see also Section 5.3 and Figure 60). Cost pressures were reflected in industrial producer prices, which were almost a tenth higher on average in September 2021 than in December 2020 in manufacturing and 25% higher in the manufacture of metals and fabricated metal products. Despite the stabilisation of the euro against a basket of currencies,<sup>14</sup> the real effective exchange rate, deflated

<sup>13</sup> Slovenia has a relatively strong industrial base of metal-related activities, which are strongly influenced by rising energy prices in addition to rising metal prices. The manufacture of metals and fabricated metal products alone accounts for 4.5% of total value added (2% in the EU), and metal products are also an important input material in a number of other activities that are strongly represented in Slovenia (e.g. the automotive sector). This partly explains the above-average share of metal imports, which has accounted for 3% to 3.5% of total imports in recent years (the EU average is around 1%).

<sup>14</sup> Having appreciated against a basket of currencies in the early stages of the global spread of the COVID-19 epidemic, the euro remained relatively stable or started to depreciate slightly throughout the rest of 2020 and in the first three quarters of 2021, so it did not have a significant impact on the competitiveness of Slovenian exporters.

by the industrial producer price index (REER ppi), was at its highest level in the last decade. Inflation, which had been low for several years, also started to rise, but is still lower than that of Slovenia's trading partners, which has kept the real effective exchange rate deflated by inflation (REER hicp) at a favourable level.

**Figure 8: In the first year of the COVID-19 crisis, there were no significant signs of a deterioration in competitiveness, but recently cost pressures have increased**



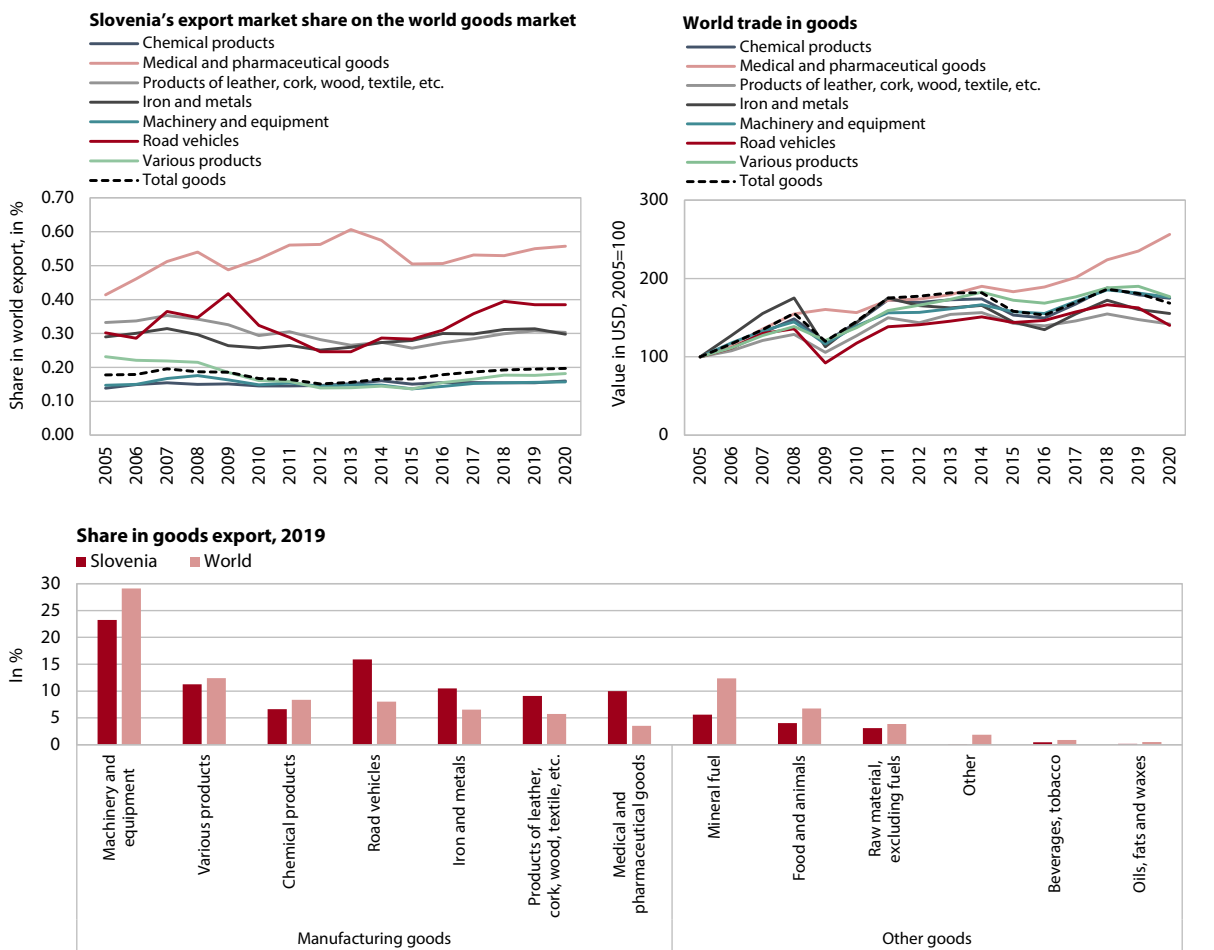
Sources: ECB (2022), UN Comtrade (2022), UNCTAD (2021), OECD (2021b); calculations by IMAD.  
Note: The Slovenian market share is calculated as the ratio between Slovenian exports and world exports. Slovenian exports of goods do not include exports of pharmaceuticals to Switzerland as a proxy for strongly increased re-exports of pharmaceuticals, which do not reflect the change of competitiveness, have an insignificant impact on economic activity and are excluded from the national accounts export statistics.

**Slovenia's export market share increased by 1% in the world goods market and by 0.7% in the EU market in 2020.**

**Despite a sharp decline in the initial phase of the COVID-19 pandemic, Slovenia's export market share in the world goods market increased slightly on average in 2020.** In the initial phase of the COVID-19 pandemic, which led to a sharp decline in global trade some of Slovenia's major trading partners (e.g. Italy and France) and product groups (e.g. cars) were among the hardest hit. This negative structural effect on Slovenia's total market share was mitigated, however, by a high export share of pharmaceuticals, with strong growth in demand during the coronavirus crisis. Despite the renewed deterioration of the epidemic situation, the rest of 2020 saw a marked upswing in global exports and even more so in Slovenian exports. The value of both in the last quarter was already above the pre-epidemic level. According to initial estimates, Slovenia's export market share thus increased by 1% in the world goods market and by 0.7% in the EU market in 2020.



**Figure 9: In the crisis year 2020, pharmaceutical products were the driver for growth in Slovenia's export market share on the world goods market**



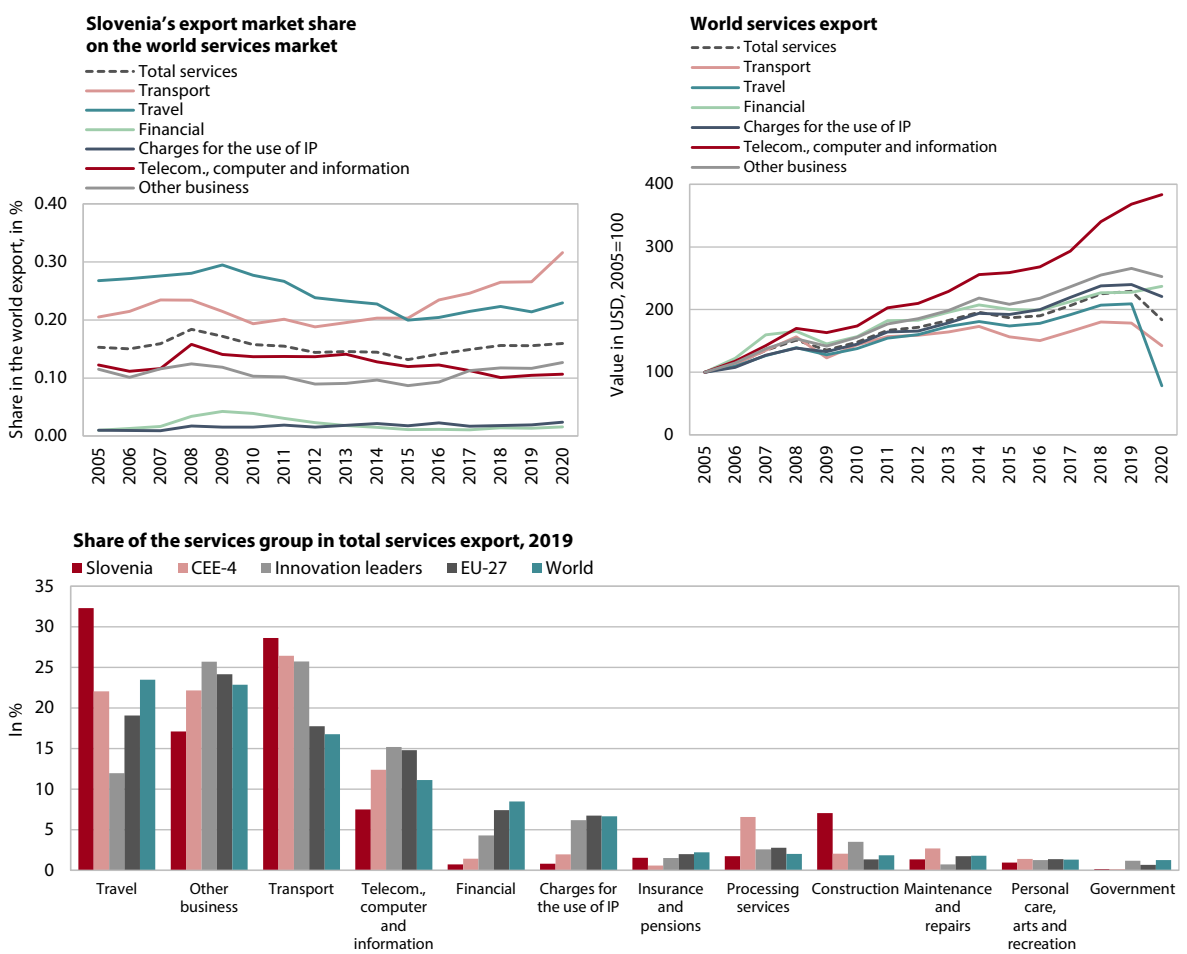
Sources: UN Comtrade (2022), UNCTAD (2021); calculations by IMAD.

Note: World trade in goods reflects the dynamics of world goods exports. Globally, world exports are roughly comparable to world imports. The market share is calculated as the ratio between Slovenian exports and world exports of the same group of goods. Slovenian exports of goods do not include exports of pharmaceuticals to Switzerland as a proxy for re-exports of pharmaceuticals, which do not reflect a change of competitiveness, have an insignificant impact on economic activity and are excluded from the national accounts data on exports.

**Slovenia's most important services export groups (travel and transportation) were severely affected by the COVID-19 crisis.** The pandemic has had an even more uneven impact on world trade in services, affecting it on average more than trade in goods. At the beginning of 2021, the value of global services exports was still more than a tenth lower than before the crisis, and the return to pre-epidemic levels is likely to take longer, at least in certain segments. Containment measures (as well as self-limiting behaviour) had the greatest impact on the reduction in travel. According to the World Trade Organisation, the dollar value of global trade in travel fell by a massive 63% in 2020 (Slovenian exports by 60%), followed by transportation services with a drop of more than 20% (Slovenian exports by 5%). These two groups of services trade account for more than 60% of Slovenia's services exports (the world average is 40%). On the other hand, Slovenia has relatively low export shares in some groups of services where global trade increased in 2020, for example telecommunications, computer and information (ICT) services and financial services. From the perspective of foreign demand, Slovenia's export specialisation was thus extremely unfavourable.



**Figure 10: Slovenian services exports are mainly concentrated in the slower-growing services markets, which were also the hardest hit by the COVID-19 pandemic**



Sources: OECD (2021b), WTO (2022); calculations by IMAD.  
Note: World trade in services reflects the dynamics of world services exports. Globally, world exports are roughly comparable to world imports. The Slovenian market share is calculated as the ratio between Slovenian exports and world exports of the same group of services.

**Also in the last 15 years, world trade in service groups, where Slovenia has a competitive advantage, has been among the slowest growing.** Globally, the fastest growth since 2005 was recorded in trade in knowledge-intensive services. The nominal value of exports of ICT services increased almost four-fold and that of other business services, including R&D, professional and management consultancy activities and technical trade-related services, by more than two and a half times. Followed by compensation for the use of intellectual property and financial services among the larger groups of services. The smallest increase in the value of global trade in services since 2005 was recorded in transportation and travel, two groups in which Slovenia, together with construction, has the highest revealed comparative advantage and market shares. The orientation on these slower-growing services markets limited the growth of Slovenia's overall service export market share, which remains at a similar level to 15 years ago, with occasional fluctuations.<sup>15</sup> In industry, Slovenia is increasingly moving from labour-intensive and low-technology

<sup>15</sup> For comparison, Slovenia's export market share on the world goods market increased by more than a tenth to 0.2% in 2005–2019, which is higher than its share on the world services market (0.16%).

■ *Slovenia has been less competitive in knowledge-intensive services, including ICT, where high market shares and productivity gains are mainly achieved by the innovation leaders, while the Visegrad countries are also waking up.*

products to high-technology products, which is confirmed by a relatively favourable development of productivity in addition to the increasing market share. The Slovenian service sector, on the other hand, relies heavily on traditional market services, which could to some extent be the consequence of Slovenia's favourable geographical position. So far, Slovenia has been less competitive in knowledge-intensive services, including ICT. High market shares and productivity gains here, for example, are mainly achieved by the innovation leaders, while the Visegrad countries, which like Slovenia traditionally have a stronger industrial base, are also waking up.

## 3 Productivity and business performance

### 3.1 High-growth enterprises in terms of productivity

#### 3.1.1 The top 5% of the best performing enterprises<sup>16</sup>

The analysis was carried out using the consolidated AJPES data, i.e. a sample of 7,153 or 10.6% of enterprises, which together represent 57% of the total value added and 55% of the employees of all enterprises for which data are available. The most successful enterprises included 5% of firms with the highest growth in nominal productivity, separated by absolute and relative productivity growth<sup>17</sup> between the averages of 2017–2019 and 2014–2016. For a more detailed description of the methodology, see Appendix 1.

**Of the enterprises with the fastest productivity growth, 99% come from the group of SMEs, of which 43% are micro, 49% are small and 7% are medium-sized enterprises, with smaller enterprises also showing higher productivity growth.** According to the defined methodology, in order to be ranked among the 5% of the fastest growing enterprises in Slovenia, the enterprise's productivity had to increase either in absolute terms by at least EUR 22,760 or on average by about EUR 7,600 per year or in relative terms by at least 61% during the period analysed. 5% of companies that achieved productivity growth under one or the other criterion during the period analysed amounts to 241 companies under each criterion, while 122 companies met both criteria, making a total of 360 companies on the list of fastest-growing companies. Of these, 99% are SMEs, of which 43% are micro-enterprises, 49% are small and 7% are medium-sized enterprises, which is 1.2 p.p. more than the share of SMEs in the total sample analysed. 3 large and 24 medium-sized enterprises were among those with the best productivity scores. In terms of relative productivity growth, micro and small enterprises increased their productivity by an average of 102% and 92% respectively, while medium-sized and large enterprises increased their productivity by an average of 86% and 70% respectively. The same applies to the absolute productivity growth, which, for example, increased by an average of EUR 39,981 in micro enterprises, EUR 34,603 in small enterprises, EUR 32,101 in medium-sized enterprises and EUR 32,838 in large enterprises.<sup>18</sup>

<sup>16</sup> For a more detailed analysis, see Appendix 1.

<sup>17</sup> Labour productivity, i.e. value added per employee (AOP 188), where value added is calculated as gross operating yield (AOP 126), minus costs of goods, material and services (AOP 128), minus other operating expenses (AOP 148).

<sup>18</sup> These changes refer to the inclusion of enterprises according to the absolute or the relative criterion separately. If we consider the included enterprises according to both criteria at the same time, the absolute productivity of large enterprises has increased more than that of small and micro enterprises and that of medium-sized enterprises the least.

Table 1: Structure of high-growth companies by size

Indicator	Micro	Small	Medium-sized	Large	Total	N
Number of high-growth enterprises	156	177	24	3	360	
Size structure of high-growth enterprises	43.3%	49.2%	6.7%	0.8%	100%	
Number of all enterprises in the sample (for 2019)	2858	3343	803	149	7153	
Size structure of all enterprises in the sample	40.0%	46.7%	11.2%	2.1%	100%	
Share of high-growth enterprises	5.5%	5.3%	3.0%	2.0%	5.0%	
Average absolute increase in productivity according to the absolute criteria (in EUR)	39,981	34,603	32,101	32,838	36,681	241
Average relative increase in productivity according to the relative criteria	102%	92%	86%	70%	96%	241
Average absolute increase in productivity of all included enterprises (in EUR)	31,476	28,254	27,429	32,838	29,634	360
Average relative increase of turnover of all included enterprises	83%	75%	69%	53%	78%	360

Source: AJPES (n.d.-b); calculations by IMAD.

**The fastest-growing enterprises in terms of productivity are active in all sectors, suggesting that company-level (rather than sector-level) factors play a key role, although the share of high-growth companies in the high-technology sector appears relatively low at 9%.** The sectors with the highest share of enterprises among the fastest growing enterprises in terms of productivity are trade (29% of enterprises<sup>19</sup>) and manufacturing (20% of enterprises<sup>20</sup>). This group is followed by construction (13%<sup>21</sup>), professional, scientific and technical activities (11% of companies<sup>22</sup>), and transportation and storage (10%<sup>23</sup>). In the group with the largest relative productivity growth, human health and social work activities (an increase of 175%<sup>24</sup>) stand out, followed by administrative and support service activities<sup>25</sup>, accommodation and food service activities,<sup>26</sup> and professional, scientific and technical activities<sup>27</sup>. The latter stand out with the largest absolute productivity growth, as productivity in this group increased by almost EUR 43,000 or 15% more than the average of the high-growth enterprises. On the other hand, the share of high-growth companies operating in high-technology sectors<sup>28</sup> appears to be relatively low, at 9.2%, with a higher than average probability of being included in the list of fastest-growing companies in terms of productivity across the sample.<sup>29</sup>

<sup>19</sup> Within trade, wholesale trade has the highest share (with 21% of companies) with a growth rate that is about average.

<sup>20</sup> Within manufacturing, the manufacture of fabricated metal products (4%), the manufacture, repair and installation of machinery and equipment (4%), and the more traditional manufacture of products of wood (3%) stand out in terms of the share of enterprises. However, their productivity growth is at the same time around average, while in relative terms the more traditional manufacture of non-metallic mineral products on the one hand and the more technologically sophisticated manufacture of computers, electronic and optical products on the other stand out.

<sup>21</sup> Within the construction industry, most dynamic enterprises are engaged in specialised construction activities (9%), but in the group of most successful enterprises they achieve below-average results.

<sup>22</sup> Within professional, scientific and technical activities, most enterprises are engaged in architecture and engineering activities (6%), advertising and market research (3%), and scientific research and development (1%), all of which achieve significantly above-average productivity growth.

<sup>23</sup> Within this sector, 5% of companies are engaged in land transport and 4% in storage and related transport activities.

<sup>24</sup> However, only two such enterprises are active in this area, with an average of 8 employees.

<sup>25</sup> 130% increase, mainly due to the rental and leasing activities.

<sup>26</sup> 115% increase realised by 11 companies with an average of 15 employees. This suggests that, despite the low average productivity of the participating accommodation and food service companies (53% of the average of the companies included in the sample), these companies nevertheless contribute to accelerating productivity growth and are therefore also relevant from an economic policy perspective.

<sup>27</sup> 114% productivity growth generated by 27 companies, with an average of 19 employees.

<sup>28</sup> Their definition is based on the Eurostat classification, which defines sections 21 and 26 as high-technology and sections 59–63 and 72 as high-technology knowledge-intensive services within manufacturing.

<sup>29</sup> The share of high-technology companies in the total sample is 6.6%.

Within this framework, most companies are active in the information and communication sector, where 7% of the companies are among the fast-growing companies but only achieve average growth in the group of fastest-growing companies (both absolute and relative growth<sup>30</sup>). The agriculture, forestry and fishing sector is the only one with no companies among the fastest growing.

Table 2: Structure of 5% of the fastest growing enterprises in terms of productivity and 25% of the fastest growing large enterprises by the level of activity categories based on NACE classification<sup>31</sup>

NACE Rev. 1	Name	5% of all enterprises		25% of large enterprises	
		No.	%	No.	%
2	Mining	1	0.3%		
3	Manufacturing	72	20.0%	16	53.3%
5	Water supply, sewerage, waste management and remediation activities	4	1.1%	1	3.3%
6	Construction	47	13.1%	3	10%
7	Wholesale and retail trade; repair of motor vehicles and motor cycles	104	28.9%	5	16.7%
8	Transportation and storage	36	10%	1	3.3%
9	Accommodation and food service activities	12	3.3%	1	3.3%
10	Information and communication activities	25	6.9%	1	3.3%
13	Professional, scientific and technical activities	41	11.4%		
14	Administrative and support service activities	8	2.2%	2	6.7%
16	Health and social work	5	1.4%		
17	Arts, entertainment and recreation	4	1.1%		
18	Other activities	1	0.3%		
	Total	360	100%	30	100%

Source: AJPES (n.d.-b); calculations by IMAD.

The share of labour costs in value added is 50%, which is 21 p.p. lower than for all companies in the sample.

The fastest growing enterprises in terms of productivity are located in all statistical regions of Slovenia: almost half of them are located in the Osrednjeslovenska region, and the region with the highest share of the fastest-growing enterprises among all enterprises is the Primorsko-Notranjska region. The most fast-growing enterprises, 48%, are located in the Osrednjeslovenska region, followed by Podravska, Gorenjska and Savinjska (with 11%, 9% and 8% of all enterprises respectively). However, a comparison of the share of fast-growing enterprises in relation to all enterprises in the region shows<sup>32</sup> that most of them are found in the Primorsko-Notranjska region (8%), followed by the Osrednjeslovenska, Jugovzhodna Slovenija and Obalno-Kraška regions (7%, 6% and 5% respectively). In absolute terms, productivity increased most on average by enterprises in the Osrednjeslovenska, Obalno-Kraška and Gorenjska regions, and in relative terms by enterprises in the Zasavska, Goriška and Obalno-Kraška regions. On the other hand, the share of fast-growing enterprises in terms of productivity is lowest among enterprises in the Posavska (1%), Goriška, Zasavska, Pomurska and Koroška regions (3% in each). Fast-growing enterprises from the Podravska, Koroška and Posavska regions belonged to the group with a relatively low increase in both absolute and relative productivity compared to fast-growing enterprises from other regions.

<sup>30</sup> This also applies to computer programming, consultancy and related activities, whose absolute and relative growth lag behind the average of the group of the most successful enterprises (by 6% and 4% respectively). In telecommunications, only one microenterprise is among the fastest growing in terms of productivity.

<sup>31</sup> For a more detailed classification, see Section 7.1.2.

<sup>32</sup> For an overview table, see the next subsection.

**High-growth enterprises in terms of productivity are more profitable, their profitability increases faster, they invest more, they have 23% higher wages on average<sup>33</sup> and they also increase their wages twice faster than the entire sample of companies and are above-average employers.** As regards the business performance of the fastest-growing companies in terms of labour productivity, they are twice as capital-intensive than the sample overall and made more capital investments between 2014 and 2019. This is reflected in significantly higher profitability, which, in contrast to all companies where profitability stagnated, also increased significantly between 2014 and 2019. The share of labour costs in value added is 50%, which is 21 p.p. lower than for all companies in the sample, with the fastest-growing companies, in contrast to companies overall, showing a sharp decline between 2014 and 2018. This does not burden wages, which are not only higher in the fastest-growing companies (by 23% on average), but have actually risen twice as fast as in companies in the sample overall between 2014 and 2019. At the same time, the number of employees among the fastest growing companies in terms of productivity increased by two-thirds on average. In terms of the share of exports in revenues, both extremes can be found, i.e. no export orientation or total export orientation, while at the same time the fastest growing companies are on average more export-oriented in terms of productivity and increase their export orientation extremely quickly.

**Table 3: Business performance of 5% of the fastest growing companies in terms of productivity and 25% of the large companies in the total sample of companies**

Indicator	Total sample of companies	5% of the fastest-growing	25% of large enterprises
Return on revenue (2019)	4.3%	9.4%	8.6%
Labour costs per employee (2019)	26,849	33,088	30,695
Assets to labour ratio (2019)	119,473	240,941	188,792
Share of labour costs in value added (2018)	71%	50%	57%
Share of exports in revenue (2019)	23%	34%	48%
Growth of return on revenue (2014–2019)	0.1 p.p.	5.9 p.p.	5.7 p.p.
Growth of average number of employees (2014–2019)	44%	67%	36%
Growth of labour costs per employee (2014–2019)	17%	36%	19%
Growth of assets to labour ratio (2014–2019)	-12%	21%	5%
Growth of the share of labour costs in value added (2014–2018)	0 p.p.	-33 p.p.	-9 p.p.
Growth of the share of exports in revenue (2014–2019)	3 p.p.	6 p.p.	2 p.p.

Source: AJPES (n.d.-b); calculations by IMAD.  
Note: For a definition of indicators, see (Povšnar et al., 2020). Labour costs in value added increased sharply in 2019, which is difficult to explain, so 2018 is taken as the final year, which is in line with the time series.

**Successful companies with high productivity growth can be found in all market, often niche segments, from high-technology to service and manufacturing activities that produce end and intermediate products.** Based on a qualitative analysis of the fastest growing companies in terms of productivity, it can be assumed that they include many niche and thus more specialised companies, often in areas where Slovenia is comparatively more competitive (e.g. production and processing of metals). In the manufacturing sector, the fast-growing companies offer both end and intermediate products, so this does not seem to be a decisive factor of growth. Within high-technology activities, many companies are active in the field of electronics, programming and automation and IT-related, for example in the field of telecommunication solutions and deployment of broadband networks in rural areas, payment processing, internet marketing, production of electronic gaming

<sup>33</sup> Calculated as labour costs (AOP 139) per employee (AOP 188).

machines or electromobility control systems. There are only a few start-ups in this segment. However, there are also a number of breakthrough companies in this segment in other areas that are not considered technologically sophisticated, which is not necessarily true of certain companies. Among the fastest growing companies in terms of productivity, we also find successful companies in health and medicine (both on the production and service side), production of construction materials or buildings, furniture, tourism, and niche companies in less typical segments of otherwise dynamic sectors, such as the manufacture of flavourings and food ingredients in the chemicals and chemical products sector or the manufacture of weapons. In the service sector, more specialised companies also seem to be slightly more represented, for example in transportation and storage, architectural and engineering activities, and areas that involve a certain public-private dimension, for example in education (e.g. when it comes to IT solutions for schools) or in medicine (e.g. in rehabilitation). Of course, among the dynamic enterprises in terms of productivity growth, there are also a number of enterprises whose performance is based on normal market fluctuations (e.g. in the field of trade) or have high growth for example for being part of multinational companies. There are also examples of companies that are more dependent on the dynamics of the domestic economy and/or economic policy, for example capital-intensive construction companies (e.g. asphalt plants).

### 3.1.2

### The fastest growing large enterprises

Considering that, according to AJPES, large enterprises generate over 43% of added value and only three large enterprises rank among the 5% fastest growing enterprises in terms of productivity, an additional 25% of the most successful large enterprises attaining productivity growth have been analysed.<sup>34</sup> A total of 30 enterprises meet the criteria and, to be included on the list, they had to have increased their productivity by at least EUR 6,841 in absolute terms or by at least 18% in relative terms in the period 2017–2019 compared to 2014–2016, with an average productivity increase of EUR 13,302 in absolute terms and 30% in relative terms for this group. While the lower limits are set relatively low, they are above the target average annual increase in productivity, both absolute and relative, in line with the Slovenian Industrial Strategy 2021–2030 (Government of the Republic of Slovenia, 2021b).

**While more than half of dynamic large enterprises are involved in manufacturing, there are no export-oriented knowledge-based large service companies in this group.** According to the sectoral structure, more than half of all enterprises (53%) come from manufacturing, followed by trade (17%) and construction (10%). At a more detailed divisional level, the fastest-growing large enterprises are much more dispersed by sector in terms of productivity, with up to two firms in all other divisions, except for trade (with 4 active enterprises) (see Section 7.1.2). At the same time, there is a noticeable absence of large export-oriented knowledge-based service companies.

<sup>34</sup> A total of 25% enterprises that have achieved productivity *growth* during the period considered were ranked among the fastest-growing large enterprises in terms of productivity; however, this is not the case for all enterprises from the sample, so the final share of fast-growing large enterprises amounts to 20%. The fact that, in the group of large enterprises, 20 out of 30 enterprises simultaneously met both the absolute and relative criteria also contributed to a lower share in the overall sample.

The Savinjska and Posavska regions are over-represented in the group of the 25% best performing large enterprises, compared to the regional coverage of 5% of the best performing enterprises, while there are no large dynamic enterprises in the Koroška, Primorsko-Notranjska, Zasavska or Obalno-Kraška regions. In terms of regional coverage (see Figure 4), the Osrednjeslovenska region, with its 47%, has a comparable share of the most dynamic large enterprises, and the same goes for the 5% of the best performing enterprises. In the case of large companies, it is followed by the Savinjska region, with 13% of enterprises, and the Podravska and Gorenjska regions, with 10% each. Taking into account the territorial distribution of large enterprises, the Posavska region has the highest share of fast-growing enterprises in terms of productivity in the region, followed by the Osrednjeslovenska and Jugovzhodna Slovenija regions, while the Podravska and Savinjska regions have a similar share. In absolute terms, large enterprises from the Osrednjeslovenska and Gorenjska regions have increased their productivity the most compared to the national average, while in relative terms, large enterprises from the Savinjska region stand out. No large fast-growing enterprises in terms of productivity are to be found in the Koroška, Primorsko-Notranjska, Zasavska or Obalno-Kraška regions.

Table 4: Structure of the 5% most dynamic enterprises and 25% most dynamic large enterprises by statistical region

# Region number	Region	5% of all enterprises			25% of large enterprises		
		No.	% of all enterprises	% of enterprises in the region	No.	% of all enterprises	% of enterprises in the region
1	Pomurska	7	2%	3%	1	3%	14%
2	Podravska	41	11%	4%	3	10%	21%
3	Koroška	6	2%	3%			
4	Savinjska	29	8%	4%	4	13%	21%
5	Zasavska	3	1%	3%			
6	Posavska	2	1%	1%	2	7%	50%
7	Jugovzhodna Slovenija	26	7%	6%	2	7%	22%
8	Osrednjeslovenska	172	48%	7%	14	47%	24%
9	Gorenjska	31	9%	4%	3	10%	16%
10	Primorsko-Notranjska	12	3%	8%			
11	Goriška	10	3%	3%	1	3%	11%
12	Obalno-Kraška	21	6%	5%			
	Total	360	100%	5%	30	100%	20%

Source: data from AJPEŠ (n.d.-b); calculations by IMAD.

Large fast-growing enterprises in terms of productivity are under both domestic and foreign ownership, more end-product oriented and more profitable, while making fewer capital investments than the 5% of the best performing enterprises. Similarly to the 5% fastest growing enterprises in terms of productivity, the most performant large enterprises are twice as profitable as other companies in the sample, and they are also increasing profitability as fast as the 5% fastest growing enterprises (see Table 3). Compared to all the enterprises in the sample, they are significantly more capital intensive (by 58%), but at the same time less capital intensive than the 5% fastest growing enterprises (by 22%), while also increasing capital adequacy at a slower rate than the 5% fastest growing enterprises. While salaries<sup>35</sup> are higher compared to the overall sample, they are increasing with the same dynamic as in other enterprises, and employment is increasing at a slower rate but has a higher starting point. Labour costs in the value added amount to

<sup>35</sup> For definition, see previous subsection.



57%, which is significantly less than the overall sample, with the share continuing to decline, though at a slower rate than that of the 5% fastest growing enterprises. Half of the 25% fastest growing large enterprises are foreign-market-oriented and half are domestic-market-oriented,<sup>36</sup> but overall, they are predominantly end-product-oriented. In terms of ownership structure, the fastest-growing large enterprises in terms of productivity are under both domestic and foreign ownership, with the latter slightly dominating.

## 3.2 Impact of COVID-19 on the financial situation of companies based on the estimate of the potential scale of bankruptcies

### 3.2.1 Financial situation of the corporate sector

**In the year of the outbreak of the COVID-19 epidemic, most indebtedness and liquidity indicators improved further with the help of government measures, but the profitability of the corporate sector declined sharply.** According to the majority of indicators, indebtedness and over-indebtedness<sup>37</sup> reached their peak in 2009, then declined until 2016, and in the last years before the epidemic, total corporate debt<sup>38</sup> increased slightly again, while bank debt has been declining steadily. In 2020, the majority of indebtedness indicators dropped again, in our estimation also due to the extensive government measures to mitigate the effects of the epidemic.<sup>39</sup> Total and financial debts thus remained below the 2007 level and bank debt below the 2005 level (Figure 11). According to the majority of indicators, the ability of companies to repay their debts has also improved further, with most of them reaching the best values throughout the observed period (since 2006).<sup>40</sup> In 2020, however, over-indebtedness increased slightly for the first time since 2009 (when it also peaked), though it still remained close to its lowest level throughout the observed period (Figure 12). In 2020, the liquidity of the corporate sector also strengthened according to all indicators and reached the most favourable values throughout the entire observed period. However, profitability indicators have fallen significantly in the face of the crisis (Figure 11).

<sup>36</sup> The threshold for foreign/domestic market orientation was set at 50% of the share of net turnover from foreign sales in total net turnover.

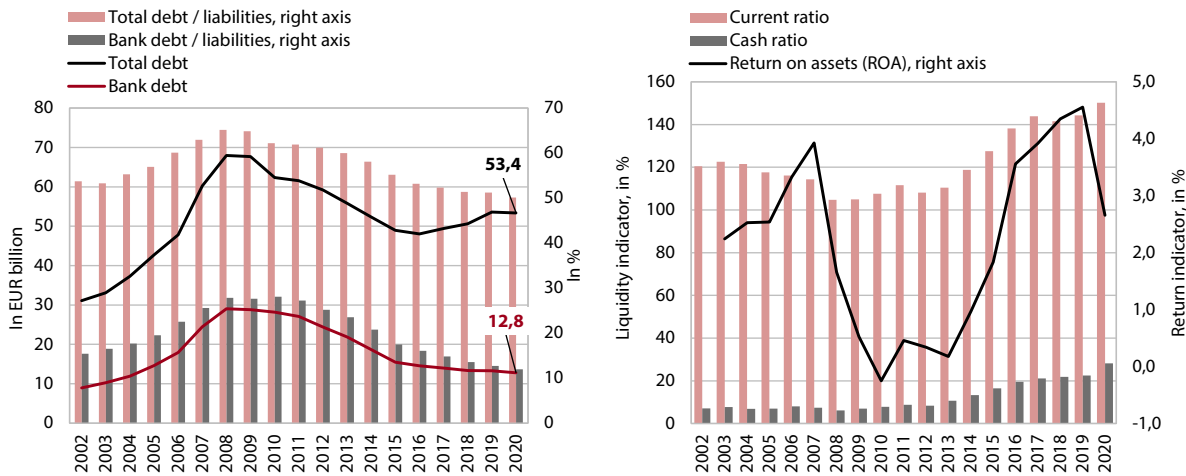
<sup>37</sup> Over-indebtedness is calculated as the sum of net financial debts (i.e. financial debt excluding cash), exceeding EBITDA by a factor of five (if  $FL \geq 5$ ) or as the sum of the total net financial debt (if  $EBITDA < 0$ ). EBITDA (Earnings Before Interest, Taxes, Depreciation and Amortisation) is free cash flow from operating activities (earnings before interest, taxes, depreciation and amortisation). FL – financial leverage (i.e. net financial debt/EBITDA).

<sup>38</sup> Total debt comprises financial (including bank), operational and other liabilities of companies.

<sup>39</sup> For an overview of liquidity measures, see Lušina and Tavčar (2021). Even before the outbreak, companies had good liquidity and profitability, and during the epidemic, their liquidity was further strengthened by various measures. They have also been reluctant to invest due to high economic uncertainty.

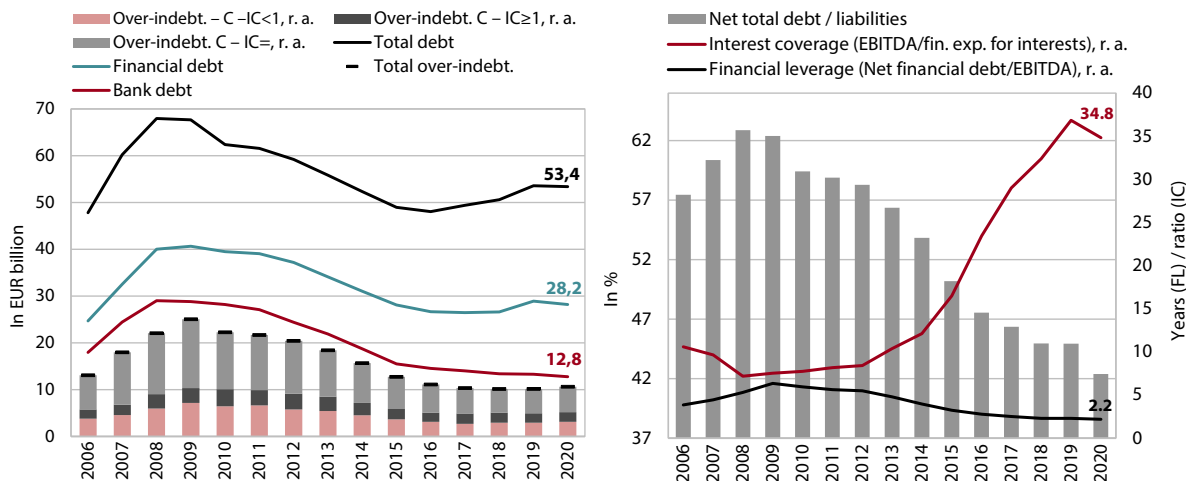
<sup>40</sup> The indicators for total debt and bank debt in liabilities reached the most favourable values throughout the entire observed period (since 2002; Figure 11). Before the epidemic, the ability to repay debts was first improving, mainly due to deleveraging, and in the last period before the epidemic, when indebtedness was already increasing according to some indicators, due to the improvement of business effects (EBITDA, which has been increasing on average since 2010, but more markedly in the last six years before the epidemic. With the epidemic, it fell by around 6%).

Figure 11: In the crisis year 2020, indebtedness and liquidity improved further, while profitability fell significantly



Source: AJPES (n.d.-b); calculations by IMAD.

Figure 12: The ability of the corporate sector to repay debts improved in 2020 according to most indicators, while over-indebtedness increased slightly for the first time since 2009



Source: AJPES (n.d.-b); calculations by IMAD.

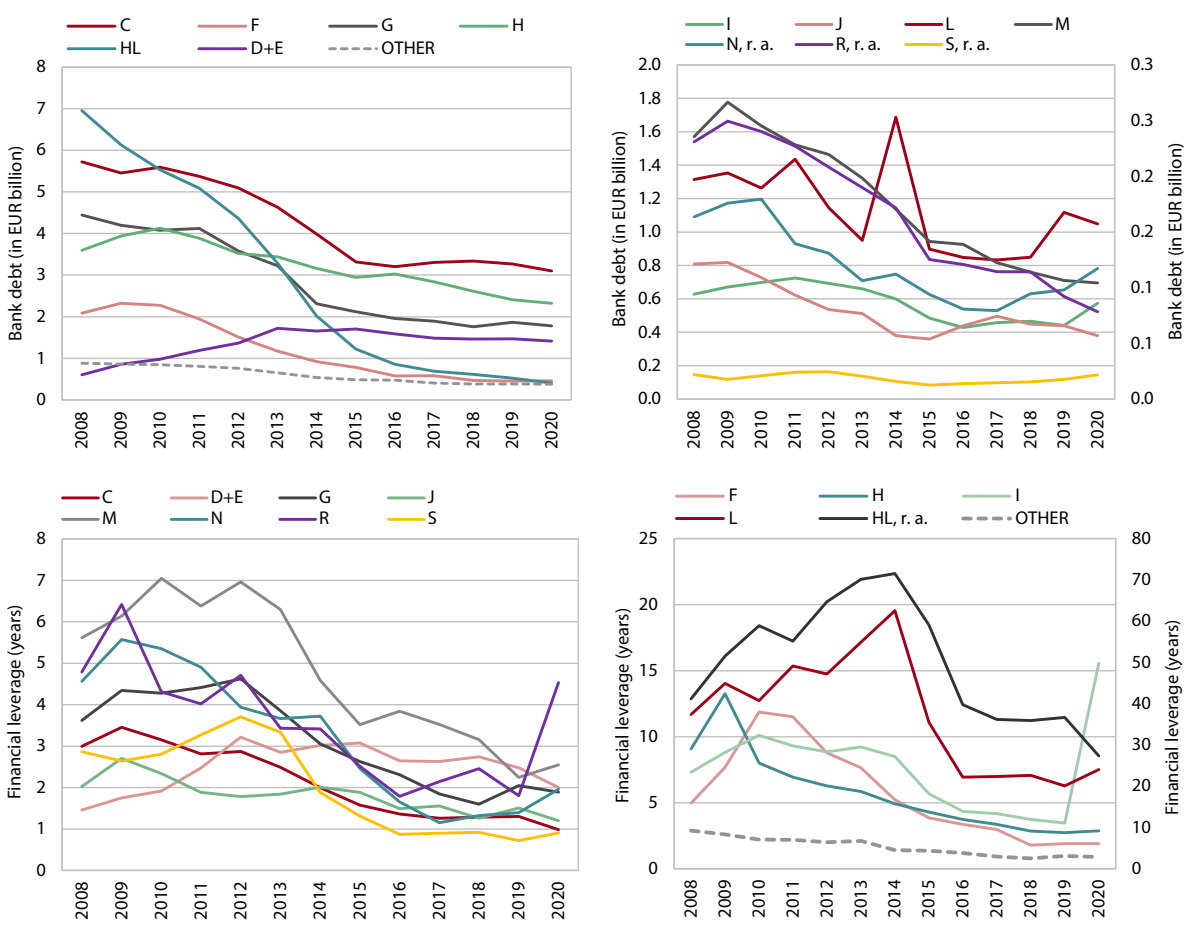
Note: Over-indebt. – over-indebtedness (net concept); C – IC – companies with interest coverage (EBITDA/interest); FL – financial leverage; IC = . - companies with zero financial expenditure for interests – interest coverage; r. a. – right axis.

However, while the overall financial picture of companies remained relatively healthy, the financial situation in certain segments of the economy deteriorated significantly in 2020, in particular in service industries, which were closed for at least some time in accordance with the containment measures.<sup>41</sup> Thus, in 2020, bank debt did not further decrease only in accommodation and food service activities, other service activities, administrative and support service activities and construction (Figure 13).<sup>42</sup> Moreover, in 2020, the ability to repay debt, measured as

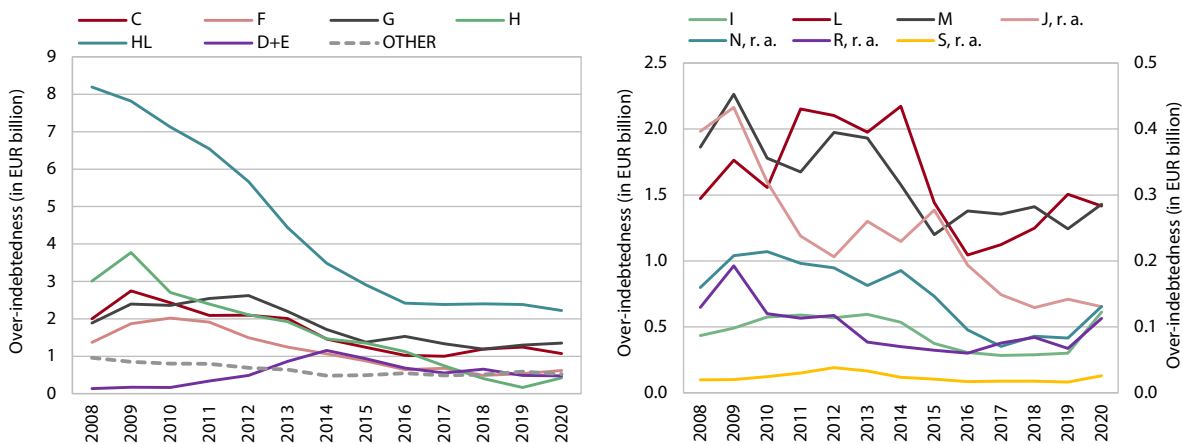
<sup>41</sup> The most affected market services: accommodation and food service activities (I, including tourism), administrative and support service activities (N, including travel and employment agencies), arts, entertainment and recreation (R), other service activities (S, including laundry services, hairdressing, other beauty services and physical well-being activities), and transportation and storage (H, especially the part strongly linked to tourism).  
<sup>42</sup> For bank debt dynamics by other categories of companies (export orientation, size, age, technology intensity and knowledge intensity), see Appendix 2, Figure 2.

financial leverage (i.e. net financial debt/EBITDA), deteriorated in some segments of the economy, especially in companies which, with a significant decline in free cash flow from operations (EBITDA), either further increased their indebtedness or deleveraged much less than their cash flow declined. Financial leverage thus increased in accommodation and food service activities (where it ranked the highest throughout the observed period – 15.6 years), real estate activities, administrative and support service activities, professional, scientific and technical activities, and other service activities.<sup>43</sup> Despite the deterioration of the ability to repay debt in some activities, financial leverage is still mostly at its best level throughout the observation period (since 2006), with the exception of holding and leasing companies (where it remains the lowest despite a significant improvement since 2014 – around 27 years), the energy industry (where it remains relatively low), accommodation and food service activities, and arts, entertainment and recreation (Figure 13).

**Figure 13: During the first year of the epidemic, bank debt, financial leverage and over-indebtedness increased mainly in non-financial market services<sup>44</sup>**



<sup>43</sup> For financial leverage dynamics by other categories of companies (export orientation, size, age, technology intensity and knowledge intensity), see Appendix 2, Figure 3.  
<sup>44</sup> Non-financial market services (G, H, I, J, L, M, N, R, S and T); for details, see also the Standard Classification of Activities 2008 (Braunsberger et al., 2010).



Source: AJPES (n.d.-b); calculations by IMAD.  
Note: Financial leverage – net financial debt/EBITDA; over-indebtedness – net concept; C – manufacturing, D+E – energy industry (electricity, gas, steam and air-conditioning supply; water supply, sewerage, waste management and remediation activities), F – construction, G – wholesale and retail trade; repair of motor vehicles and motorcycles, H – transportation and storage, I – accommodation and food service activities, J – information and communication, HLs – holding and leasing companies, L – real estate activities, M – professional, scientific and technical activities, N – administrative and support service activities, R – arts, entertainment and recreation, S – other service activities, OTHER (A, B, part of K, O–Q, T): A – agriculture, forestry and fishing, B – mining and quarrying, part of K – financial and insurance activities, O – public administration and defence; compulsory social security, P – education, Q – human health and social work activities, T – activities of households as employers of domestic personnel; undifferentiated goods- and services-producing activities of households for own use;<sup>45</sup> for basic characteristics of all groups of companies, see Appendix 2, Figure 1.

### 3.2.2 Exposure of the corporate sector to insolvency

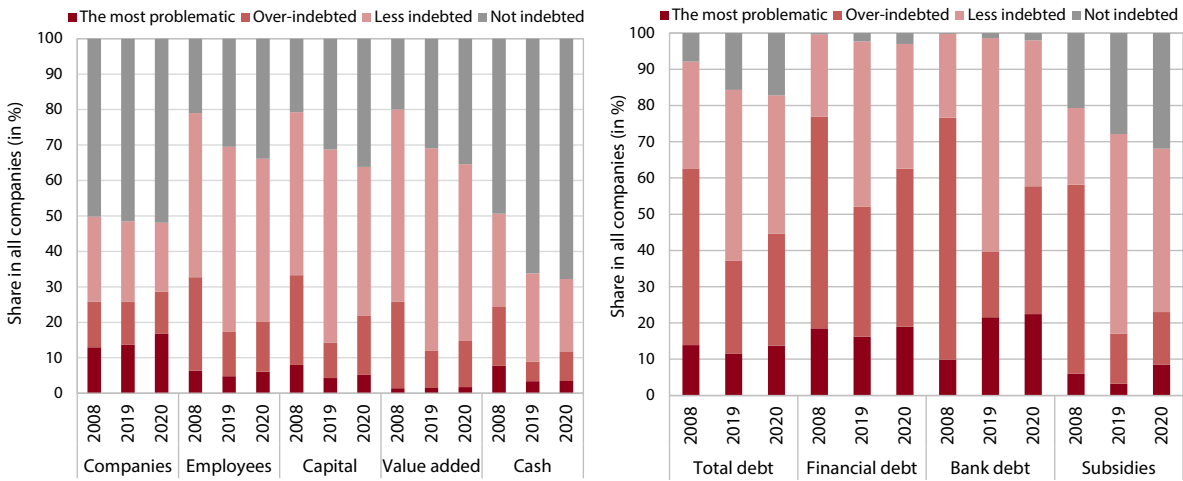
#### 3.2.2.1 Situation in the corporate sector

**In 2020, the share of over-indebted companies increased due to a significant decline in service activities, which were the most affected by the epidemic.** Over-indebted companies were exposed to insolvency even before the epidemic and even more so with its onset. In 2020, the share of over-indebted companies increased to 28.7% (25.8% in 2019). These companies had 20.1% (17.3%) of all employees, 22% (14.3%) of capital and 11.8% (8.9%) of cash and represented 14.7% (12%) of the value added generated by all companies. Their bank debt accounted for 57.7% (39.8%) of the total bank debt of all companies (Figure 14).<sup>46</sup> These are companies with below-average productivity (Figure 15) that received almost a quarter of all subsidies during the coronavirus crisis in 2020 (including COVID-19 assistance);<sup>47</sup> their share was 6 p.p. higher than before the epidemic (Figure 14; see Appendix 2, Table 1).<sup>48</sup> In 2020, their over-indebtedness increased (to EUR 10.6 billion), this mainly due to surviving companies from the most affected market service activities,<sup>49</sup> trade, professional, scientific and technical activities, and construction (Figure 13, see Appendix 2, Figures 4 and 5).<sup>50</sup> Thus the share of over-indebtedness increased the most in accommodation and food service activities,

<sup>45</sup> For details, see the Standard Classification of Activities 2008 (Braunsberger et al., 2010).  
<sup>46</sup> The total debt accounted for 44.6% (37.2% in 2019) of the total, while the financial debt accounted for 62.6% (52%) of the total financial debt (Figure 14).  
<sup>47</sup> Subsidies – all state support obtained to mitigate or remedy the consequences of the COVID-19 epidemic is shown in a separate analytical chart of accounts within account 768 – Other revenues related to business effects (COVID-19 state support) or in an income statement under the item “Subsidies, grants, annual leave payments, compensations and other revenues related to business effects” – AOP124 (SIR, 2020; SAS 2016, 2015).  
<sup>48</sup> Last year, the extent of subsidies (AOP124) increased 3.3-fold compared to their average extent in the 2006–2019 period (Figure 14; see Appendix 2, Table 1).  
<sup>49</sup> See note 41.  
<sup>50</sup> For over-indebtedness dynamics by other categories of companies (export orientation, size, age, technology intensity and knowledge intensity), see Appendix 2, Figure 4.

transportation and storage, administrative and support service activities, the arts, entertainment and recreation, professional, scientific and technical activities, and construction (Figure 16). The problems of some over-indebted companies also call into question their very existence. During the coronavirus crisis (in 2020), the share of the debt of such companies that were unable to finance it on an ongoing basis due to low or even negative cash flow from operating activities ( $IC < 1$ ) increased, amounting to around half of the total debt of all over-indebted companies<sup>51</sup> (it was over 4 p.p. higher than when it peaked in 2009). During the epidemic (in 2020), the exposure of the banking sector to over-indebted companies also increased (in all the activities that were the most affected by the epidemic; see Appendix 2, Figure 6). Over-indebted companies have only been able to temporarily postpone their problems during the coronavirus crisis, mainly due to various forms of assistance to preserve employment, tax deferrals and credit agreement obligations, so their problems could become more visible after all the measures have expired.

Figure 14: Basic characteristics of companies by level of indebtedness<sup>52</sup>

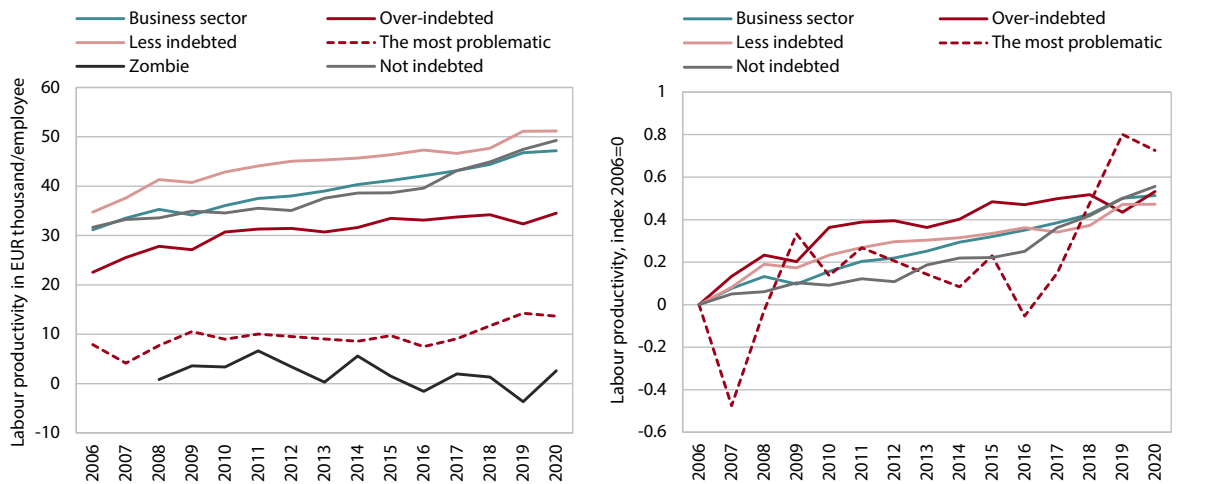


Source: AJPEs (n.d.-b); calculations by IMAD.  
Note: For definitions and basic characteristics of all groups of enterprises by level of indebtedness, see also Appendix 2, Table 1; Most problem. – the most problematic companies (belong to the group of over-indebted companies); Subsidies – subsidies, grants, annual leave payments, compensations and other revenues related to business effects (AOP 124).

<sup>51</sup> Around 29% of the debt of over-indebted companies was such that the companies had interest coverage ( $IC < 1$ ) and, at the same time, financial interest expenses higher than zero (Figure 12). In 2020, their share increased slightly (by 1 p.p.) and was slightly higher than in 2009, when over-indebtedness reached its peak (by 0.8 p.p.).

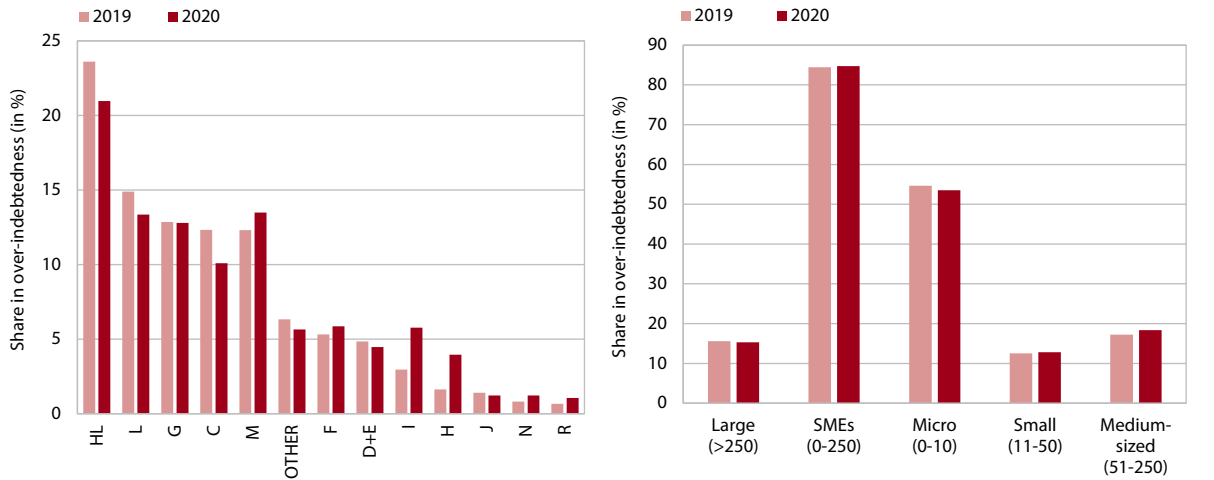
<sup>52</sup> The level of indebtedness is defined in terms of the level of net financial debt, EBITDA and, consequently, the financial leverage indicator (FL, i.e. the ratio of net financial debt to EBITDA). Over-indebted companies (including the most problematic ones –  $FL < 0$ ; and  $FL \geq 5$ , while  $EBITDA > 0$ ); less indebted companies ( $0 < FL < 5$ , while  $EBITDA > 0$ ); non-indebted companies without net financial debt but with a negative or positive EBITDA ( $FL = 0$ ); undefined companies ( $FL = -$ ) and companies with negative net financial debt ( $NETFD < 0$ ). For basic characteristics of all groups of companies by level of indebtedness, see also Appendix 2, Table 1. Financial leverage (with a threshold of 3–5 years) as an indicator of the creditworthiness or viability of companies has also been used by some EU Member States when designing their recapitalisation schemes (to help the economy in the aftermath of the COVID-19 pandemic), including Spain and Denmark (EC, 2020c and 2020d). In our analysis, we have opted for a base threshold of 5 years. However, the estimates are also robust when using a threshold of 3.5 years.

**Figure 15: Labour productivity of over-indebted, most problematic over-indebted and zombie companies is below average throughout the observation period**



Source: AJPES (n.d.-b); calculations by IMAD.  
Note: For definitions and basic characteristics of all groups of companies by level of indebtedness, see also Appendix 2, Table 1; Most problem. – the most problematic companies (belong to the group of over-indebted companies); Zombie status is attributed to companies that have a negative EBITDA for at least three consecutive years, so the data is only available from 2008 onwards; the right figure only depicts growth by indebtedness level (for a more illustrative display, as the growth of zombie companies is too volatile).

**Figure 16: In the first year of the epidemic, over-indebtedness of over-indebted companies increased, especially in some of the most affected service activities**



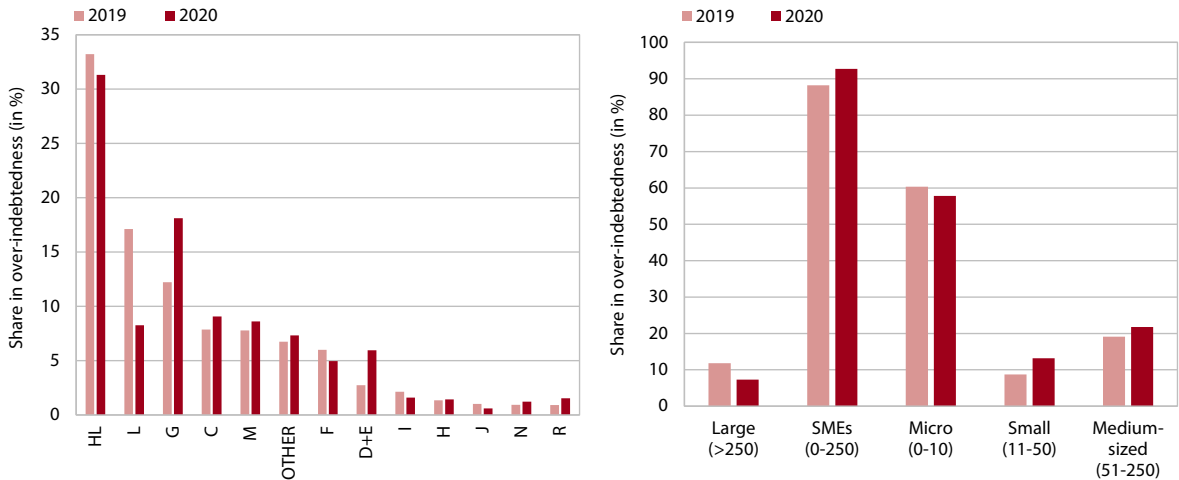
Source: AJPES (n.d.-b); calculations by IMAD.  
Note: SMEs – micro, small and medium-sized companies; for basic characteristics of all groups of companies, see Appendix 2, Figure 1 and Table 1; OTHER<sup>53</sup> – A, B, part of K, O–Q, S and T.

**The share of the most problematic over-indebted companies, which have a relatively high probability of insolvency, increased in 2020, along with their over-indebtedness.** These are companies that have net financial debt and negative EBITDA. Their over-indebtedness, i.e. net financial debt, amounted to EUR 5.1 billion in the first year of the coronavirus crisis and was just over 13% higher than before the COVID-19 epidemic. In 2020, 16.9% (13.6% in 2019) of companies were such, employing 6.1% (4.8%) of all employees, holding 5.2% (4.3%) of capital and 3.5%

<sup>53</sup> OTHER (A, B, part of K, O–Q, S and T) – In analysing the structure of over-indebtedness, other service activities – S are included in the OTHER category, as its share of the total indebtedness only accounted for 0.2% despite the activity being affected in 2020.

(3.4%) of cash, and generating 1.8% (1.5%) of corporate value added. Their over-indebtedness accounted for 47.8% (44.2%) of total over-indebtedness, while their bank debt accounted for 6.9% (5.7%) of the total bank debt of all companies (Figure 14; see Appendix 2, Table 1).<sup>54</sup> In 2020, the most problematic of the over-indebted companies saw their share of total corporate sector subsidies increase by around 5 p.p. (to around 8%; Figure 14; see Appendix 2, Table 1). During the coronavirus crisis, over-indebtedness increased for all SME size groups, while it decreased for large companies. In terms of sectors, over-indebtedness increased mainly in professional, scientific and technical activities (by almost 6 p.p.)<sup>55</sup> and accommodation and food service activities (by 3.2 p.p.).<sup>56</sup> Trade and real estate followed, with around 1 p.p. higher over-indebtedness. The share, although low, also increased slightly in other service activities, which, apart from accommodation and food service activities, were the most affected by the epidemic (Figure 17).<sup>57</sup> In 2020, the exposure of the banking sector to the most problematic over-indebted companies also increased (to EUR 885.4 million; mainly in some of the service activities that were the most affected by the coronavirus crisis; see Appendix 2, Figure 7).

**Figure 17: In the 2020 coronavirus crisis, the most problematic over-indebted companies saw their over-indebtedness increase, especially SMEs, while, in terms of activities, over-indebtedness increased the most in professional, scientific and technical activities and accommodation and food service activities**



Source: AJPES (n.d.-b); calculations by IMAD.  
Note: SMEs = micro, small and medium-sized companies; OTHER (A, B, part of K, O-Q, S and T).

<sup>54</sup> Their total debt accounted for 13.8% (11.6% in 2019) of the total debt, while the financial debt accounted for 19% (16.2%) of the total financial debt.

<sup>55</sup> These are mostly companies in the activities of head offices, management consultancy activities (NACE Rev. 2: 70), which are typically characterised by low employment and high indebtedness. In 2020, this was the case for 54% of all the most problematic companies in professional, scientific and technical activities, employing 57% of all employees from the most problematic companies in professional, scientific and technical activities. Their over-indebtedness accounted for 88% of total indebtedness, while the bank debt accounted for 89% of total bank debt of the most problematic companies in professional, scientific and technical activities, the concentration of indebtedness being very high and mainly due to two companies.

<sup>56</sup> These are mostly companies in food and beverage service activities (NACE Rev. 2: 56), which employed around 69% of all employees from over-indebted companies in accommodation and food service activities in 2020 and also contributed a similar percentage to their value added. However, two-thirds of the over-indebtedness and bank debt of over-indebted companies in accommodation and food service activities were contributed by accommodation companies (NACE Rev. 2: 55). The concentration of over-indebtedness is high, with the 50 most problematic companies accounting for almost two-thirds of all over-indebtedness or net financial debt of the most problematic companies in 2020.

<sup>57</sup> In administrative and support service activities, arts, entertainment and recreation, and transportation and storage.



**In 2020, the share of zombie companies with the highest probability of insolvency also increased, as did their over-indebtedness.** The probability of insolvency of zombie companies is even higher than that of the most problematic over-indebted companies, as these are companies that have had negative cash flow from operating activities (EBITDA)<sup>58</sup> for at least three consecutive years, while their relative indebtedness has been much higher and productivity much lower than most of the rest of the corporate sector. In 2020, 10.3% (9.8% in 2019) of companies were such, employing 1.4% (1.3%) of all employees, holding 5% (4.7%) of capital and 4.7% (5.2%) of cash, and generating 0.1% (-0.1%) of corporate value added. Their over-indebtedness accounted for 25.2% (25.1%) of total over-indebtedness, while their bank debt accounted for 2.3% (2.1%) of the total bank debt of all companies.<sup>59</sup> Moreover, zombie companies were relatively more indebted than other companies across most indicators throughout the observed period, even taking their net relative indicators into account (Figure 18).<sup>60</sup> Despite their extremely low productivity and much higher relative indebtedness than the corporate sector average, along with a considerable question mark over their continued existence, zombie companies received just over EUR 17 million in subsidies during the epidemic (which includes COVID-19 assistance), amounting to 212% more than before the epidemic, although their share of total subsidies was low, at 1.3%; see Figure 18). The zombie companies were generally not large enterprises,<sup>61</sup> but mainly micro enterprises (mostly in holding and leasing and professional, scientific and technical activities). By activity, almost half of the over-indebtedness of zombie companies was accumulated in holding and leasing activities, while professional, scientific and technical activities accounted for around 14% and the remaining activities had shares of less than 10% (with only trade, manufacturing and real estate activities above 5%).<sup>62</sup> Their total over-indebtedness increased by 5% (to EUR 2.7 billion) during the epidemic (in 2020), especially for micro enterprises (their share was 1.4 p.p. higher). In 2020, exposure increased in the majority of activities, most notably in trade (last year, the share was 2.1 p.p. higher; see Appendix 2, Figure 8).<sup>63</sup> Their exposure to banks also increased in 2020 (to EUR 298.9 million; see Appendix 2, Figure 9).

<sup>58</sup> "There are basically two broad approaches in defining zombie firms. In the seminal papers by Hoshi (2006) and Caballero et al. (2008) that focus on firm-bank relationships in Japan in the 1990's, the zombie measures attempt to identify firms that make extremely low interest payments given their levels of debt and who are likely to receive financial aid from lenders. A number of recent papers have studied zombie firms in European countries along these lines (e.g. Acharya et al., 2016, Schivardi et al., 2018). In a second approach, recent studies have used various measures of weak performance of firms to identify zombies. These measures include firms with negative profits (Bank of England, 2013) or negative value added, or firms with a persistently low interest coverage ratio (earnings before interest and taxes (EBIT) relative to the interest paid and financial charges) (e.g. McGowan et al., 2018, Bank of Korea, 2013)." (Nurmi et al., 2020). In our analysis, we decided to use the second approach, within which we believe that weak performance – the approach adopted by the Bank of England (2013) and Bighelli and Lalinsky (2021) better describes the current state of the crisis than the definition (interest>EBITDA), which better describes zombie companies during the global financial crisis (2008), when, in addition to the credit crunch, the interest rate was also quite high (McGowan et al., 2018).

<sup>59</sup> Their total debt accounted for 6.8% (6.8% in 2019) of the total debt, while the financial debt accounted for 9.9% (9.2%) of the total financial debt of all companies.

<sup>60</sup> Cash is subtracted from absolute indebtedness rates (total, financial and bank debt).

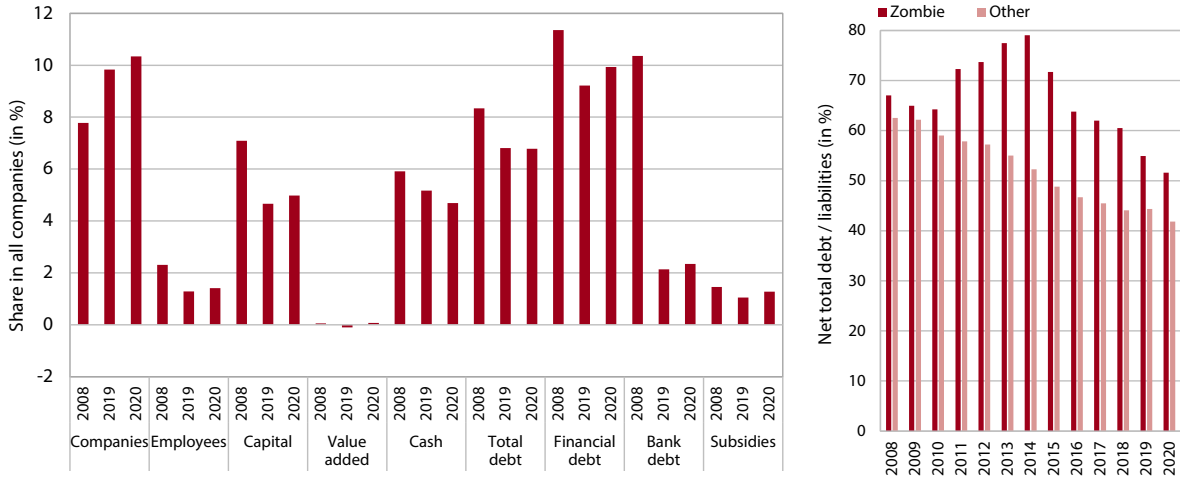
<sup>61</sup> There were none in 2019, while in 2020 there was one company in professional, scientific and technical activities (exposure: EUR 3 million).

<sup>62</sup> The results are also comparable when using the definition by McGowan et al. (2018).

<sup>63</sup> Exposure also increased for companies in accommodation and food service activities, construction, real estate activities, administrative and support service activities, professional, scientific and technical activities, and the energy industry.



Figure 18: Basic characteristics of zombie companies



Source: AJPES (n.d.-b); calculations by IMAD.  
Note: Subsidies – subsidies, grants, annual leave payments, compensations and other revenues related to business effects (AOP 124); Other – other than zombie companies.

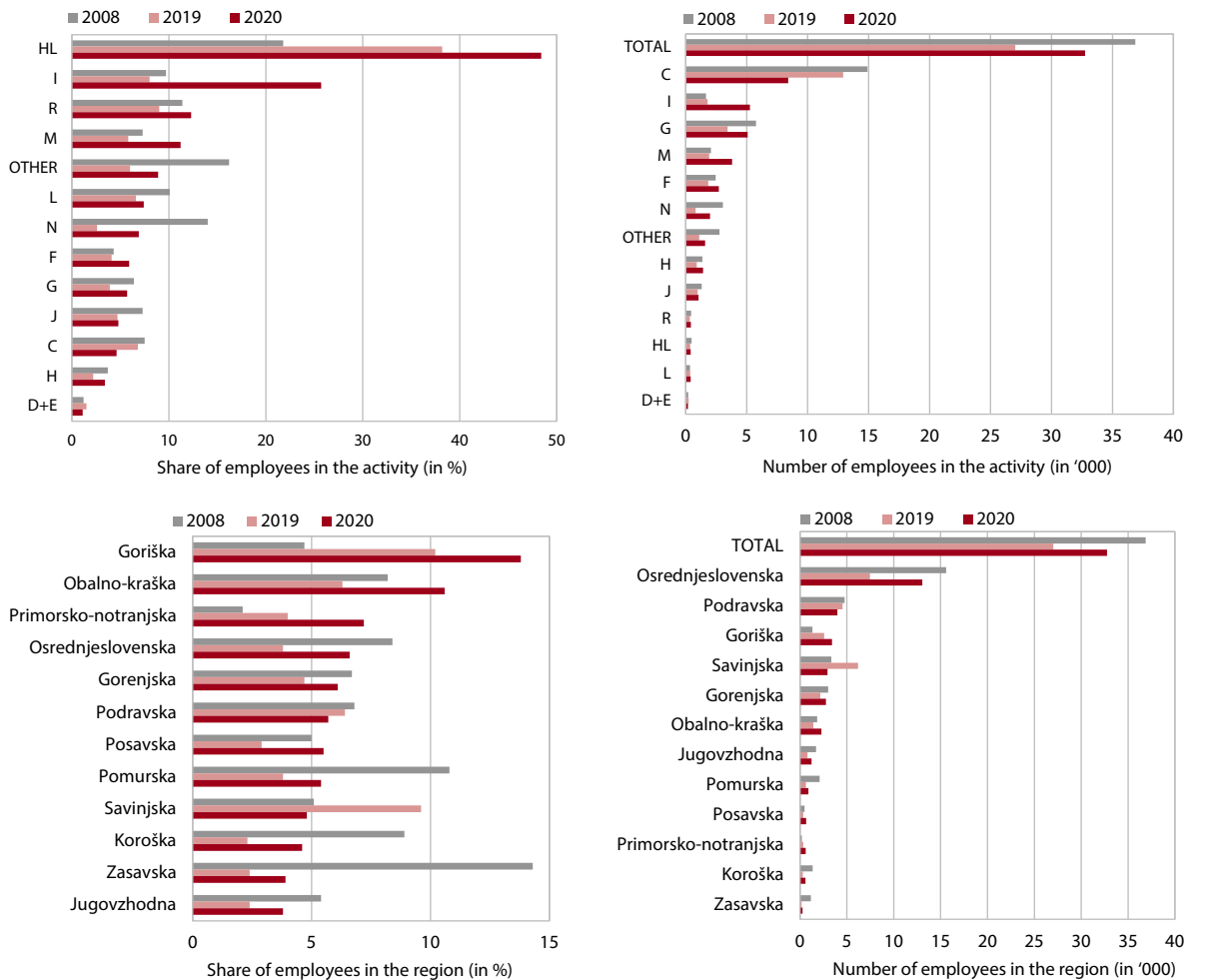
By region, the share of the most problematic over-indebted and zombie companies was quite similar within each region but higher in the Zahodna Slovenija cohesion region.

**The outbreak of the COVID-19 epidemic has increased the shares of companies and employees with higher possibility of insolvency, but the share of employees in the most problematic and zombie companies<sup>64</sup> remains much lower than during the global financial crisis (2008–2013).** According to our estimates, in 2020, 21% (17.8% in 2019) of companies were such,<sup>65</sup> employing 6.4% (5.2%) of all employees, holding 7.8% (6.6%) of capital and 6.7% (7%) of cash, and generating 1.7% (1.3%) of corporate value added of all companies. Their over-indebtedness accounted for 47.8% (44.2%)<sup>66</sup> of total over-indebtedness, while their bank debt accounted for 6.9% (5.7%) of the total bank debt of all companies.<sup>67</sup> During the first year of the epidemic, they received 8.8% of subsidies (which is a 4.9% higher share than in 2019; see Appendix 2, Figure 10). The productivity of those companies was three-fourths lower than the productivity of the entire corporate sector throughout the observed period (see Appendix 2, Figure 11). In 2020, the most problematic over-indebted and zombie companies employed 32,700 workers, which is a fifth more than in 2019 (Figure 19) and more than in the period of economic growth (2014–2019; 5% of all employees), though significantly less than during the global financial crisis (2008–2013; 8.8% of all employees). By activity, the most problematic over-indebted and zombie companies in 2020 were in holding and leasing (more than half), followed by, with a share of more than one-fifth, non-financial market services, which were the most affected by the epidemic, as they were also closed for some time, and real estate activities (see Appendix 2, Figure 12). Most of these activities also employed a significant share of the workforce, with a particularly high share in holding and leasing and accommodation and food service activities. By region, the share of the most problematic over-indebted and zombie companies was quite similar within each region but higher in the Zahodna Slovenija cohesion region. The share was the highest (more than 20%) in the Obalno-Kraška, Osrednjeslovenska and Goriška regions (with the Goriška and Obalno-Kraška regions having the highest share of employees in such companies; the number of employees was the highest in the Osrednjeslovenska

<sup>64</sup> A company can also be classified in both groups of companies at the same time.  
<sup>65</sup> In the period of economic growth (2014–2019), the share of the most problematic and zombie companies in the entire business sector averaged 17.9%, compared to 19.2% in the global financial crisis (2008–2013).  
<sup>66</sup> In 2020, their total over-indebtedness increased by 13.4% (to EUR 5.1 billion).  
<sup>67</sup> Total debt accounted for 14.3% (12.5% in 2019), while the financial debt accounted for 19% (16.3%) of the total financial debt of all companies.

region; Figure 19, see also Appendix 2, Figure 12). Regarding size, the companies with a higher risk of insolvency were mainly micro enterprises, in terms both of the number of enterprises and of the number of employees (see Appendix 2, Figure 13).

Figure 19: Employment in the most problematic over-indebted and zombie companies by activity and region



Source: AJPES (n.d.-b); calculations by IMAD.  
Note: OTHER (A, B, part of K, O–Q, S and T).

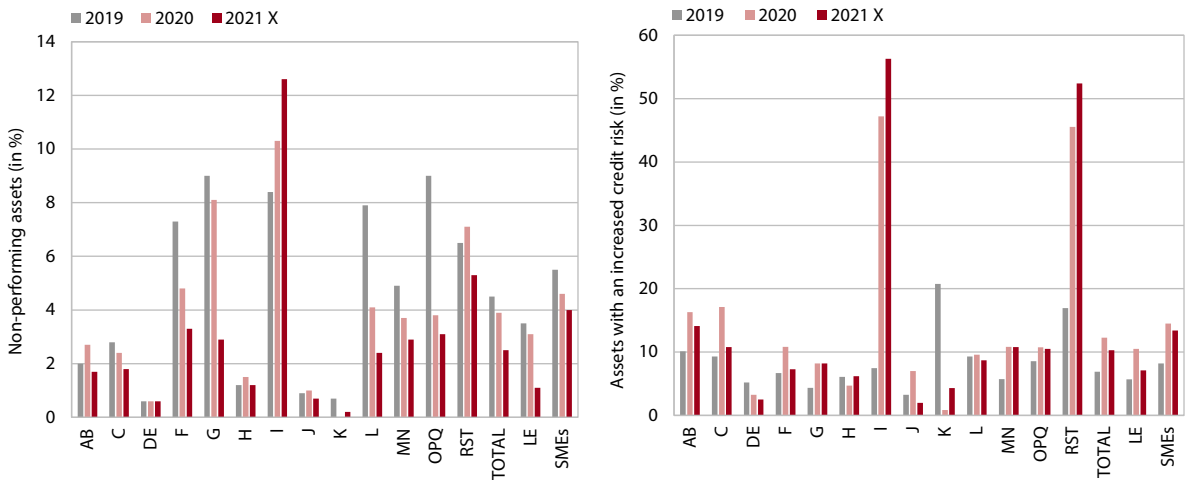
**Despite the lower long-term growth and development potential of the most problematic over-indebted and zombie companies, their production resources would not necessarily be permanently lost if the over-indebted companies were properly restructured and we were to address labour shortages in the economy.** Future measures should be designed to ensure that they do not perpetuate zombie companies (i.e. unhealthy cores of the economy), whose existence prevents the optimal allocation of production resources to more productive companies and, as a consequence, hampers both productivity and economic growth. Aid should be targeted at healthy cores of the economy that are not over-indebted and have only short-term liquidity deficits due to the coronavirus crisis and are viable in the long term and also at development-oriented niche parts of the economy with high growth potential, which could contribute significantly to the further development breakthrough of the Slovenian economy.<sup>68</sup>

<sup>68</sup> For detailed possibilities of economic policy in this area, see Demmou et al. (2021) and Pierri et al. (2021).

3.2.2.2 Banking system situation

**Even after the outbreak of the epidemic, the situation in the banking system remained stable, this owing to strong action by economic policymakers.**<sup>69</sup> This was facilitated by the past recovery of the banking system and the subdued lending activity before the outbreak of the epidemic, which led to a well-capitalised banking system and a relatively low indebtedness of the economy.<sup>70</sup> The share of non-performing assets did not increase with the outbreak of the epidemic and has been gradually decreasing since the second quarter of 2021, despite the expiry of moratoria on loan repayments.<sup>71</sup> The decrease was most pronounced in April and was largely due to a fall in non-performing assets in businesses, mainly in trade, which was largely the result of a one-off repayment of a large amount of debt. In August 2021, their share amounted to 2.6%. The share of non-performing assets in SMEs (4%) and large enterprises (1.1%) has decreased. Only accommodation and food service activities stand out, as they were the most affected by the measures taken to prevent the spread of infections. The share of non-performing assets in accommodation and food service activities thus increased almost by half during the epidemic, amounting to 12.5%. Exposures to claims that are grouped for the purpose of credit loss assessment indicate a slightly increased credit risk. The share of claims with a significant increase in credit risk after the granting of the credit (group 2)<sup>72</sup> has increased by half in the post-outbreak period and accounts for around one-tenth of banks' claims against companies. This share has been gradually decreasing since May 2021, though increasing again slightly in August. It remains significantly higher than before the outbreak only in the activities that were more severely affected by the epidemic (accommodation and food service activities, arts, entertainment and recreation, and other service activities), where it exceeds 50%.

**Figure 20: The share of non-performing assets and claims against companies with significantly increased risk is gradually decreasing**



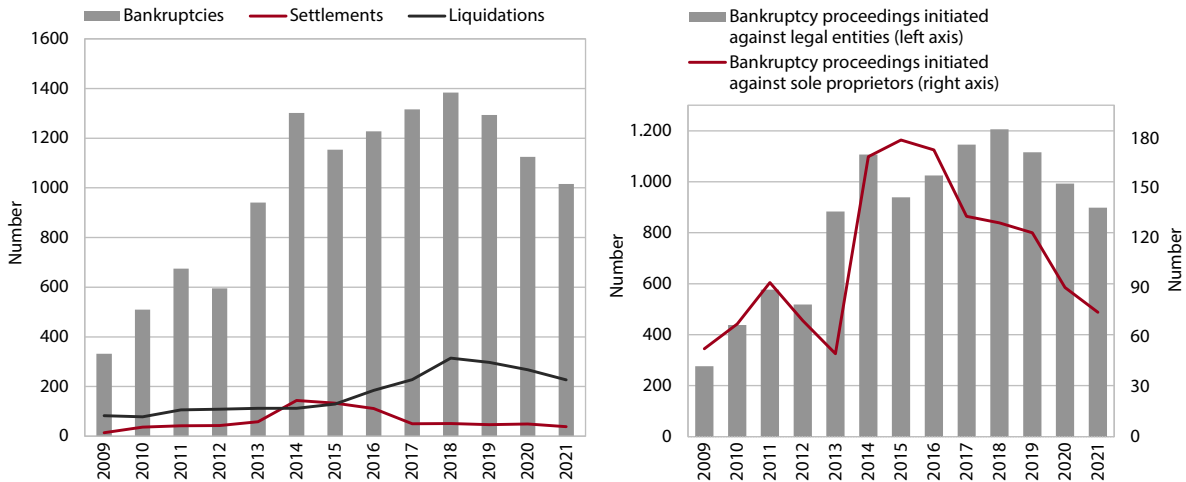
Source: BoS (2021).  
Note: LE – large enterprises, SMEs – micro, small and medium-sized enterprises.

<sup>69</sup> Supervisory Banking Statistics data for the euro area show a similar picture (ECB, 2021).  
<sup>70</sup> Also see Section 3.2.1, Figure 11.  
<sup>71</sup> According to the EBA's definition, the share of total non-performing assets amounted to 1.3% at the end of October.  
<sup>72</sup> In accordance with the IFRS 9, banks divide claims into three groups for the purpose of assessing credit losses. Group 1 includes claims that have not yet experienced a significant increase in credit risk. Group 2 includes claims for which there has been a significant increase in credit risk between the date of initial recognition and the reporting date. Group 3 includes claims in default.

3.2.2.3 Financial solvency of business entities

Numerous intervention measures taken by the government to mitigate the effects of the epidemic in 2020 and 2021, financial stability, and good business results of all business entities in the years preceding the epidemic are the reasons why the solvency of Slovenian business entities did not deteriorate in 2020 and 2021. The number of bankruptcy proceedings initiated against legal entities and sole proprietors since the beginning of the epidemic has been lower than in 2019. The number of bankruptcies for companies in 2020 (993) decreased by 11% compared to the previous year, while the number of bankruptcies for sole proprietors (90) decreased by 27%. The decrease in the number of bankruptcies is also reflected in the comparison of 2021 with 2020 (10% for companies and 17% for sole proprietors), as some of the measures, such as legal moratoria, state funding, additional recovery time for companies and a change in insolvency legislation (which halted a number of insolvency proceedings) were also in place in 2021.

Figure 21: Number of bankruptcy proceedings initiated against legal entities (left) and number of bankruptcy proceedings initiated against sole proprietors (right)

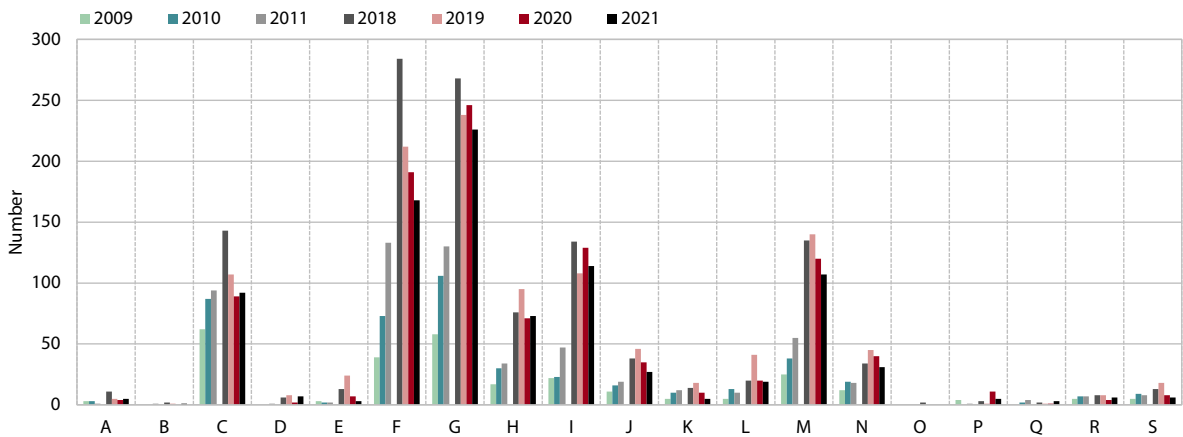


Source: AJPES (n.d.-a).

Given the magnitude of the shock caused by the COVID-19 crisis and the experience of the past global financial crisis, there is a risk that the number of insolvent entities will increase after all measures to mitigate the economic impact of the epidemic have expired. The consequences of the global financial crisis (starting in 2008), which worsened all business performance indicators for business entities, appeared with a delay.<sup>73</sup> The number of bankruptcy proceedings initiated against legal entities started to increase in 2010, when it rose by 60% compared to the previous year, rising by an additional third in 2011. We do not expect the consequences of the current crisis to be the same as those of the previous one, as the financial position of companies before the first crisis was much worse than at the outbreak of the epidemic and the crisis was strongly linked to the liquidity problems of financial institutions. However, even in the current crisis, some activities, in particular service activities, have been severely affected, so these more exposed activities could see a more pronounced increase in solvency problems once all the support measures have expired. This is also indicated by the increase in the share of the most problematic over-indebted and zombie companies during the epidemic – see Section 3.2.2.1.

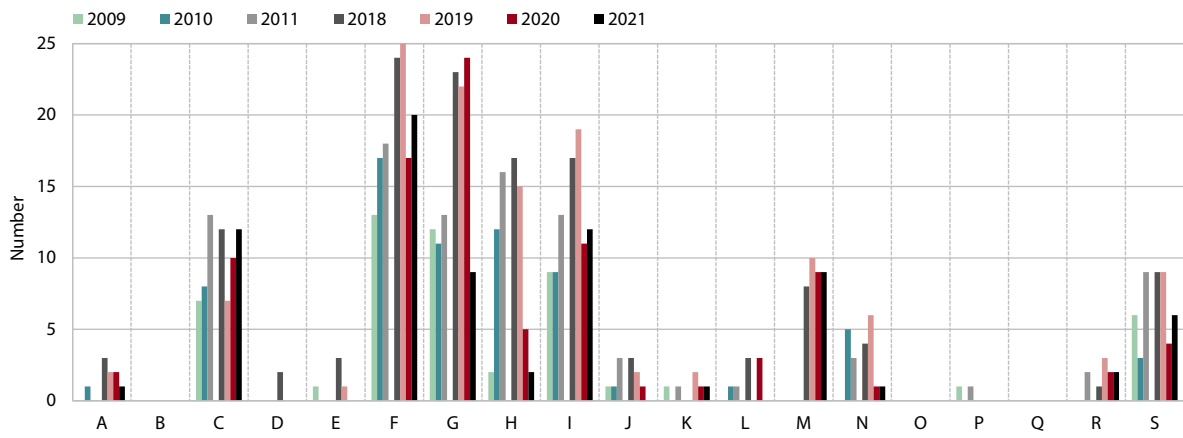
<sup>73</sup> See also Tavčar (2021).

**Figure 22: Number of bankruptcy proceedings initiated against companies, by activity**



Source: AJPES (n.d.-a).

**Figure 23: Number of bankruptcy proceedings initiated against sole proprietors, by activity**



Source: AJPES (n.d.-a).

Note: For a description of activities, see List of acronyms.

### 3.3

## Companies benefiting from emergency measures of temporary lay-off and short-time work

**Since the beginning of the epidemic, Slovenia has adopted a number of job-retention measures, the most significant of which, in terms of payments, has been the reimbursement of salary compensation for temporarily laid off employees.** The measures were aimed at reducing labour costs, which often account for a significant part of businesses' expenditure, to increase the chances of retaining jobs and keeping employees until the economic activity could recover. In the period from March 2020 to October 2021, EUR 1.77 billion was paid out for job-retention measures, with the largest amount of EUR 596 million paid out for the measure of temporary lay-off.<sup>74</sup> Measures to retain jobs included the payment of a basic income and social contributions to sole traders and other beneficiaries (EUR 440 million), payment of social contributions to employees who worked during the epidemic (EUR 436 million), payment of social contributions for temporarily laid-off employees (EUR 124 million), partial subsidisation of part-time work (EUR 74 million), crisis allowance (EUR 58 million), subsidisation of the minimum wage (EUR 25 million), and sickness benefits for employees (EUR 21 million).

**Although all measures helped reduce the burden on businesses and thus retain jobs, in the following analysis we focus only on the measures of temporary lay-off and short-time work, due to the availability of detailed payment data.**

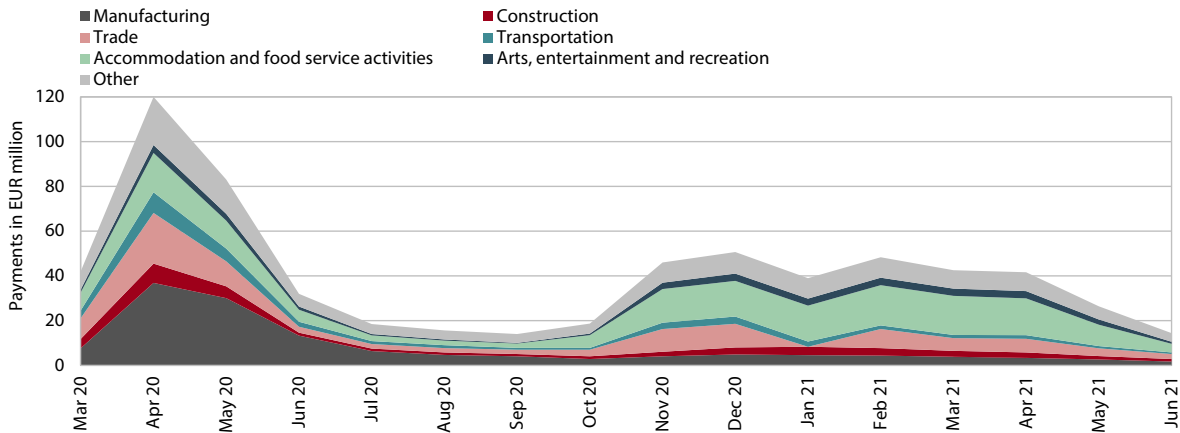
Temporary lay-off is the largest measure in terms of payments, but together with short-time work it accounts for only a third of all payments under job-retention measures. The temporary lay-off measure also provided employers with the right to partial reimbursement of salary compensation paid to workers who could not be provided with work due to the epidemic and were temporarily laid off. The employees were entitled to 80% of salary compensation, with the government reimbursing employers a part of this amount (which changed with individual amendments to the measure from 40% up to 100%), but only to a certain level (either up to the amount of unemployment benefit – EUR 892 – or up to the average salary in 2019 – EUR 1,754). In mid-2020, the measure of partial subsidisation of short-time work was also put in place. The measure enabled employers to temporarily impose short-time work (to a maximum of half-time work), while for the rest of the time the worker was on temporary lay-off. In doing so, employers were entitled to a subsidy of up to EUR 448 per employee, depending on the length of the short-time work.

**The amounts of payments for temporary lay-off and short-time work were largely related to the development of the epidemic and its negative impact on individual activities.** The first wave of the epidemic, together with the measures to contain it, severely affected both service activities and industry. After recovering in the third quarter, the negative impact of the second wave on economic activity was smaller, with service activities most affected. Accordingly, the amounts paid under the emergency measures of temporary lay-off and short-time work also fluctuated. The monthly amount of payments to the affected part of the economy for the measures concerned peaked in April, during the first wave of the epidemic, when it reached EUR 120 million. Around one-third of this amount was paid to business entities in manufacturing and two-thirds to those in service activities. In the period from October to December 2020, there was a renewed, albeit less pronounced,

<sup>74</sup> The payment amount refers to the period from March 2020 to October 2021. Although some measures, such as temporary lay-off, were in force for a shorter period (e.g. until June 2021 or until the end of the last declared epidemic), the amount of aid for the measures could vary beyond the end of the period of validity of the individual measures, due to subsequent payments or reimbursements.

increase in payments, but the amount of payments gradually decreased until June 2021, when the temporary lay-off measure expired.

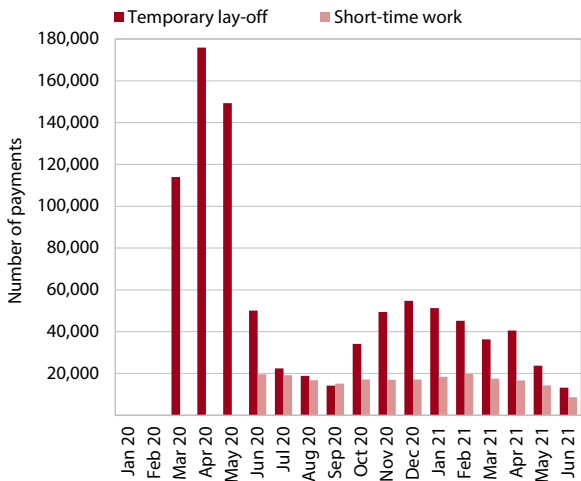
**Figure 24: Amount of payments arising from emergency measures of temporary lay-off and short-time work in Slovenia**



Source: ESS.

**A large share of employees and companies participated in the measures, especially in the first wave, particularly in those activities that were the most affected by lockdown.** Data on payments made by the Employment Service of Slovenia (ESS) for the application of individual emergency measures show that from March 2020 to June 2021, when the measure of temporary lay-off expired, it was used by 31.7 thousand business entities for 215 thousand employees. The largest share of companies that used the measure at least once is from accommodation and food service activities (around 73% of all companies from these activities) and arts, entertainment and recreation (70%). These activities were the most affected by the measures to contain the virus. A high share of such companies was also seen in trade (47%) and manufacturing (43%). Although the measure was in place for 16 months, around half of the businesses benefited from the measure for three months or less (cumulatively or intermittently). During that time, the short-time work scheme was used at least once by 10.3 thousand business entities for 52 thousand employees. The significantly lower frequency of using the short-time work scheme may also be partly due to the fact that businesses saw the measure of temporary lay-off as more attractive in terms of the impact on reducing labour costs, and partly due to a total ban on the operation of certain activities (accommodation and food service activities, tourism, a part of trade, arts, entertainment and recreation, etc.).

Figure 25: Number of payments for the measures of temporary lay-off and short-time work



Sources: ESS, SURS, AJPES.  
Note: A – agriculture, forestry and fishing; B – mining and quarrying; C – manufacturing; D – electricity, gas, steam and air-conditioning supply; E – water supply, sewerage, waste management and remediation activities; F – construction; G – wholesale and retail trade, repair of motor vehicles and motorcycles; H – transportation and storage; I – accommodation and food service activities; J – information and communication; K – financial and insurance activities; L – real estate activities; M – professional, scientific and technical activities; N – administrative and support service activities; O – public administration and defence, compulsory social security; P – education; Q – human health and social work activities; R – arts, entertainment and recreation; S – other service activities.

Figure 26: Correlation between value added growth (in %) and the share of companies benefiting from the temporary lay-off measure (in %), 2020

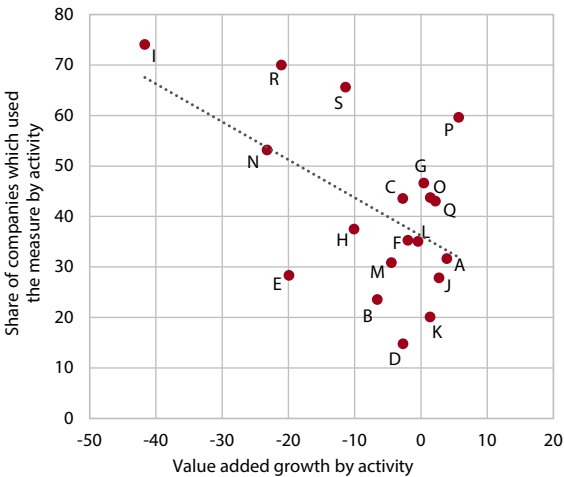
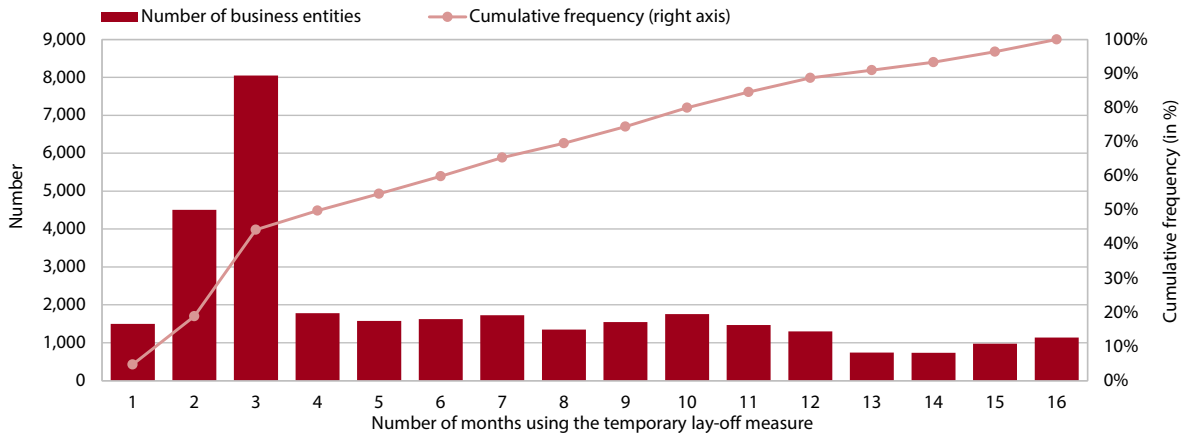


Figure 27: Distribution of the number of companies according to the time of using the measure of temporary lay-off



Source: ESS.

**Model assessments show that the differences in the frequency of using the temporary lay-off measure between different companies (in terms of their size, productivity, export orientation, indebtedness, etc.) exist but are very small.** We used logistic regression to assess how various factors influenced the likelihood of a company using the measure of temporary lay-off in 2020. Econometric analysis allows us to isolate the simultaneous influence of several other factors when interpreting the impact of individual factors on the likelihood of using a measure (see also the Appendix in Chapter 0).<sup>75</sup> The average probability of a company using

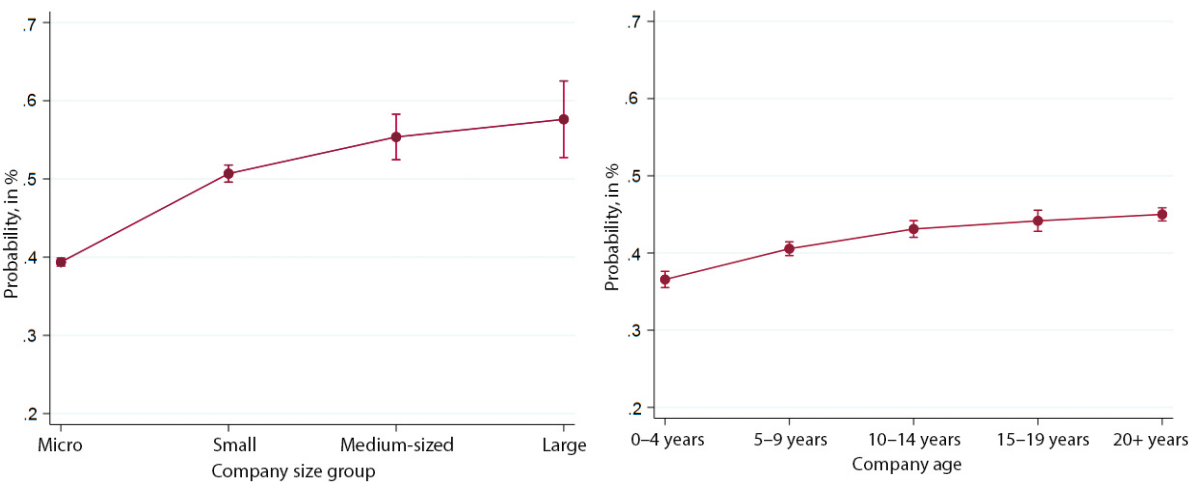
<sup>75</sup> The factors, i.e. variables, included in the model (to exclude their simultaneous impact) include the age of the company, its size in terms of the number of employees, productivity, export orientation, indebtedness, sector (NACE Rev. 2) and region where it is situated. The variable of activities was included in order to exclude the impact that the differences in the extent to which individual economic activities were affected could have on the likelihood of companies using the measure.



■ The measure was slightly more often used by companies that are less or moderately productive and less often by companies that are highly productive.

the measure was 42%. Assessments show that the differences in the probability of using the measure between different companies existed but were not significant. The average probability of larger companies with more than 250 employees using the temporary lay-off measure was 57%, which is more than micro (39%) and small enterprises (50%). The probability of older companies (older than 20 years) using the measure was 45%, while for younger companies it was 36%. This could be due, among other things, to the different organisation and work distribution of employees in larger companies and the experience of older companies in accessing different forms of state aid.<sup>76</sup> The measure was slightly more often used by companies that are less or moderately productive (48% in the fifth decile) and less often by companies that are highly productive (28% in the tenth decile).<sup>77</sup> The same was true for companies in terms of indebtedness, where medium-indebted companies used the measure more often (44% in the fifth decile) compared to the least indebted companies, which did not need the measure to such an extent, or the least indebted companies, which could not benefit from the measure due to legal conditions. This was also the case for companies with negative capital (33% probability compared to 43% for other companies). However, there were small differences between companies according to export orientation; non-export oriented companies were slightly less likely to use the measure (39%) compared to export oriented companies (43%).<sup>78</sup>

■ Figure 28a: Probability of a company having benefited from the temporary lay-off measure in 2020 by size group (left) and age group (right)



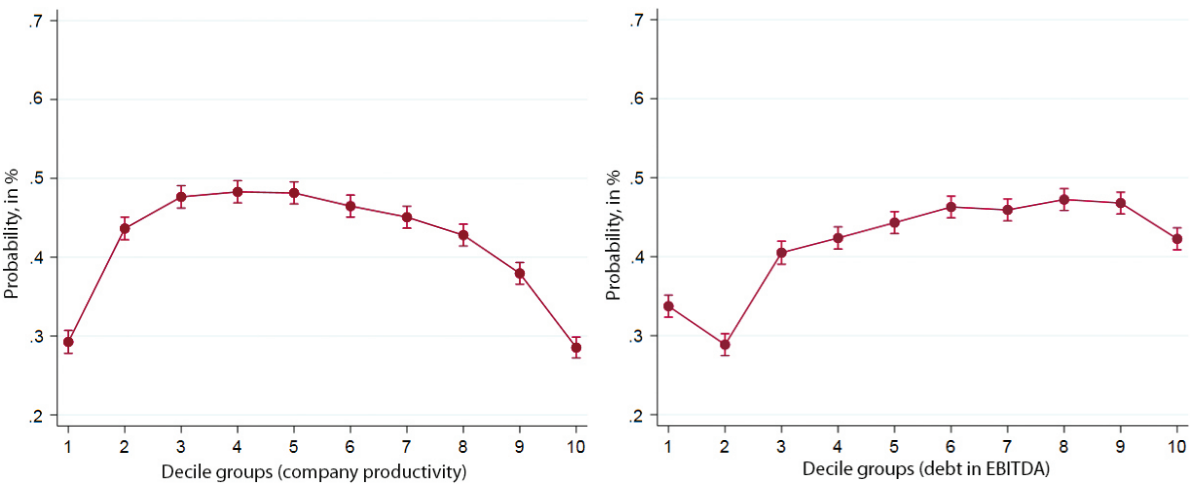
Source: ESS, AJPES; calculations by IMAD.  
Note: The frames shown in the graphs represent a 95% confidence interval. The size of enterprises is determined in accordance with the definition under the Companies Act (ZGD-1) based on the number of employees.

<sup>76</sup> Small enterprises have a different organisation of the work process than larger companies, one employee often covering several different areas. This may limit the possibilities of using the temporary lay-off measure in smaller companies.

<sup>77</sup> Companies with very low productivity that were very unlikely to use the measure (first decile) also constitute an exception. According to our assessment, these are companies in poor condition that most likely did not meet the legal requirements necessary to benefit from the measure. Employers who had not paid their compulsory duties or other financial non-tax liabilities collected by the tax authority or had not submitted all the withholding tax returns for income from the employment relationship for the period of the last five years were not eligible to benefit from the measure. An analysis by Bighelli and Lalinsky (2021) that included data for Slovenia generally confirms the assessments, with companies achieving medium productivity being the most likely to benefit from the temporary lay-off measure.

<sup>78</sup> The impact of these factors on the likelihood of using the temporary lay-off measure is also confirmed by an alternative model assessment of the impact on the extent to which companies used the measure (using the fractional logit model). According to the analysis, larger, older and less productive companies used the temporary lay-off measure for a larger share of their employees than other companies.

**Figure 28b: Probability of a company having benefited from the temporary lay-off measure in 2020, by productivity level (left) and indebtedness (right)**



Sources: ESS, AJPES; calculations by IMAD.  
Note: The frames shown in the graphs represent a 95% confidence interval. The size of enterprises is determined in accordance with the definition under the Companies Act (ZGD-1) based on the number of employees.

**The small differences in the frequency of using the temporary lay-off measure across different groups of companies show that the measure has helped to retain the potential and protect jobs in many companies.** The broad target orientation of the measure and its implementation was aimed at protecting businesses and safeguarding jobs in response to the sharp decline in activity. Assessments show that the measure benefited a wide range of different companies and did not disproportionately benefit companies in a less favourable situation. This has preserved the potential for a faster recovery and prevented excessive dismissals that could have slowed the recovery.

**In terms of job retention, the adopted measures have had a positive and desired impact.** After the labour market deteriorated rapidly from mid-March last year with the adoption of measures to contain the coronavirus epidemic,<sup>79</sup> the swift adoption of emergency legislation to retain jobs and mitigate the effects of the epidemic had a significant impact in reducing the decrease in employment compared to the decrease in GDP, and the labour market adjustment had a greater impact on the number of hours worked.<sup>80</sup> The lower-than-expected labour market response based on past long-term trends is also reflected in the analysis of trends in the actual surveyed unemployment rate and its prediction, which derives from Okun’s law, i.e. the long-term link between GDP and the unemployment rate (see IMAD, 2021, Section 1.1).

<sup>79</sup> In April in particular, the number of persons in employment decreased (by 0.9%), while the number of registered unemployed persons increased significantly (by 19.9%).  
<sup>80</sup> On average, gross domestic product decreased by 4.2% in 2020 and employment decreased by 4.8% in terms of the number of hours worked, while employment in terms of the number of employees decreased by 0.6%.

## 4

## Productivity factors

**Intangible assets are gaining importance as a productivity factor.** An important potential to increase the productivity of modern economies lies in reducing the gap between the majority of companies and the best performing ones, which usually stand out in terms of large investments in intangible assets. There are significant gaps in productivity between companies which can only partly be explained by the differences in the nature of their activities (e.g. different capital intensity of the sectors), since productivity is highly dispersed even among companies from similar industries. In addition to investments in tangible assets (e.g. technological equipment), it is increasingly influenced by investments in intangible assets. These usually include (a) intangible ICT assets with investments in computer software and databases, (b) intellectual property with investments in research and development, design, entertainment, literary and artistic originals, etc., and (c) economic competencies such as branding with investments in advertising and market surveys, purchased and own organisational capital and training (Stehrer et al., 2019). The study by Hazan et al. (2021) found that, at the sectorial level, investments in intangible assets are positively linked to productivity and that those companies within the same sector with larger investments in intangible assets increase their value added more rapidly. The OECD (Calligaris, 2021) also finds that an important factor behind increasing discrepancies in productivity between companies is investments in intangible assets,<sup>81</sup> while according to Gal (2021), who studies the impact of the human factor on productivity, the differences in skills and other characteristics (e.g. gender, age and cultural background) between employees and managers can explain as much as a third of the productivity gap between the best performing companies and the average. The COVID-19 epidemic has further emphasised the importance of investing in intangible assets, as it seems that strongly performing companies with the skills and organisational capital to experiment with new ways of doing business, work, consumption and communication face the new situation more easily (Andrews et al., 2021).

**Considering its increasing importance as a productivity factor, the main part of this chapter is devoted to the analysis of investments in intangible assets.** The introductory analysis of investment activity in Slovenia is followed by an overview of investments in various types of intangible assets, with a focus on innovation, digital transformation and knowledge and on other types of so-called soft intangibles such as design, branding and organisational capital. The final section presents certain types of social and institutional capital as productivity factors, such as international integration and openness, attractiveness to talent, entrepreneurship, cooperation and trust, and quality of state governance. This concerns the question of a wider framework in which companies operate and which can significantly contribute to their growth and development.

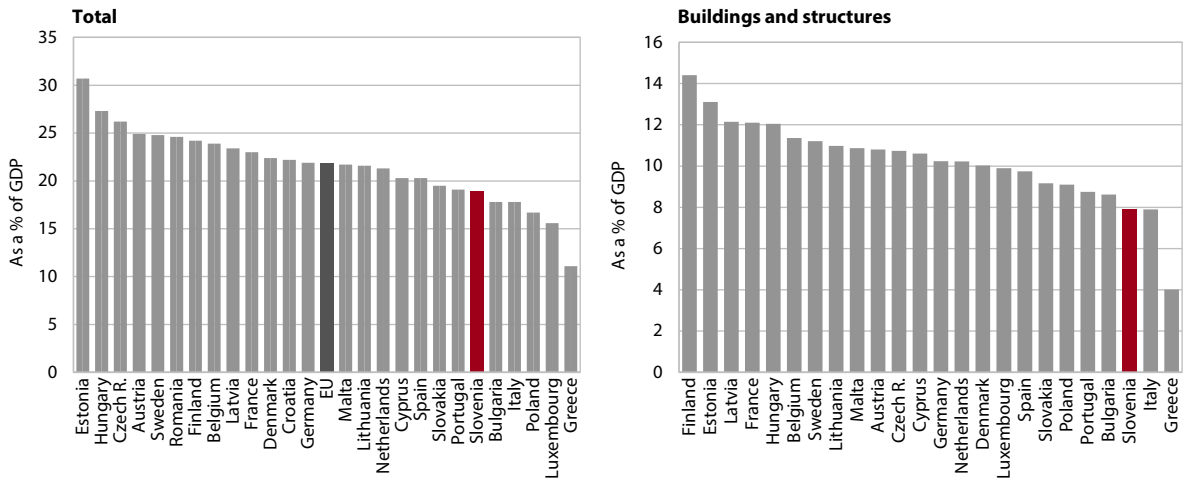
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<sup>81</sup> Similarly, the results of an analysis of Dutch companies show that investments in intangible assets offer an opportunity for less productive companies to reduce the gap between the best performing companies (Borowiecki et al., 2021).

4.1 Fixed capital investments

**Capital growth in Slovenia has decreased significantly since 2008, with a low investment to GDP ratio even by international comparison.** The ratio of investment to gross domestic product ranged from 26% to 29% in the 2004–2008 period, which was to a large extent due to intensive motorway construction. This ratio later decreased, mainly due to banking sector problems, deleveraging of companies and deteriorated expectations, and stagnated at around 19% after 2011 due to relatively low demand and high uncertainty (IMAD, 2020b). Under the influence of the EU funding cycle, the ratio declined in 2016 after a transitory increase in 2014 and 2015, strengthened slightly in the following years, and declined again in the first year of the COVID-19 epidemic, under the influence of uncertainty and deteriorated expectations. In 2020, the ratio of investment to gross domestic product amounted to 19% in Slovenia, among the lowest in the EU, with particularly low investment in buildings and structures.

Figure 29: The overall level of investment in Slovenia is low, particularly in construction (2018)



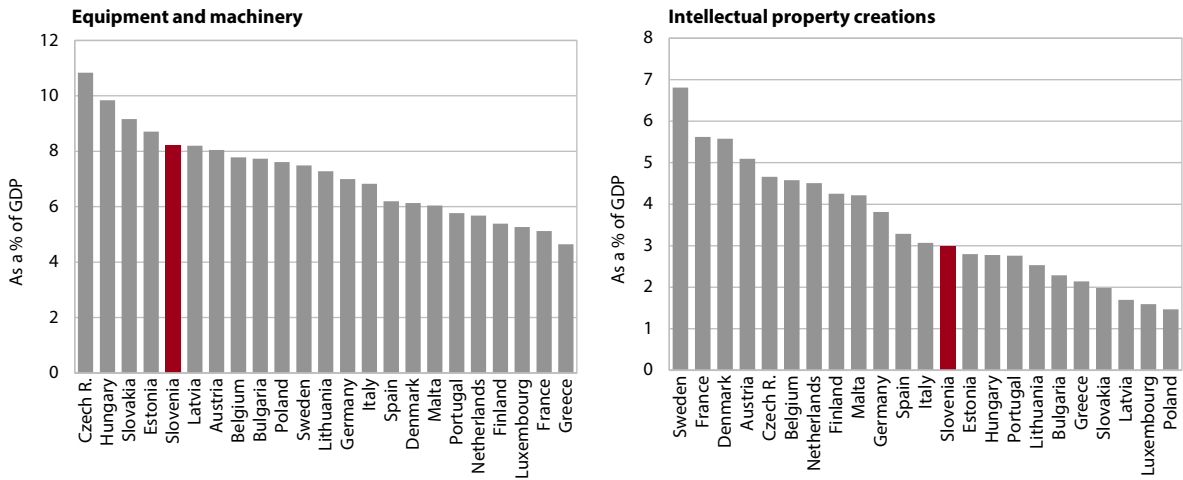
Source: Eurostat (2022).  
Note: Data shown is for 2018; more recent data is available for a smaller set of countries, but changes in the position of individual countries are small.

**Low levels of investment are influenced significantly by low construction investment.** Investment in buildings and structures has increased in the last few years but their share in terms of GDP remains among the lowest in the EU. In this context, *investment in other buildings and structures* (civil engineering works such as roads and railways and all construction of non-residential building such as buildings for trade and service activities and industry) in Slovenia are at the average EU level but are significantly lower than in other EU Member States with below-average development. Investments in housing account for just over 2% of GDP, making Slovenia one of the countries with the lowest shares in this regard. While housing investments (and housing in general) are not among the decisive factors of long-term productivity, they can significantly influence its fluctuation in the short term.

**From a productivity point of view, the more important investment in equipment and machinery is relatively high, while investment in intellectual property creations is low.** Slovenia is one of the EU Member States with an above-average ratio of investment in equipment and machinery to GDP. This is linked to a relatively high share of industry in the economy and many successful and profitable companies in this sector. The picture is less favourable when it comes to investment

in intellectual property creations (e.g. computer software and databases, research and development), which represent one of the key productivity growth factors in modern economies. In Slovenia, investment in these creations lag behind the most advanced countries in this field, and the share of such investment is below EU average (Figure 30).

Figure 30: Investment in equipment and machinery is high, while investment in intellectual property creations is below average (2018)

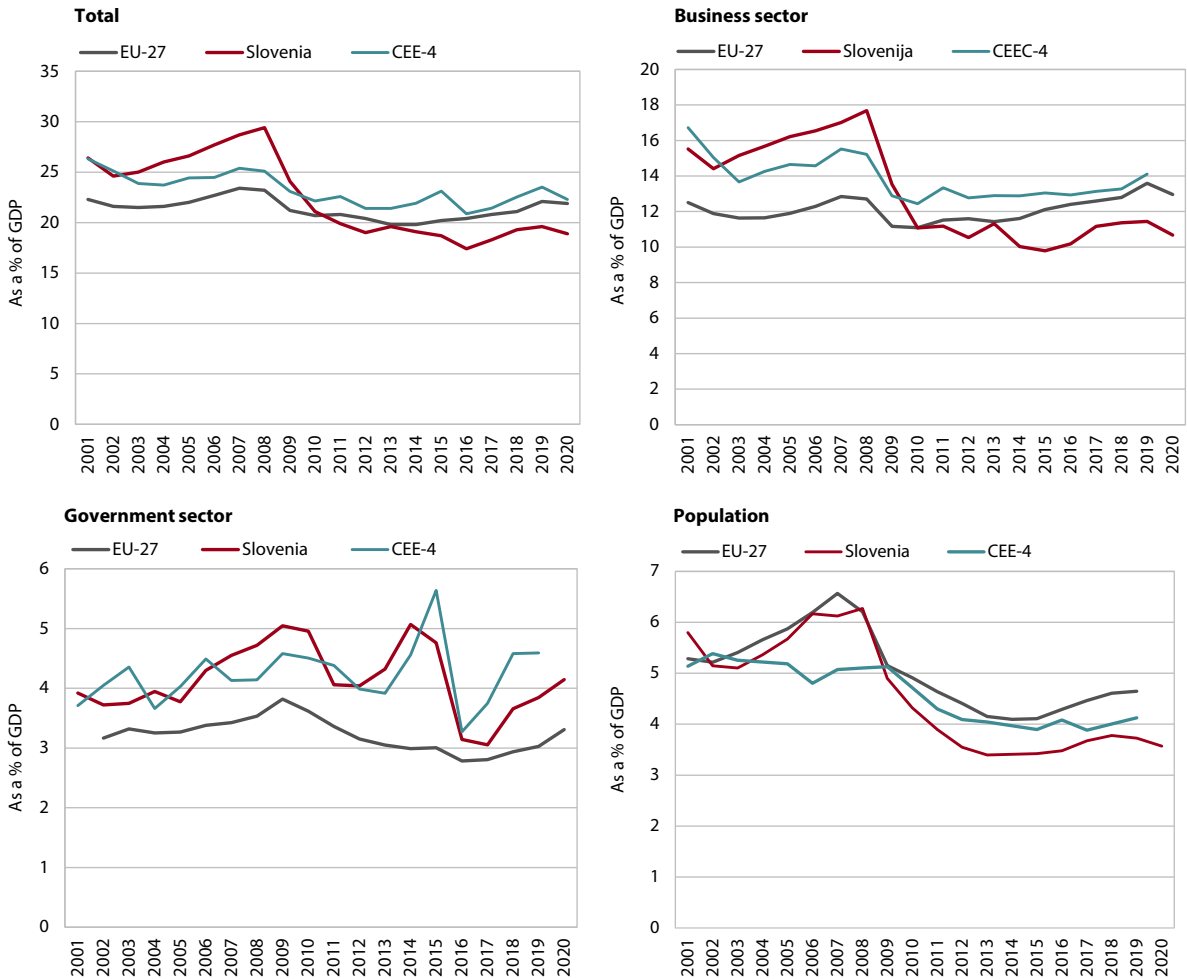


Source: Eurostat (2022).  
Note: Data shown is for 2018; more recent data is available for a smaller set of countries, but changes in the position of individual countries are small.

**In terms of investors, less investments in Slovenia are made by people and businesses and more by the government.** Because of EU funding, Slovenia has a higher ratio of government investment to total GDP than the EU average, which is linked to the fact that Slovenia is less developed than the EU average and relatively more EU funding goes to less developed countries and regions. However, the ratio is lower compared to some other Member States which are similarly below EU average in terms of development.<sup>82</sup> In Slovenia, people invest less compared to the EU average, which is mainly linked to lower investment in housing as the most important investment category for this sector. The ratio of corporate investment to GDP in Slovenia is also lower than the EU average; according to our assessment, this is mainly due to lower investment in intellectual property creations and partly due to lower investment in buildings and structures.

<sup>82</sup> In 2019, the government sector allocated 3.8% of GDP to investment in Slovenia, compared to 5% in Estonia, 6.2% in Hungary, 4.3% in Poland and 4.2% in the Czech Republic; the rate in Slovakia (3.6%) was lower than in Slovenia.

**Figure 31: Investment as a share of GDP has been below the EU average over the last decade, with the only exception being government investment**



Source: Eurostat (2022).  
Note: CEE-4 simple average of the Czech Republic, Hungary, Poland and Slovakia. For population investment, the figure for the EU-27 is calculated as a simple average.

**Before the outbreak of the epidemic, companies pointed to the difficulty of finding suitable labour as a limiting factor for investment, while after the outbreak, they pointed to an uncertain future.** According to an EIB survey (EIB, 2019), 85% of Slovenian companies pointed to staff with the right skills as a limiting factor for investment in 2019, while after the outbreak of the epidemic, they most often mentioned an uncertain future (EIB, 2021). After 2008, limited financial resources also played a role in low investment activity, but this factor has become less important in recent years.<sup>83</sup>

<sup>83</sup> According to business tendencies, more than 25% of companies in manufacturing cited *financial problems* as a limiting factor for their business in 2011–2013, while the share of this limiting factor has not exceeded 10% since 2017. Similarly, in 2011–2013, more than 30% of companies in construction pointed to high *financial costs* and *difficulties in obtaining loans* as limiting factors. Since 2017, the share has not exceeded 10% for either factor.

## 4.2 Innovation, digital transformation and knowledge

### 4.2.1 Research, development, innovation and entrepreneurship

**In Slovenia, investment in research and development (R&D) has been increasing over the past three years but still lags behind the best performing countries by one percentage point of GDP.** According to temporary data, the volume of R&D investment in 2020<sup>84</sup> was nominally the highest to date, but in relative terms, at 2.15% of GDP<sup>85</sup> it still lagged behind the peak in 2012–2013 by almost half a percentage point; since 2016 it has also lagged behind the EU average and even more so behind innovation leaders<sup>86</sup> (2019: by 0.2 p.p. and by 1 p.p. respectively). Total R&D expenditure was in decline between 2012 and 2017, until 2016 in the public sector<sup>87</sup> and between 2015 and 2017 in the private sector. With the consolidation of public finances after the global financial crisis, it first dropped in the public sector (2012–2016: by EUR 117 million); its nominal growth in the last three years prior to 2019 compensated for around 70% of this drop. In 2020, government budget allocations for R&D<sup>88</sup> in GDP was still lagging behind the EU average by 0.23 p.p. and behind innovation leaders by 0.3 p.p. A decrease in business sector investment (by EUR 102 million in 2015–2017) was linked to several factors,<sup>89</sup> but a nominal increase compensated for the entire drop by 2019, although temporary data for 2020 indicate a new decrease. In the 2008–2019 period, the business sector contributed an important share of total R&D expenditure, mostly exceeding 60% (2019: 61.5%), which is also high by international comparison (in innovation leaders it amounted to 58.4% in 2017), while public sector investment was relatively low.

<sup>84</sup> When publishing temporary data, SURS explained that reporting units used the methodology more consistently (SURS, 2021b), meaning that the data is probably incomparable with the data for previous years. We therefore only comment in detail on data up to 2019.

<sup>85</sup> The proposal for the Resolution on a Slovenian Scientific Research and Innovation Strategy 2030 and the adopted new Scientific Research and Innovation Activities Act (ZZrID) envisage increased joint investment in R&D by 2030 to 3.5% of GDP, with public resources accounting for 1.25% of GDP – the Government of the Republic of Slovenia (2021a) and (ZZrID, 2021).

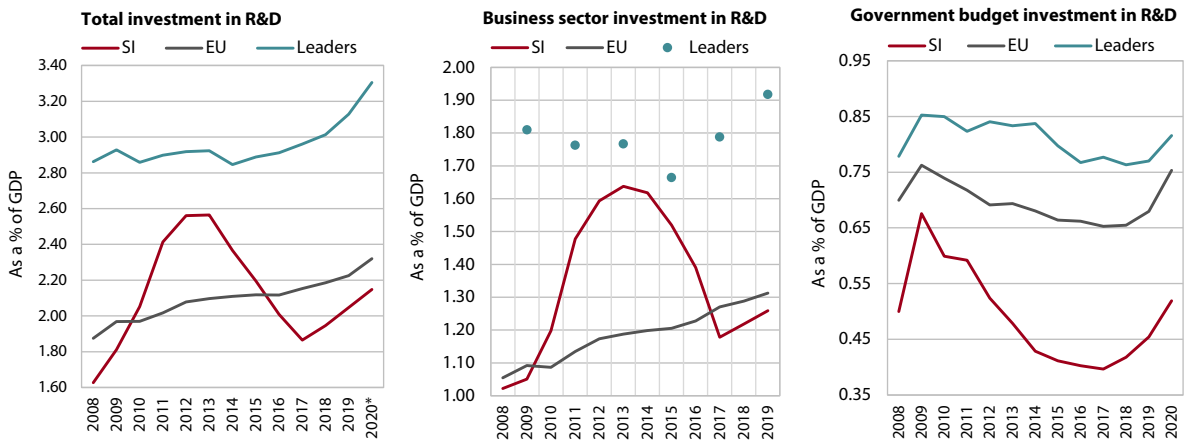
<sup>86</sup> The definition of innovation leaders (Sweden, Finland, Denmark and Belgium) is based on EC (2021c).

<sup>87</sup> I.e. the government and higher education sectors together.

<sup>88</sup> Since 2009, Slovenia has also lagged significantly behind in terms of the budget share for R&D, allocating 1.04% of the budget to R&D in 2020 (EU: 1.42%, innovation leaders: 1.5%).

<sup>89</sup> The decline in R&D investments was the result of several groups of factors: (i) the volume of European funding decreased between 2013 and 2014 with the completed co-financing of R&D projects by state and European funding in Centres of excellence and in Competence and Development centres, while for concrete projects, co-funding by the business sector was required, and the simultaneous slow and late absorption of European funds since the start of implementation of the new financial perspective 2014–2020, and (ii) after 2015, the volume of R&D tax reliefs claimed also started to decline (by EUR 32 million in the 2016–2018 period). In 2019, their volume increased by 5.8% following three years of decline.

Figure 32: Since 2013, Slovenia has seen a significant decrease in total R&D investment relative to GDP



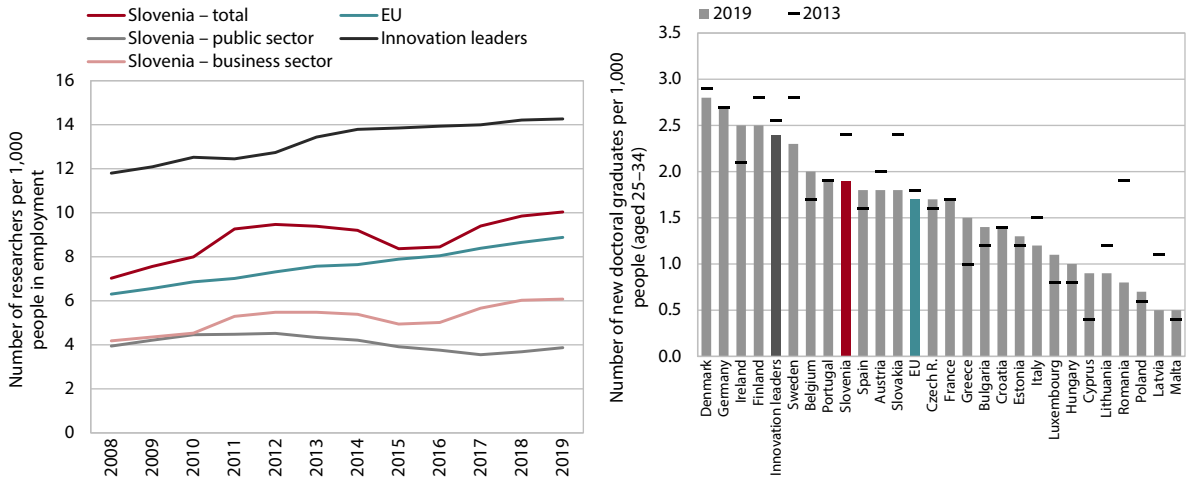
Sources: Eurostat (2022), SURS (2022); calculations by IMAD.  
Note: State budget investment in R&D also includes funds spent abroad (e.g. for CERN membership).

**Slovenia lags far behind the leading countries in the development of human resources for research and development.** The number of researchers increased in the period 2008–2019, peaking in 2019. This increase stemmed largely from the business sector, which accounted for more than 60% of all researchers as of 2017, roughly the same share as in innovation leaders. While such trends are favourable in terms of strengthening the innovation capacity of companies, attention is also needed to strengthen the research capacity of the public sector, where the number of researchers increased in 2018 and 2019 but has not yet reached the peak of 2010 (Eurostat, 2022). At the same time, the total number of researchers is considerably lagging behind innovation leaders (Figure 33), which is why creating attractive working conditions for researchers and investing in their development requires special attention. The number of young researchers has also been increasing since 2018, but it has not compensated for the past multiannual decrease by 2020 (ARRS, 2021), with the total number of new doctoral graduates in 2020 reaching the lowest level in the last ten years (SURS, 2022).<sup>90</sup> The development of human resources, which is important for business innovation activities, also requires attention, as the Young Researchers in the Economy measure, which enabled companies to strengthen their innovation capacities and access fundamental research that provides the foundation for industrial research, has not been implemented for several years.

<sup>90</sup> This is related to the decrease in the number of those enrolled in doctoral studies from the academic years 2012/2013 to 2015/2016, which could be attributed to the temporary suspension of co-financing of doctoral studies from public sources, years of reduced funding under the Young Researchers Programme, the ending of the Young Researchers in the Economy programme, less interest in enrolling in doctoral studies during the previous global financial crisis, demographic changes (reduction of generations), and delays in completing studies due to the COVID-19 epidemic.



**Figure 33: Despite favourable trends in recent years, Slovenia still lags behind innovation leaders in terms of the number of researchers, with the number of new doctoral graduates also being low**



Sources: OECD (2021i), Eurostat (2022) and SURS (2022).

**According to the most recent measurement for the 2016–2018 period, the innovation activity of enterprises (IAEs) has returned to its level before the decrease in the 2010–2016 period, but this was still not sufficient to fill the gap between the EU average and the innovation leaders due to small and medium-sized enterprises lagging behind.** According to our assessment, the improvement shown by the results of the latest SURS survey on innovation activity for 2016–2018<sup>91</sup> also stems from higher investment in innovation activity, including in R&D, especially in connection with the revived development policy after 2016.<sup>92</sup> There were 48.6% innovation-active enterprises (IAEs) in Slovenia in 2016–2018,<sup>93</sup> which was 8 p.p. more than in 2014–2016.<sup>94</sup> Several enterprises have introduced product and business process innovations at the same time, which indicates the complementarity of both types of innovations and their interdependence and intertwining. The results of the most recent IAEs measurement have shown that medium-sized enterprises lag further behind the EU average than small enterprises, while large enterprises have maintained their advantage in relation to the EU and innovation leaders' average.<sup>95</sup>

<sup>91</sup> SURS has introduced methodological changes in line with the revised OECD methodology (Oslo Manual 2018). The main change refers to the new concept of defining innovations, which defines two types of innovations: (i) product (goods and/or services) innovation and (ii) business process innovation (for more information see IMAD, 2021c). The survey includes enterprises with at least 10 employees and is conducted every other year.

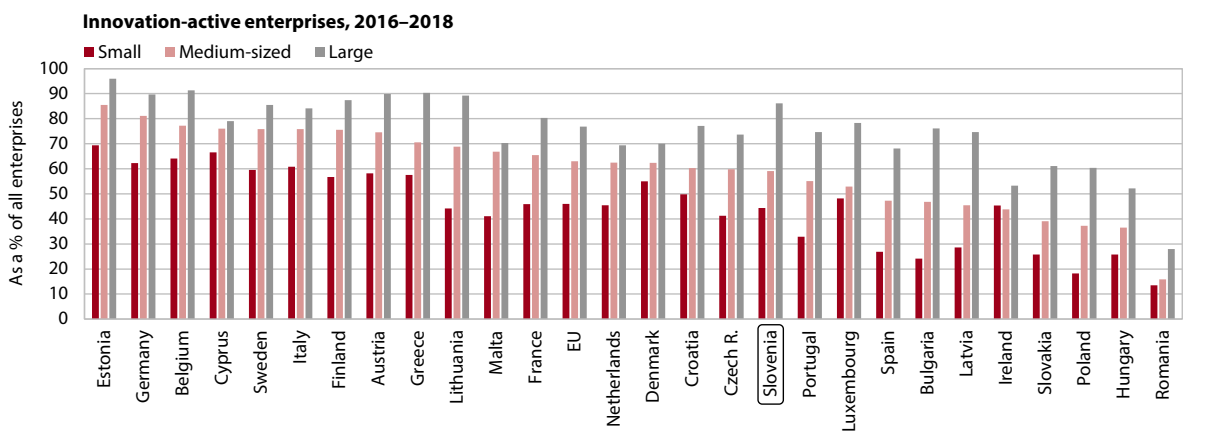
<sup>92</sup> Incentives stemmed mainly from drawing EU funding or Slovenia's Smart Specialisation Strategy.

<sup>93</sup> Due to changes in methodology, the data of the last innovation-intensity measurement expressed in the IAEs share among all enterprises are not directly comparable with the data of previous periods (SURS, 2020b). The increase in innovation intensity in 2016–2018 is thus partly due to methodological changes.

<sup>94</sup> It is a comparison according to the previously valid definition of innovation (technological and/or non-technological), which was derived from the Oslo Manual 2005.

<sup>95</sup> Slovenia (small: 44.4%, medium-sized: 59.1%, large: 86.2%), EU (small: 46%, medium-sized: 63%, large: 76.8%), innovation leaders (small: 59.5%, medium-sized: 73.6%, large: 84.8%).

**Figure 34: The share of large innovation-active enterprises is larger than the innovation leaders' average and significantly larger than the EU average, while the SMEs are still lagging behind**



Sources: Eurostat (2022), SURS (2022).

**Medium-sized enterprise lag further behind the EU average than small enterprises, while large enterprises have maintained their advantage in relation to the EU and innovation leaders' average.**

**According to the European Innovation Index, Slovenia has been classified among moderate innovators for a third consecutive year, which is a regression compared to previous years, when it classified among strong innovators.** A decrease in innovation activity in the 2010–2016 period<sup>96</sup> also had a significant impact on the European Innovation Index (EII) value for Slovenia, which decreased in the 2018–2020 period.<sup>97</sup> According to the last measurement for 2021,<sup>98</sup> this trend was discontinued due to a considerable improvement in the innovators dimension;<sup>99</sup> however, Slovenia still ranked second to last in terms of progress among EU Member States compared to 2014. This classified it below the EU average among moderate innovators for a third consecutive year. Among the Member States joining the EU during its 2004 enlargement, Estonia, Cyprus and Malta ranked higher than Slovenia in 2021. Prior to that, Slovenia was classified among strong innovators with an EII value close to the EU average. Among the EII dimensions, firm investments performed the worst compared to the EU average, due to low non-R&D innovation expenditures.<sup>100</sup> This is also the dimension where the gap with the EU average widened the most between 2014 and 2021. There has also been a significant decrease in finance and support, where traditionally low values for venture capital stand out. The poor performance was also due to the negative contribution of public sector investment in R&D, which declined between 2012 and 2016, reaching 0.52% of GDP in 2019 (EU: 0.72% of GDP). While there was also a significant deterioration in the human resources dimension, mainly due to changes in the education system during that period,<sup>101</sup> but Slovenia still ranks above the EU average in terms of

<sup>96</sup> Slovenia had 46.5% of IAEs in the 2010–2012 period, 45.9% in the 2012–2014 period and 39.8% in the 2014–2016 period.

<sup>97</sup> Index calculations are based on older data; the EII 2021 includes data for the period from t-1 to t-5. The EII 2020 included data on innovation activity from 2014–2016, so the years mentioned above should not be linked to the economic policy of that time.

<sup>98</sup> Certain methodological changes have been made in the European Innovation Scoreboard 2021, which now also includes digitalisation and environment-related topics. The comparable EII time series covers a period of eight years, i.e. the 2014–2021 period (for more information, see EC, 2021c).

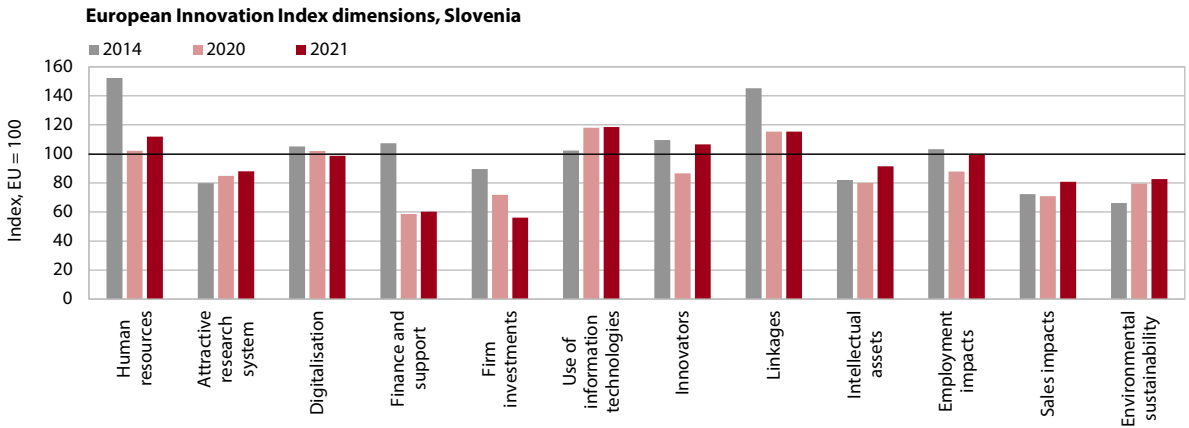
<sup>99</sup> The indicators in the 2016–2018 survey of innovation activity in enterprises (CIS, 2018) have improved significantly, particularly the share of SMEs that have introduced a product innovation. This also includes the share of SMEs that implemented a business process innovation.

<sup>100</sup> For example, expenditure to acquire capital assets (machinery and equipment, software and buildings), intellectual property rights, external knowledge and training on innovation activities for employees.

<sup>101</sup> Including the new doctoral graduates indicator where the most recent EII 2021 measurement implemented methodological changes. This now includes only doctoral graduates in the narrower field of science (science, technology, engineering and mathematics). In 2016, as pre-Bologna study programmes were coming to an end, a large number of PhD students obtained a doctoral degree, so this does not reflect the actual changes in

this dimension. However, the biggest improvement in performance compared to the EU average was achieved in environmental sustainability, mainly due to improved resource productivity. According to regional European Innovation Index measurements, the efficiency of the research and innovation system in Vzhodna Slovenija was lower than in Zahodna Slovenija throughout the 2014–2021 period. In 2021, they reached 79.8% and 98.1% of the EU average respectively, both regions showing an increase from the previous year. If we disregard the concentration of knowledge institutions in Zahodna Slovenija, which provide significant support to the creation and publication of excellent scientific publications, two indicators can be highlighted as a relative advantage in both regions compared to the EU average: product innovators, and employees with tertiary education in knowledge-intensive activities. Between 2014 and 2021, Zahodna Slovenija improved the efficiency of its research and innovation system more than Vzhodna Slovenija (EC, 2021f).

Figure 35: The trend of decreasing efficiency of the Slovenian research and innovation system, as measured by the EII, was discontinued in 2021, but with one of the smallest improvements compared to 2014



Source: EC (2021d).

**Entrepreneurial activity declined with the COVID-19 pandemic, but individuals perceived entrepreneurship positively.** Early-stage entrepreneurial activity<sup>102</sup> constitutes the share of adult population engaged in entrepreneurial activity in a given year. According to the GEM<sup>103</sup> data, this activity increased considerably after the global financial crisis; however, it decreased significantly in 2020 due to the COVID-19 pandemic. The result for Slovenia was low by international comparison, since it is lagging behind the EU average<sup>104</sup> in terms of both nascent<sup>105</sup> and new<sup>106</sup> companies. The share of early-stage entrepreneurs who chose entrepreneurship because of perceived promising business opportunities declined<sup>107</sup> in 2020 after

the field. As a consequence, these changes have also had an impact on the decrease of the human resources component in the following years. When calculating the EII 2021, the 2018 data was used for this indicator.

<sup>102</sup> Early-stage entrepreneurial activity includes individuals who have just set up a new business or are engaging in new business activities, including self-employment. It also includes individuals who are owners/managers of a new business that is less than 42 months old.

<sup>103</sup> The Global Entrepreneurship Monitor (GEM) is a global longitudinal entrepreneurship survey (existing since 1999). Slovenia has participated in the survey every year since 2002. The last survey was carried out in 2020, with fewer countries participating due to the pandemic. In Slovenia, the survey took place from May to July, while in some countries the data collection was carried out over a longer period, up to October. During this time, the pandemic transitioned from the first to the second wave, which should be taken into account when making comparisons between countries, as it may influence respondents' changed perceptions (Rebernik and Širec, 2021).

<sup>104</sup> In 2020, 14 EU Member States were included in the GEM (Global Entrepreneurship Monitor) project.

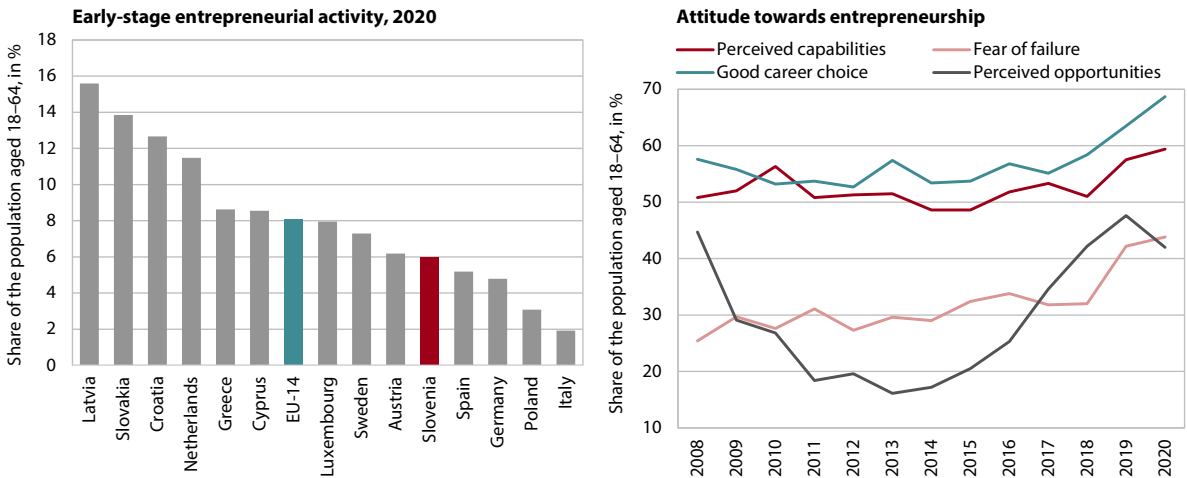
<sup>105</sup> This includes entrepreneurs aged between 18 and 64 years whose business is no more than three months old.

<sup>106</sup> This includes entrepreneurs aged between 18 and 64 years whose business is more than three and less than 42 months old.

<sup>107</sup> It increased in only three EU Member States (Italy, Latvia and Slovakia).

a six-year period of steady growth but remained at a relatively high level. However, the share of the population considering themselves to have sufficient skills and knowledge to start a business remained favourable by international comparison. It is also encouraging that the share of nascent entrepreneurs who faced difficulties in the transition to new entrepreneurs was the lowest among the EU Member States surveyed. This could be a good starting point for future entrepreneurial activity if the relevant supporting policies are improved, especially in the area of fostering innovation and strengthening human capital, where a deficit is showing (IMAD, 2021c).

**Figure 36: While Slovenia ranks low by international comparison in terms of early-stage entrepreneurial activity, the attitude towards entrepreneurship has improved significantly**



Source: GEM (2021a).  
Notes: Early-stage entrepreneurial activity measures the share of the adult population engaged in entrepreneurial activity in a particular year. EU-14: the average of EU Member States included in the latest GEM survey 2020. Perceived capabilities: the share of the adult population who believe they have the necessary skills and knowledge to start a business. Fear of failure: the share of the adult population who would not start a business for fear of failure. Good career choice: the share of the adult population who believe that entrepreneurship is a good career choice. Perceived opportunities: the share of the adult population who believe that there are perceived good business opportunities to start a business where they live.

4.2.2 Digitalisation

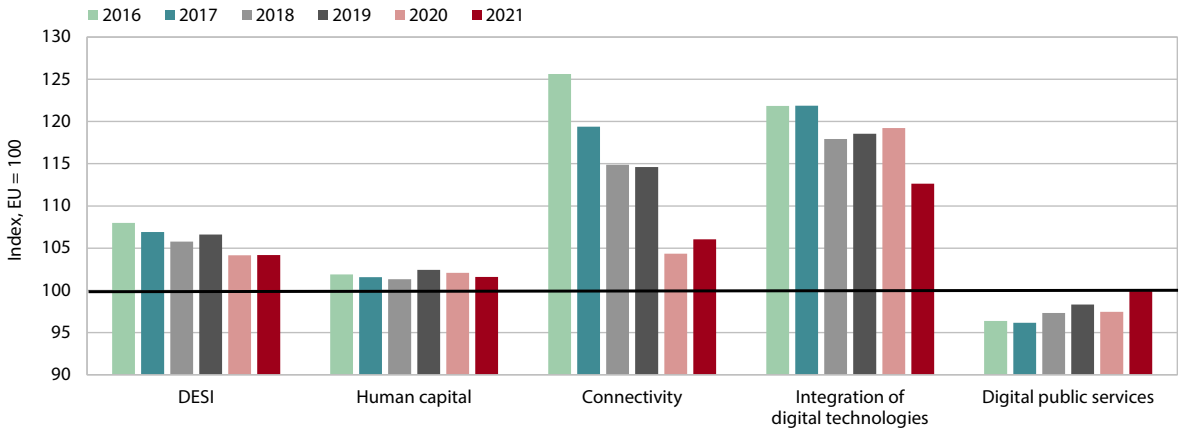
4.2.2.1 Digital economy and society situation

**Slovenia ranks above the EU average in terms of digitalisation of the economy and society, showing some progress in the past year but slowly losing its advantage over the EU average in the long term.** According to the revised methodology, Slovenia has ranked above the EU average in the Digital Economy and Society Index (DESI) since 2016. In 2021, it moved up one place (to 13th), but it has been at a similar level, i.e. between 13th and 14th among EU Member States, since 2016. On the other hand, its advantage over the EU average decreased from 8 to 4 index points between 2016 and 2021, with no change in the last year. The IMD's World Digital Competitiveness Ranking, according to which Slovenia has moved from 34th to 31st place between 2017 and 2020, while in 2021 it fell to 35th place among the 64 countries analysed worldwide, also indicates that the country is merely maintaining its relative position in the field of digitalisation (IMD, 2021a).

**People's attitude towards digitalisation has improved significantly in recent years**

**Slovenia is becoming increasingly open to digitalisation, with positive trends in digital public services, while losing comparative advantages in connectivity and integration of digital technologies.** The Eurobarometer data indicates that people's attitude towards digitalisation has improved significantly in recent years: while in 2017 Slovenia still had the lowest share of citizens among EU Member States who positively evaluated the impact of digital technologies on society (but not on the economy), in 2021, Slovenia has the sixth highest share of respondents who positively evaluated the impact of digital transformation on the economy and society (Eurobarometer, 2021b). While the analysis of the individual components of the DESI shows (see Figure 37) that Slovenia has made progress in the area of digital public services, it maintains its relative position slightly above the EU average in the area of human resources. On the other hand, it is losing competitiveness in connectivity and digital technology integration, where it still has comparative advantages, but they are much less pronounced than in 2016.

**Figure 37: The new European Digital Economy and Society Index (DESI) puts Slovenia ahead of the EU average but with a gradually decreasing advantage over the EU average**



Source: EC (2022); calculations by IMAD.

## 4.2.2.2

## Digital public services and human capital

**Among digital public services, there has been a marked improvement in the use of digital e-government services, while digital services for business remain uncompetitive.** With significant progress in 2021, Slovenia has for the first time caught up with the EU average in the area of digital public services, ranking 16th among EU Member States (it achieved the same ranking in 2019). The main reason for this notable progress lies in the significant increase in the share of people who have used the internet to interact with public authorities.<sup>108</sup> On the other hand, digital public services for businesses remain as problematic as ever, with Slovenia lagging well behind other EU Member States, ranking 22nd. In terms of other indicators, e.g. digital public services for citizens or pre-completed forms, it is around the EU average – the same goes for open data (15th place), which deserves more attention in the future due to its strong multiplier effect on other areas.

**While Slovenia remains slightly above the EU average in terms of human capital in the field of digitalisation, it is at the same time falling further behind innovation leaders.** In the area of human capital, Slovenia's relative position remains slightly above the EU average at 13th place: slightly below average for online user skills and slightly above average for more advanced ICT skills. Despite the average performance, the relatively low share of Slovenians with at least basic digital skills stands out at 55%, while the average for innovation leaders amounts to 70%;<sup>109</sup> the share is also significantly higher in the Czech Republic and Estonia, amounting to 62%. In terms of more advanced ICT skills, Slovenia is slightly above the EU average, with a slight negative trend in the share of female ICT professionals employed and a positive trend in the share of enterprises training their employees in ICT. Slovenia is well above the EU average in this area (by 31 index points in 2021), but at the same time the gap with innovation leaders has widened significantly over the last three years.<sup>110</sup>

## 4.2.2.3

## Connectivity and digital accessibility

**While Slovenia has made slight progress in connectivity in the last year, it has noticeably reduced its comparative advantage in this area in the long term.** On the one hand, on average, it increased its advantage over the EU average in connectivity from four to six index points in 2021. This was mainly due to the allocation of frequencies to 5G operators in June 2021, which indicates an improvement in supply in this segment.<sup>111</sup> A positive shift has also been achieved in the broadband price index, where Slovenia ranks slightly above the EU average for the first time. On the other hand, Slovenia's position in the fixed network continues to deteriorate; in this until recently, it had a clear comparative advantage but now barely ranks above the EU average. For the first time, Slovenia has slipped below the EU average in fixed broadband network access: while the share of households with access to at least 100 Mbps is increasing, it still lags behind the EU average by almost 15 index points. Slovenia is also not in the group of countries with accelerated broadband access deployment with speeds above 1 Gbps, where Hungary stands out in a positive sense.

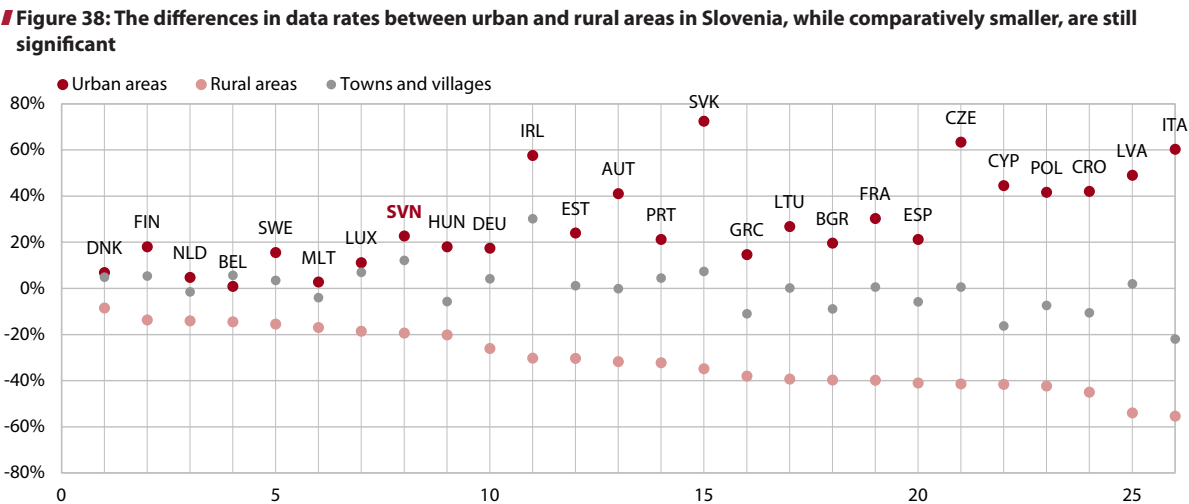
<sup>108</sup>In 2021, Slovenia moved up from 16th to 8th place in this indicator, exceeding the EU average by 19 index points.

<sup>109</sup>The gap with innovation leaders is even more notable when it comes to more than basic digital skills, where the share amounts to 31% in Slovenia and 45% in innovation leaders.

<sup>110</sup>For a more detailed analysis of the skills needed for digital transformation, see Section 5.1.2.

<sup>111</sup>The DESI index for the 5G coverage indicator is based on a study that has not yet taken into account the fact that Telekom Slovenije also started marketing 5G services in October 2020 (AKOS, 2021), so we can expect a further improvement in Slovenia's position in this area next year.

**Slovenia is comparatively lagging behind in fixed broadband coverage, which is particularly disadvantageous in terms of ensuring quality digital accessibility for all, especially in rural areas.** In terms of fixed broadband network coverage, Slovenia has been a clear outlier in positive terms, delivering an even higher coverage than innovation leaders until 2019. In the last two years, however, it has fallen far behind: it is at the EU average with its household coverage of at least 30 Mbps amounting to 88%; it is still 11 index points ahead in terms of very high-capacity networks, but also with a negative trend. According to AKOS, the share of fibre-optic connections in all fixed broadband connections reached 45.3% in the first quarter of 2021 (AKOS, 2021), but this is a linear continuation of the growth trend of the last decade, i.e. without the further acceleration that could be expected in the context of the COVID-19 crisis.<sup>112</sup> Slovenia ranks 38th and 41st in the world in terms of actual internet speeds on mobile and fixed broadband networks respectively,<sup>113</sup> which points to the need for additional and accelerated investment in next-generation technologies. In terms of territorial coverage, AKOS data shows that digital accessibility in some areas of Slovenia remains low (see Appendix 7.4). However, the difference in fixed network internet speeds between urban and rural areas is relatively small compared to other countries, but still 52% and 63% (depending on the rate to or from the user) higher in urban areas than in rural areas<sup>114</sup> (Figure 38).



Source: presentation by IMAD based on data from Ookla, Speedtest Intelligence, obtained by the OECD (Weber and Garcilazo, 2021).  
Note: The data refer to the fixed network data rate to the user on 27 January 2021 and the classification of the areas is based on the OECD methodology (Fadic et al., 2019). Percentages on the x-axis refer to the deviation from the national average data rate (=0%).

<sup>112</sup> See the SURS data on the number of optic access connections.  
<sup>113</sup> The data referring to July 2021 obtained from <https://www.speedtest.net/global-index/slovenia#fixed> on 7 September 2021. The introduction of new technologies is also reflected in the real download speed figures, with Slovenia improving its ranking by 9 places between July 2020 and July 2021.  
<sup>114</sup> Calculations made by IMAD based on the data by Ookla, Speedtest Intelligence, obtained by the OECD (Weber and Garcilazo, 2021). The data refer to the 27 January 2021.

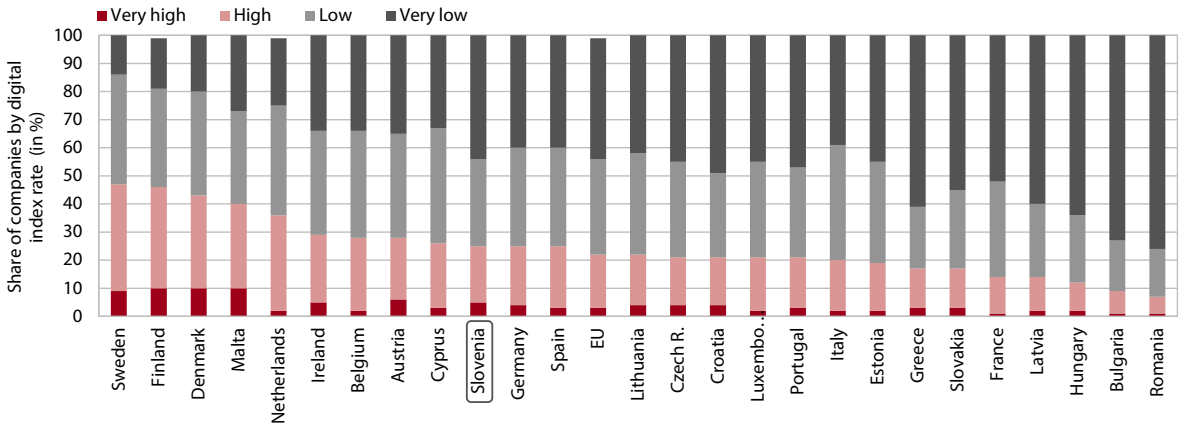
4.2.2.4

Digital transformation technology integration in the business sector

**In terms of the share of digitally advanced companies, large enterprises lag behind innovation leaders by 7 p.p., small enterprises by 16 p.p. and medium-sized enterprises by the largest margin (22 p.p.).**

**Slovenian companies, especially large ones, were among the more digitally intensive in 2021.** According to Eurostat’s Digital Intensity Index (SURS, 2020a), which measures the state of informatisation and digitalisation, 25% of companies in Slovenia had a high or very high digital index in 2021. This puts the Slovenian business sector in a relatively strong position, ranking tenth in the EU, especially for large enterprises, 77% of which are digitally advanced, which is the fourth highest share in the EU.<sup>115</sup> Among medium and small enterprises, 40% and 20% respectively are digitally advanced, enough to rank 12th in the EU. In terms of the share of digitally advanced companies, large enterprises lag behind innovation leaders by 7 p.p., small enterprises by 16 p.p. and medium-sized enterprises by the largest margin (22 p.p.), confirming that these companies require additional economic policy attention – see IMAD (2021c). The share of digitally advanced enterprises is 13 p.p. higher in the Zahodna Slovenija cohesion region, at 31%, than in the Vzhodna Slovenija cohesion region, which represents a significant difference. This is particularly accentuated among medium-sized companies, with 51% of these companies being digitally advanced in Zahodna Slovenija and only 30% in Vzhodna Slovenija. Among large companies, the difference can mainly be seen in the segment of companies with a very high digital index, which is 7 p.p. higher in Zahodna Slovenija.

**Figure 39: Digital Intensity Index 2021 puts Slovenia in a relatively favourable position**



Source: Eurostat (2022).  
Note: The deviation from 100% present in the original data is due to rounding.

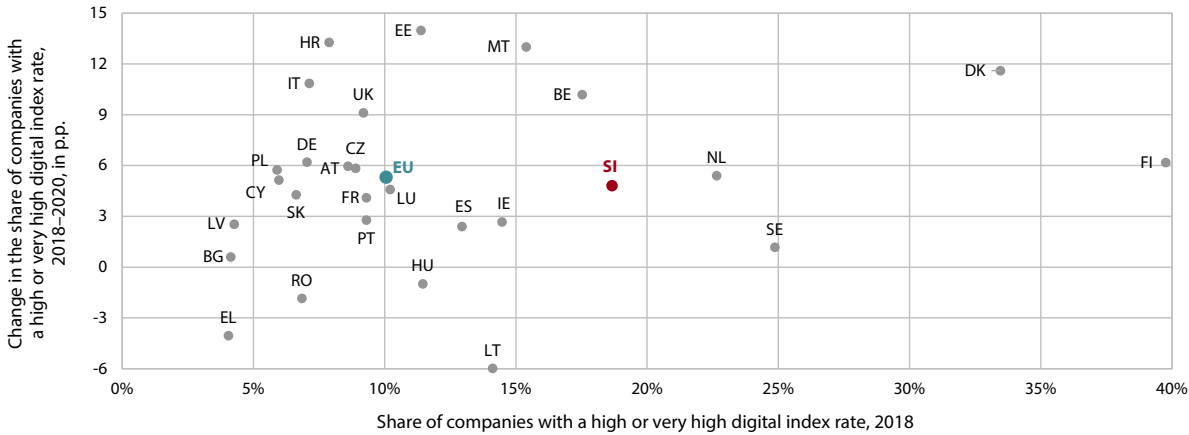
**In this context, the corporate sector is gradually losing its digital comparative advantage and the gap between large and other enterprises is widening.** A comparison of the intensity of informatisation and digitalisation in the business sector based on the Digital Intensity Index 2018–2020<sup>116</sup> shows (Figure 40) that only a handful of below-average EU Member States are taking advantage of the transition to the fourth industrial revolution to significantly accelerate informatisation and digitalisation (Estonia, Croatia and Malta).<sup>117</sup> Slovenia ranks among the EU Member

<sup>115</sup>In terms of this indicator, Slovenian large enterprises are outperformed only by large enterprises from the three innovation leaders according to the European Innovation Scoreboard, i.e. Finland, Denmark and Sweden.  
<sup>116</sup>The data collection methodology only allows for comparison between these two years.  
<sup>117</sup>In addition to the developed countries of Denmark, Belgium and the UK, Italy also showed very high dynamics over the 2018–2020 period and was one of the countries with the highest increase in the European Innovation Scoreboard in 2021.



States with an average speed of informatisation and digitalisation of the business sector in terms of the growth of the Digital Intensity Index. Between 2018 and 2020, it dropped from fifth to eighth place, increasing its gap with innovation leaders from 10 index points to 13.<sup>118</sup> An analysis of the pace of digitalisation over the 2018–2020 period by company size suggests that the gap between large and other enterprises could widen further in the future. The share of digitally advanced large enterprises increased by 10 p.p. (the 10th highest growth in the EU, yet still below the EU average for large enterprises), while the share of medium-sized enterprises increased by 7 p.p. (ranking 12th in the EU) and the share of small enterprises increased by only 4 p.p. (ranking 15th in the EU).

**Figure 40: Despite a notable increase in the share of IT and digitally advanced companies in Slovenia, the progress is average among EU Member States**



Source: Eurostat (2022).

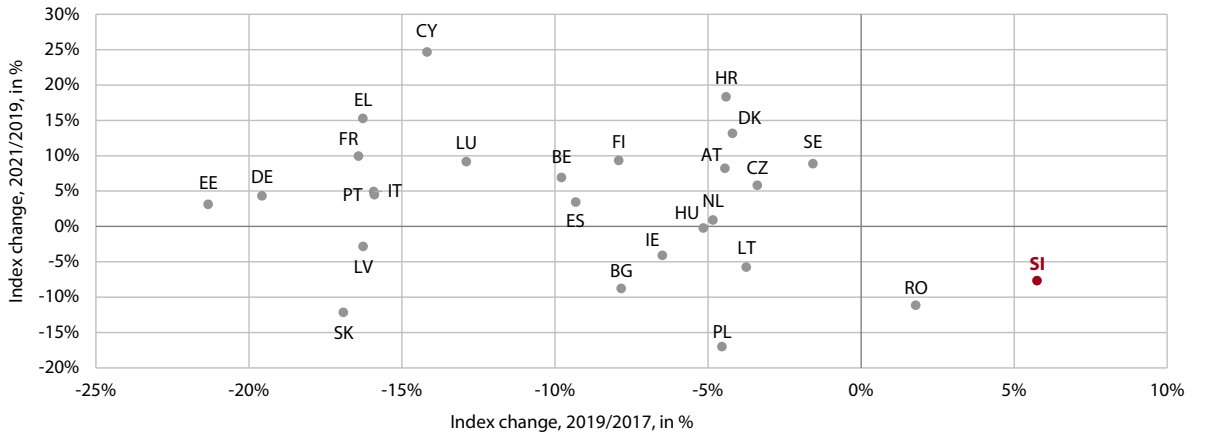
**The COVID-19 epidemic has particularly accelerated the initial stages of informatisation and digitalisation, while the pace of deploying more complex digital projects, including digital transformation, might have slowed.** Surveys in the first year of the crisis due to the COVID-19 epidemic gave mixed but mostly positive signals. For instance, Jaklič and Bruger (2020) found that, by summer 2020, 42% of companies surveyed had already implemented new technologies, while even more positive intentions by companies were indicated in the autumn surveys carried out by Kearney (2020) and Belitski (2021).<sup>119</sup> On the other hand, a SMEs analysis carried out by Klarič et al. (2020) in October based on in-depth qualitative research found that the bulk of the digitalisation processes promoted related to entry-level digital projects; other digital projects were dominated by e-marketing and e-commerce, while more complex projects, such as the deployment of artificial intelligence or digital business models, were almost non-existent. The IMD’s digital transformation index of the business sector also shows that there has been no significant deepening

<sup>118</sup> Similar dynamics are shown by DESI indicators on the use of digital technologies for businesses and e-commerce, where Slovenia still has comparative advantages, but with an even more pronounced decline than in the case of digital intensity. Slovenian companies have a very mixed performance in the use of digital technologies, and, on average, have been losing their comparative advantage since 2017 (see Appendix 4). Within this group of indicators, Slovenia is still among the leaders in the use of e-invoices (ranking 4th), artificial intelligence (ranking 5th) and ICT technologies for environmental sustainability (ranking 7th) but lags far behind in the use of big data, ranking 23rd. In e-commerce, Slovenia went from 10th place in 2016 to 7th place in 2019, while in the last two years it has ranked 10th again, which is still above average.

<sup>119</sup> According to Kearney (2020), 44% of companies expected an increase in the use of robots and automation, while a further 52% somewhat agreed with this expectation. According to Belitski (2021), 98% of SMEs had already increased their use of digital tools during the epidemic, which is the highest among all countries analysed, and an above-average proportion of companies (61%) expect to increase their use of digital tools after the epidemic.

of the processes during the epidemic.<sup>120</sup> According to the index, Slovenia moved up from 18th to 8th place out of 26 EU Member States between 2017 and 2019, even making the fastest progress among EU Member States. As shown in Figure 41, most countries took advantage of the outbreak of the COVID-19 epidemic to accelerate the digital transformation of the business sector dramatically, while Slovenia, at least according to this survey, is in the group of countries that have slowed their momentum. Between 2019 and 2021, it slipped back from 8th to 14th place, the gap with the innovation leaders widening by almost a third compared to 2017.

**Figure 41: According to the IMD’s digital transformation index of the business sector, Slovenia moved up from 18th to 8th place between 2017 and 2019, before falling back to 14th place by 2021**



Source: IMD World Competitiveness Report (2021b); calculations by IMAD.

**Only 23% of Slovenian companies base their competitive advantage on customising their products and services to the customer (ranking 20th in the EU).**

**The fact that the business sector continues to be slow to respond to the changed nature of innovation is also reflected in the lack of focus on the introduction of new business models, breakthrough and disruptive innovation,<sup>121</sup> and the adaptation of business processes and organisation.** The transition to the fourth industrial revolution is changing the nature of innovation, with an increasing importance of new business models that require a more flexible specialisation by companies, including mass customisation and a greater focus on disruptive and breakthrough innovations. This also requires companies to change their organisation and operations towards more agile, open and collaborative approaches (IMAD, 2020a). In terms of the latter, Slovenia entered the crisis moderately prepared: according to Eurofound (2020), 40% of companies<sup>122</sup> in Slovenia still operate on a “command and control” basis, ranking around the EU average at 14th place, while Župić et al. (2016) found an even lower level of organisational innovation than in companies in the Adriatic region.<sup>123</sup> In terms of the share of Slovenian companies that base their competitive advantage on customising their products and services to the customer

<sup>120</sup>The IMD Competitiveness Report provides an insight into a consistent timeline of the digital transformation of the business sector up to and including 2021 (IMD, 2021b). This is an annual survey conducted between February and April, where companies rate their agreement with the statement that digital transformation is generally well implemented in companies.

<sup>121</sup>For comparison, see Ugovšek (2020a): for breakthrough innovations, the problem is well defined, but the necessary domain knowledge is not, as the problem is extremely difficult to solve (e.g. iPhone, Tesla); for disruptive innovations, on the other hand, the problem is not well defined, but the necessary domain knowledge is, with the innovation reflecting in change in the market and, generally, in the business model adapted to the new situation (e.g. Airbnb, Netflix).

<sup>122</sup>The remaining categories in the questionnaire refer to companies characterised by “selective job complexity and autonomy” (55% of companies) and companies with “high job complexity and autonomy” (5%).

<sup>123</sup>In accordance with the study, the Adriatic region refers to the following countries: Albania, Bosnia and Herzegovina, Croatia, Greece, Italy, Montenegro, Slovenia and Serbia. For an assessment of the scale of investment in organisational capital, see Section 4.2.4.

needs, they perform even worse, at 23% (ranking 20th in the EU), almost half the share of the leading countries in this area (Eurofound, 2020). When it comes to business model innovation, according to Pucihar et al. (2018), only 25% of SMEs were engaged in this process in 2016 and 2017, but they did not allocate specific financial resources or set up a dedicated team for this purpose (ibid.). Similarly, Klarič et al. (2020) point to a poor understanding of digital business models, with 60% of participating SMEs having no or poor understanding of digital platforms and 41% having no or poor understanding of “service rental” by the end of 2020. All of the above is reflected in the structure of innovation, which is still not sufficiently based on breakthrough and especially disruptive innovations. According to Ugovšek (2020b),<sup>124</sup> 24% of companies surveyed are engaged in breakthrough and 11% in disruptive innovations, with only 4% of medium-sized and 7% of large enterprises engaged in the latter.

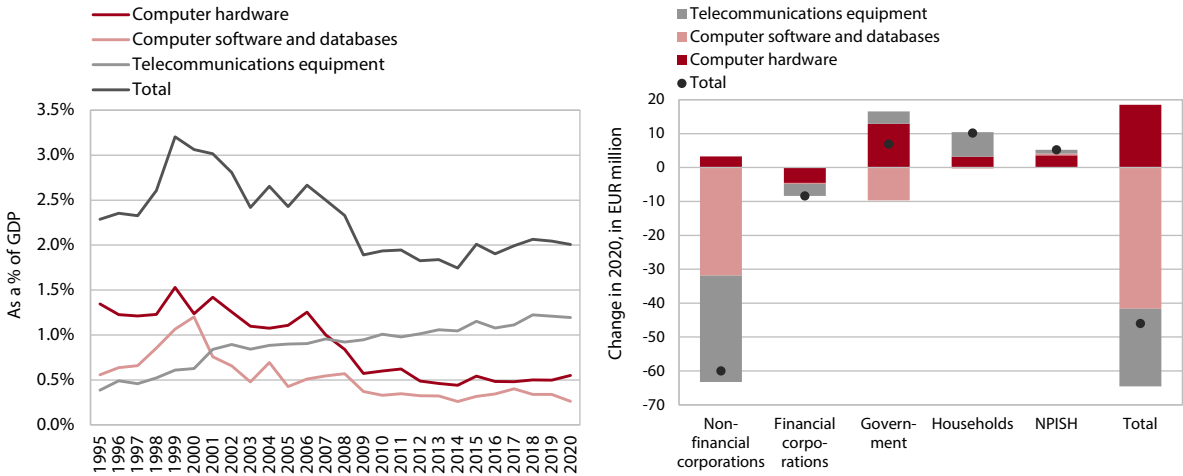
4.2.2.5

ICT and digitalisation investments

■ *Slovenia lags behind the top five countries in terms of investment in ICT by an average of 1.9% of GDP since 2014 and behind successful competitors by 1.2% of GDP.*

**Slovenia did not accelerate its ICT investment in 2020; it has remained at around 2% of GDP for the last ten years.** Slovenia is one of the EU Member States with below-average investment in ICT, lagging behind the top five countries by an average of 1.9% of GDP since 2014 and behind successful competitors<sup>125</sup> by 1.2% of GDP (IMAD, 2021c). In Slovenia, ICT investment accounted for 2% of GDP in 2020, a decrease of EUR 46 million or 4.7% compared to the previous year.<sup>126</sup> While investment in computer hardware increased (by 8%, i.e. EUR 18.5 million), investment in software and databases and in telecommunications equipment decreased more sharply: the former by 3.9%, i.e. EUR 22.9 million, continuing a negative trend for the second year in a row, and the latter by 25%, i.e. EUR 41.6 million. Gross investment in telecommunications equipment in 2020 thus amounted to EUR 122.3 million, i.e. 0.26% of GDP, reaching the lowest point compared to 2014 GDP.

■ **Figure 42: Long-term decline in gross investment in ICT (left) and significant drop in business sector investment in 2020 (right)**



Source: SURS (2022); calculations by IMAD.  
Note: The change in the figure on the right is expressed in constant 2020 prices; NPISH refers to non-profit institutions serving households.

<sup>124</sup>The survey was conducted between September and November 2020.  
<sup>125</sup>The top five countries in terms of ICT investment are Sweden, the Czech Republic, Malta, France and the Netherlands, while the three successful competitors are the Czech Republic, Lithuania and Estonia (IMAD, 2021c).  
<sup>126</sup>They also declined as a share of GDP; comparable data for other countries are not yet available at the time of writing.

**The decrease in ICT investment in 2020 is mainly due to lower investment by the business sector.** The bulk of the EUR 60 million decrease in ICT investment came from non-financial corporations, representing a 9.3% decrease compared to the previous year, while financial corporations also recorded a negative trend. Investments decreased in telecommunications equipment and in software and databases, which are closely linked to digitalisation (by EUR 32 million and EUR 35 million respectively). ICT investment accelerated most in transport, agriculture and construction, while arts, entertainment and recreation, administrative and support service activities, electricity, gas, steam and air-conditioning supply, professional, scientific and technical activities, ICT, and manufacturing stand out as declining.<sup>127</sup> Notwithstanding the even greater emphasis on digital accessibility in the context of the COVID-19 epidemic, the government also decreased its investment in telecommunications equipment by 42.6% or EUR 9.7 million in 2020, while increasing its investment in computer hardware (by 20.1%). The increase mainly focused on education and administration activities but not on health (see Appendix 4). While government investment as a percentage of GDP in all three types of ICT has stagnated over the last decade, non-financial corporations have been increasing their investment in computer software and databases, with their investment in other two types also stagnating (see Appendix 4).

■ Prior to 2009, Slovenia allocated 2 p.p. of GDP more than the EU average on investments related to digitalisation and modernisation, and since 2014 only as much as the EU average.

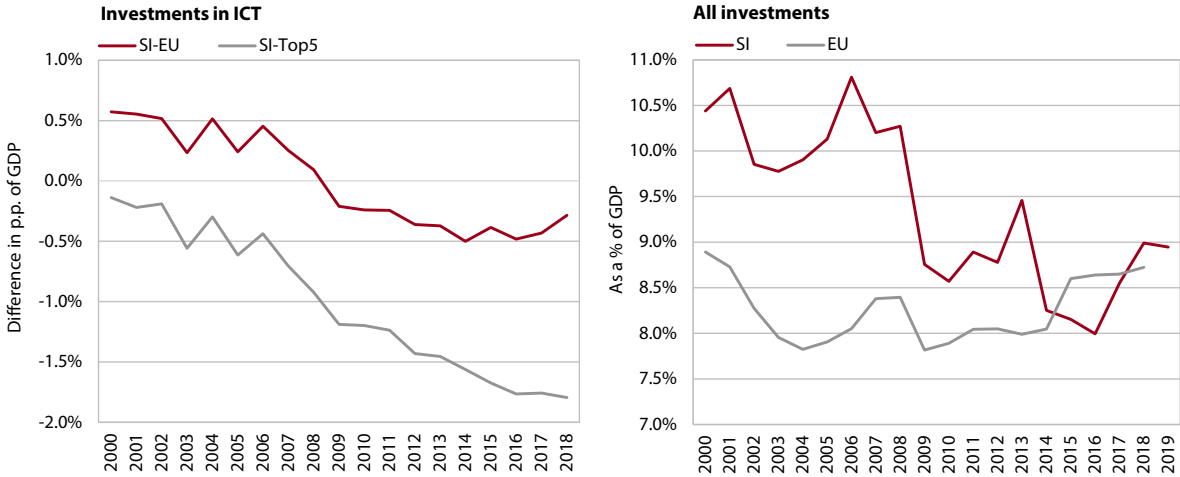
**The situation and trends in the digital intensity of the economy are, with a delay, in line with the dynamics of investment in ICT, RDI, and other machinery and equipment, which was high to start with but has been declining in trend relative to the EU as a whole.** As shown in Figure 43, left, Slovenia has lagged behind the EU average in ICT investments by a good third of percentage points of GDP for the last decade, while the gap between Slovenia and the leading five countries now stands at 1.8 p.p. of GDP. It should be taken into account however that digital intensity is influenced not only by investments in ICT but also by investments in equipment (e.g. due to introducing robots or 3D printers), while digitalisation, automation and modernisation of the production and operations in general are linked to investments in research, development, innovation and human resources. Data based on a common methodology is required to analyse these trends. They can be provided for investments in fixed assets for ICT, R&D activities, and other equipment and machinery<sup>128</sup>. Prior to the global financial crisis of 2009, Slovenia allocated 2 p.p. of GDP more than the EU average for these investments (related to digitalisation and modernisation), which was the 5th highest share in the EU. During the global financial crisis and fiscal consolidation between 2009 and 2013, Slovenia's investment advantage fell to 0.9 p.p. of GDP, which ranked it 7th in the EU. Since the economic growth in 2014, Slovenia has on average invested as much as the EU average for these purposes. According to the start of the period considered, lower investments were caused by less investments in ICT (by 0.9 p.p. of GDP) and other machinery and equipment (0.8 p.p. of GDP) to an approximately equal extent.<sup>129</sup> Digitalisation and modernisation are also impacted by non-financial factors. However, it seems realistic to expect that the initially high investments that have experienced a downward trend explain, at least partly and with a lag, the still relatively high digital intensity of the economy and at the same time the gradual falling behind compared to the average progress in the EU.

<sup>127</sup> Manufacturing decreased its ICT investments in all three segments by a total of EUR 11 million, i.e. 8.4%.

<sup>128</sup> However, not in education and training, which would be appropriate in terms of content, but the data do not allow it, at least not on the basis of a common methodology.

<sup>129</sup> The same structure occurs when only non-financial corporations are considered for investment, based on data from SUR5.

**Figure 43: In the last two decades, Slovenia has moved from the group of countries making most digitalisation-related investments to the group making average investments**



Source: Eurostat (2022), calculations by IMAD.  
Note: Total investments include investments in ICT, R&D activity, and other machinery and equipment. The average is calculated as weighed average, using GDP as the weight. Greece and Cyprus were not included in the EU average due data unavailability; this has no significant impact on the results. For the definition of top 5 countries, see footnote 125.

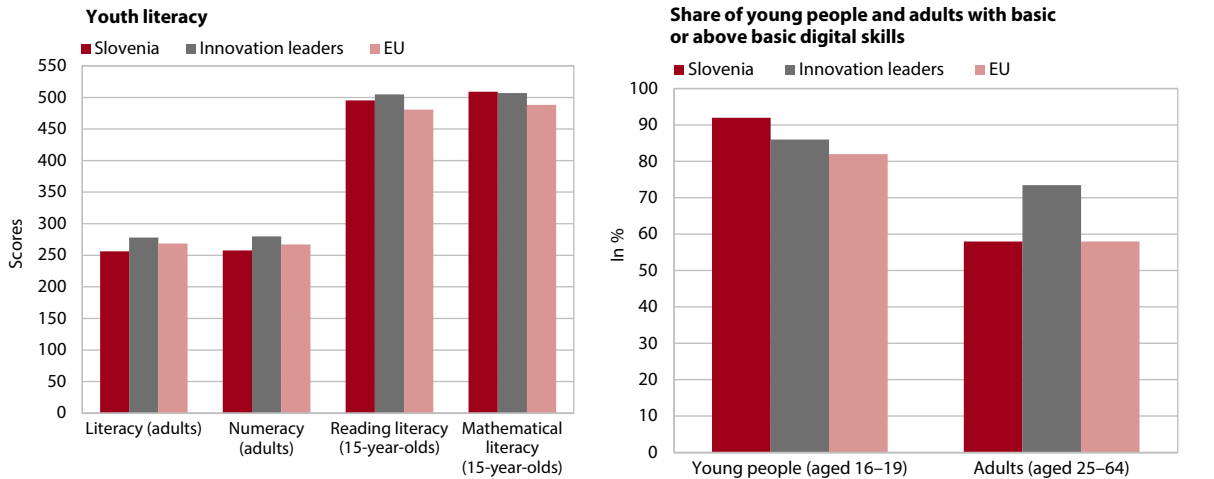
4.2.3 Human capital

**The educational structure of the adult population has been improving for several years (SURS, 2022) and the education of young people is relatively good; however, skills among the low-educated and older people remain low.** Due to long-standing high participation of young people in education and the transition of younger, better-educated people into older age groups, the share of adults with at least an upper secondary education increased in the last decade and was higher even than among the innovation leaders in 2020. However, the share of adults with tertiary education still lagged significantly behind, despite years of increase.<sup>130</sup> Due to much higher participation, the share of women in tertiary education is significantly larger than that of men<sup>131</sup> (Eurostat, 2022). The quality of the education as measured by the 2018 PISA study indicated that Slovenian 15-year-olds outperformed their peers from the innovation leader countries in mathematics and science, while their reading literacy was lower by comparison and had even considerably deteriorated compared to 2015 (OECD, 2019f). According to the observations of the Court of Auditors (2021) and the analysis by Breznik et al. (2021) there is room for improvement in working with gifted pupils and students, who are the potential future talent. It is, however, encouraging that between 2010 and 2020 the share of young people (aged 15–29) who believe that schooling provided them with the relevant skills to start a business and motivated them to become entrepreneurs has increased.<sup>132</sup> In 2020, children and young people underwent a temporary period of distance learning due to the epidemic, facilitated by a number of activities and adjustments (EC, 2020b; MIZŠ, 2020; OECD, 2021k; SIO, 2020); however, there have been some problems with the accessibility of education and negative impacts on knowledge and skills of pupils and students could become

<sup>130</sup>In 2020, the share of adults (aged 25–64) with tertiary education in Slovenia was 35.9% (in innovation leaders 43.8%) (Eurostat, 2022).  
<sup>131</sup>The difference in the share of men and women with tertiary education in Slovenia in 2020 was 13.7 p.p. (in innovation leaders 12.7 p.p.).  
<sup>132</sup>According to the studies Youth 2020 and Youth 2010 (Lavrič and Deželan, 2021).

apparent in the future, especially the impact on the development of social skills (IMAD, 2021c, 2021a). The relatively good educational structure of the population and good performance of young people are also reflected in Slovenia's high ranking according to the CEDEFOP's 2020 European Skills Index, a composite indicator measuring the performance of a country's skills system, which ranks Slovenia third behind the Czech Republic and Finland (CEDEFOP, 2021a).<sup>133</sup> Less favourable is the skills development in adults. Their proficiency in literacy and numeracy is lower than in the innovation leaders and falls among the average of 19 EU Member States that are also OECD countries<sup>134</sup> (OECD, 2016) and their digital skills were the same as the EU average; however, the low level of skills of lower-educated and older people stands out in all three areas (Eurostat, 2022; OECD, 2016).

**Figure 44: Relatively high level of skills (literacy) of young people and low level of skills in adults in comparison with the innovation leaders**



Sources: OECD (2019f), OECD (2016), Eurostat (2022).  
Notes: The figure on the left shows data for adults for the unweighted average of the 19 EU Member States for which data are available. For 15-year-olds, the unweighted average is calculated as the EU average.

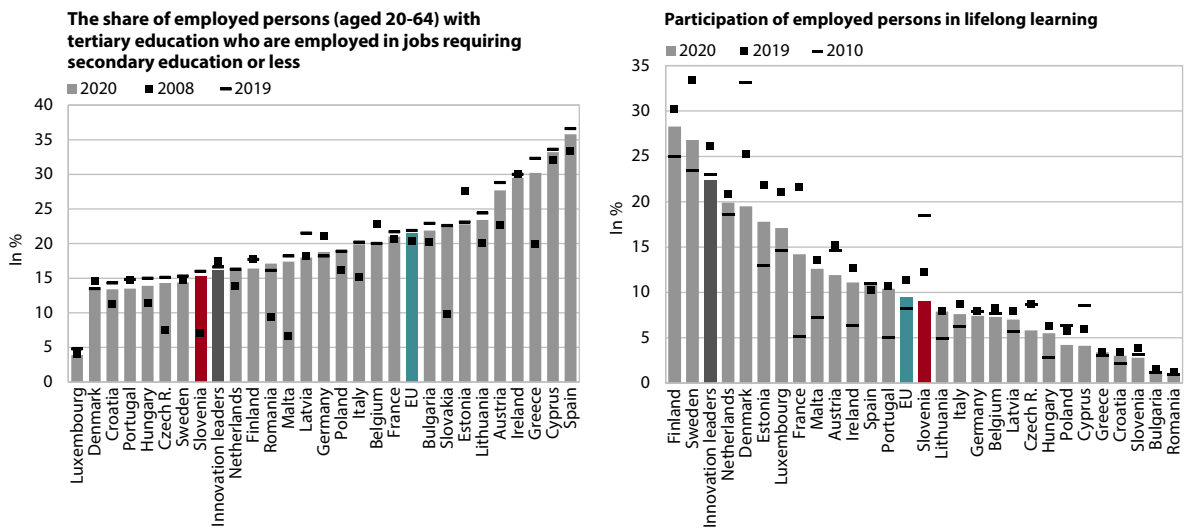
**In the second half of 2020, more than a third of all companies and over 60% of large enterprises faced job candidate shortage.**

**Disparities in knowledge and skills can have a long-term negative impact on the development potential of the economy.** While at the start of the COVID-19 epidemic in 2020 fewer companies faced a shortage of suitable job candidates due to economic downturn than in previous years (ESS, 2020c), the number of such companies soon increased. In the second half of 2020, more than a third of all companies and over 60% of large enterprises faced job candidate shortage (ESS, 2021b). In particular, there has been a lack of profiles with upper secondary vocational and professional education and certain tertiary education profiles, especially science and technology graduates (ESS, 2020d). While the share of these graduates is higher than in the innovation leaders (Eurostat, 2022), their 2020 numbers were lower than the 2012 peak due to unfavourable demographic trends (smaller generations) (SURS, 2022). With the increasing needs of digital economy, the shortage of ICT graduates is also a growing concern. In the context of strengthening the country's development and research potential, the low number of new doctoral

<sup>133</sup>The index consists of the following indicators: the pupil-to-teacher ratio at the pre-primary level, the share of the population (aged 15–64) with at least upper secondary education, the scores achieved by 15-year-olds in reading, mathematics and science literacy, adult participation in lifelong learning activities, participation in vocational education and training at upper secondary level, and the share of people (aged 16–74) with advanced computer skills (CEDEFOP, 2021a).  
<sup>134</sup>According to the Survey of Adult Skills (PIAAC) conducted under the auspices of the OECD.

graduates is also unfavourable.<sup>135</sup> For many years, the supply of healthcare graduates has been insufficient, which has become an even more pressing issue due to the COVID-19 epidemic.<sup>136</sup> In addition, there is an oversupply of tertiary education graduates on the labour market; however, in most EU Member States, their numbers are even higher (Figure 45, left). As a result, the rate of employment of tertiary education graduates in occupations requiring upper secondary education or less has increased substantially since the previous global financial crisis (Figure 45, left).

**Figure 45: There has been a significant increase since 2008 in the share of the employed persons (aged 20–64) with tertiary education employed in occupations requiring upper secondary education or less (left) and a sharp decline in participation in lifelong learning among the persons employed since 2010 (right)**



Source: Eurostat (2022).

**The long-lasting decline in the participation of adults<sup>137</sup> in lifelong learning is extremely unfavourable in terms of the digital and green transformation of the economy and other development challenges.** Participation has fallen significantly since its peak in 2010 and has been low among the older people and low-educated for many years. In terms of activity status, there has been a sharp decline in the participation rate of the unemployed, which could contribute to reducing the labour market mismatches, and the lifelong learning participation rate of the employed persons (Figure 45, right), which has been lower in the private sector than in the public sector for many years (Eurostat, 2022), despite employees and managers recognising the need for additional skills.<sup>138</sup> Such trends slow the development of human capital and the potential to reduce the labour market mismatches and have a long-term negative impact on the development potential of the economy. In 2020, the participation of employees in lifelong learning declined further because of the shut-down of the economy due to the COVID-19 epidemic and the decline in educational provision which followed; at the same time, the need for certain skills and knowledge increased due to green and digital transformation, technological developments, etc.

<sup>135</sup> In 2019, Slovenia had 1.9 new doctoral graduates per 1,000 people aged 25–34, whereas the innovation leaders had 2.4.

<sup>136</sup> Mramor et al. (2020) highlight the importance of access to healthcare services for economic productivity.

<sup>137</sup> Employed, unemployed and inactive population (CEDEFOP, 2020).

<sup>138</sup> In Slovenia, 72% of surveyed employees believe that their job requires them to constantly work on their skills (CEDEFOP, 2020a).



**Public and private expenditure on education and training for children, young people and adults is relatively low.** Public expenditure on formal education (expressed as share of GDP), mainly allocated for the education of children and young people, has mostly been falling since 2012 and was lower than EU and the innovation leaders' average in 2018 (by 1.77 p.p.). The numbers were lowest for the tertiary level of education (falling behind by 0.75 p.p.) (Eurostat, 2022). Adults often pay for formal education out of their own pocket (EC, 2020a). At the same time, public expenditure on adult education is low compared to other EU Member States (OECD, 2019a)<sup>139</sup>, thus education is often inaccessible, especially for the low- and upper-secondary-educated. Expenditure of adults on their own education and of employers on the education of their employees are also low (EIB, 2020; OECD, 2019e)<sup>140</sup> and have fallen further over a long period of time.<sup>141</sup> In 2021, the EU adopted the European Pillar of Social Rights Action Plan, according to which 60% of all adults from the EU should, by 2030, take part in education and training every year<sup>142</sup> (EC, 2021b). In addition, the EU Member States will have to define their own national targets for adult participation in education and training. In order to reach the target, Slovenia will need to significantly increase the expenditure on adult education, develop a culture of lifelong learning and make it more accessible, especially for under-represented groups.

## 4.2.4

## Other types of soft intangibles

**Slovenia seems to have regressed from one of the leading countries investing in soft intangibles before joining the EU to an average investor.** Among other forms of intangible assets for which the data are available, although based on relatively less reliable estimates based on input/output tables, investments in design, branding and organisational capital are also analysed.<sup>143</sup> Ranking fourth by share of these investments in adjusted<sup>144</sup> value added prior to its accession to the EU, Slovenia was among the leading European countries in this area. In the same period, only the United Kingdom, Sweden and Belgium invested more. Slovenia was lagging behind by 0.9 p.p. of gross value added and investing 0.8 p.p. of gross value added more than the average of the countries analysed. In the 2015–2017 period, Slovenia's level of investment remained unchanged, while 12 out of 18 analysed countries accelerated their investments, pushing Slovenia down to the group of average investors in these forms of intangibles. Slovenia's gap with the top three countries, Belgium, Sweden and Finland, all belonging to the group of innovation leaders according to the European Innovation Scoreboard, widened to 1.9 p.p. of gross value added, with Slovenia only exceeding the average of all analysed countries by 0.1 p.p.

<sup>139</sup>In 2020, expenditure of ministries (Ministry of Education, Science and Sport, Ministry of Labour, Family, Social Affairs and Equal Opportunities, Ministry of Agriculture, Forestry and Food, Ministry of Culture, Ministry of Public Administration, Ministry of the Interior, and Ministry of Justice) on adult education amounted to 0.15% of GDP (SIAE, 2020, 2021; SURS, 2021a; calculations by IMAD).

<sup>140</sup>According to the EIB Investment Survey 2020/2021, investing in education and training accounted for 4.1% of total investments in Slovenia, which is significantly less than the share of these investments in the innovation leaders (10.1%) (EIB, 2020).

<sup>141</sup>The 2019 expenditure of employers on education per employed person approximately halved compared to 2009 (SURS, 2022).

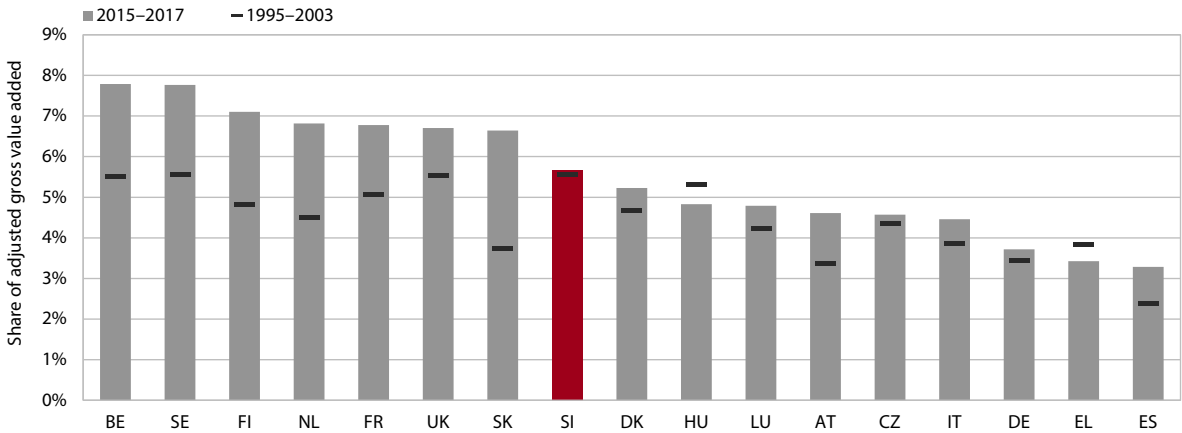
<sup>142</sup>Adult participation in education will be measured by an indicator to be included in the Labour Force Survey and based on the methodology of the Adult Education Survey.

<sup>143</sup>The analysis is based on data by INTAN Invest, which have been estimated according to the Corrado et al. (2016) method on the basis of an input/output table for services from the following activities: architectural and engineering activities; technical testing and analysis (design), advertising, and market research (branding), legal and accounting activities and activities of head offices; and management consultancy activities (part of the organisational capital purchased), taking into account management remuneration to estimate the investments in organisational capital.

<sup>144</sup>The forms of intangible assets identified with the new methodology, which are not included in the national accounts, i.e. design, branding, organisational capital and vocational training, have also been added to the calculation of gross value added according to the national accounts.



Figure 46: Slovenia regressed from a leading to an average investor in soft intangibles



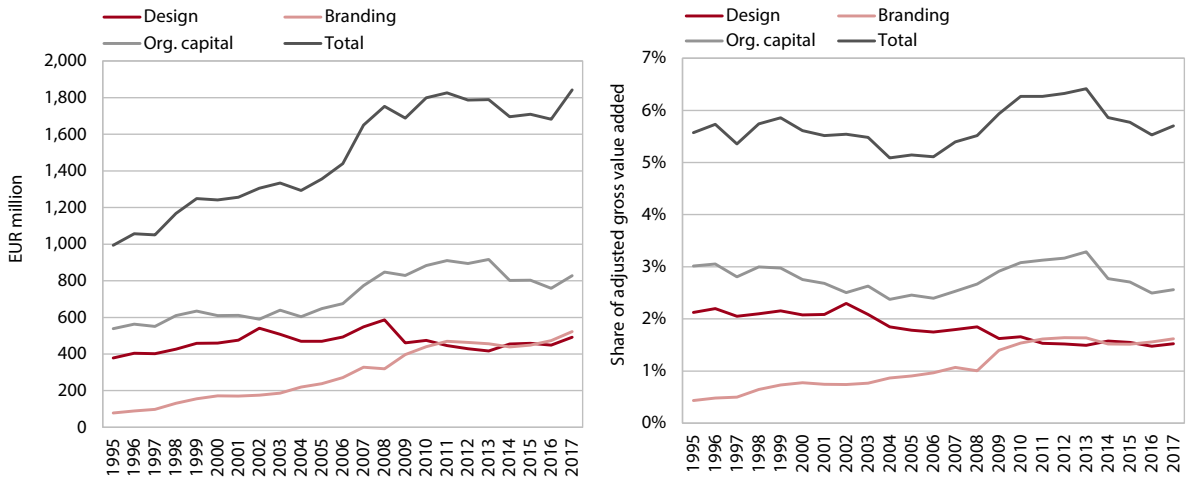
Source: INTAN Invest (2021), in accordance with Corrado et al. (2016); calculations by IMAD.  
Note: Gross value added is consistently adjusted with the expanded definition of gross fixed capital formation.

To bring the relative value-added level of investment in design to that of the top three countries, Slovenia would need to increase its investment by more than a third.

Although investments in soft intangibles in the value added are stable in Slovenia, their structure has changed considerably; in particular the importance of design has been significantly minimised. Slovenia was increasing the level of investment in nominal terms until the onset of the 2009 global financial crisis, in particular in branding and organisational capital. Since then, the level of investments stayed around EUR 1.75 billion; around half of it was spent on organisational capital (EUR 850 million) and EUR 450 million on branding, which was the only one to show an upward trend in nominal terms. The share of total investments in adjusted gross value added also remained at a comparable level throughout the period, with a slight downward deviation in the 2004–2008 period and upward deviation in the 2010–2013 period (Figure 47, right). However, there has been a significant change in the share of investments in design and investments in branding. After 2002, the relative level of investments in design was steadily declining, while the level of investments in branding was strongly accelerating up until the 2009 global financial crisis, when it became equal to investments in design in relative weight. This resulted in Slovenia falling from first to the still high fifth place in design investments and rising from seventeenth to sixth place in branding among the countries analysed. This could indicate a normalisation of the investment structure for these two purposes;<sup>145</sup> however, the top three countries in design investments increased their share of investments during the 1995–2017 period from 55 to 65%, as opposed to Slovenia, whose share fell from 85 to 48%. To bring the relative value-added level of investment in design to that of the top three countries, Slovenia would need to increase its investment by more than a third (by 37%).

<sup>145</sup> Sweden, Finland and Denmark, also innovation leaders according to the European Innovation Scoreboard.

Figure 47: Changes in investment structure of soft intangibles



Source: INTAN Invest (2021), consistent with Corrado et al. (2016); calculations by IMAD.  
Note: The EUR million on the left are expressed in 2020 constant prices, while the gross value added on the right is consistently adjusted in line with the expanded definition of gross fixed capital formation.

### 4.3 Social and institutional capital

Social and institutional capital factors tend to have a more indirect impact on productivity, which, however, becomes more important over time. These factors include the openness of the economy and society, appeal to talent, social support for entrepreneurship, institutional factors affecting the business environment (quality of institutions, regulatory framework), and trust in people and institutions.

**According to most indicators, the international integration of the Slovenian economy is high; however, in terms of competitiveness of the economy, the openness of society to change, new ideas, globalisation and different cultural patterns is relatively low.** Exposure to international competition and trade openness play an important role in raising productivity growth (Edwards, 1997; Söderbom and Teal, 2003) and also have a significant impact on the reallocation (and in some cases specialisation) of production, the elimination of less efficient firms, and a greater ability to absorb technological advances and new ideas. The openness of the economy indicator (imports and exports as a share of GDP) shows that Slovenia is among the EU Member States most open to trade, and as a small open economy it is relatively well integrated into global value chains (GVCs), with a higher value on the GVC participation index than the EU average and the innovation leaders (IMAD, 2020a).<sup>146</sup> Foreign direct investment (FDI) is also an important source of economic growth and productivity contribution, creating new job opportunities, enabling knowledge transfer and the introduction of advanced technologies, etc. (Rojec et al., 2007). Despite a relatively rapid growth of FDI inflows in the few years before the outbreak of the epidemic, Slovenia's inward FDI stock as a share of GDP remains very low compared to other EU Member States.<sup>147</sup> Most often foreign investors point out human resources and their knowledge, flexibility, reliability and

<sup>146</sup>This is particularly true for the backward GVC participation (the ratio of the foreign value added content of domestic exports to gross exports), which, according to empirical research, also has a noticeable effect on productivity (Adarov & Stehrer, 2020).  
<sup>147</sup>See also the indicator 1.15 in the IMAD report (IMAD, 2021c and 2021a).

originality as Slovenia's advantages<sup>148</sup> (IMD, 2021b). Slovenia's geostrategic location and reliable healthcare and education infrastructure are also often seen as an advantage. Government efficiency and business efficiency are less favourable than in innovation leaders, with workforce availability and skills<sup>149</sup> becoming an increasingly important limiting factor of productivity due to demographic change and rapid technological progress (IMD, 2021b). The international comparison also shows that, according to economists, Slovenia as a society is less open to new ideas, change and globalisation (IMD, 2021b), which is an increasingly pronounced weakness in the context of intense competition for talent. Slovenia also lags behind innovation leaders and the EU average in readiness for change, including understanding the need for structural reforms and risk-taking (IMD, 2021b; WEF, 2019). Research shows that openness is also linked to the influence of different cultural patterns;<sup>150</sup> Slovenia as a society emphasises a sense of community rather than individualism and is less prone to taking risks and more hierarchical and centralist than the innovation leaders (Hofstede Insights, 2021).

■ *Attracting and retaining talent is increasingly becoming a corporate priority.*

**Slovenia is less appealing to talent than the majority of economically more advanced EU Member States.** The IMD World Talent Ranking ranks Slovenia in the bottom half of EU Member States (15th place among the 26 EU Member States on the IMD World Talent Ranking (2020), with Slovenia lagging behind the innovation leaders. Investment in and development of the national talent and the availability of the skills and competencies (readiness) were rated relatively well. Slovenia ranks lower in terms of its appeal to talent, which is greatly influenced by various factors: salaries paid to service industry workers and managers, the attractiveness of the business environment for foreign experts, personal income taxation, the fairness of justice, and the brain drain. It is a positive development that attracting and retaining talent is increasingly becoming a corporate priority; however, there is still room for improvement, especially regarding motivating the employees for work (IMD, 2020). Companies in Slovenia less often motivate their employees through cash awards and interesting and stimulating work environment than the EU average (Eurofound, 2020). In addition to salaries, maintaining a healthy organisational climate and relations, career opportunities and complex challenges requiring greater responsibility are also important, as is ensuring good working conditions<sup>151</sup> for higher education lecturers and researchers (Hodak et al., 2021). Teleworking is also a way to increase worker satisfaction (OECD, 2020b). Slovenian workers are mostly satisfied with telework (Eurofound, 2021c). Due to the COVID19 epidemic,<sup>152</sup> the interest in working (and living) abroad has at least temporarily declined both in Slovenia and other countries, but at the same time there is an increased interest in virtual mobility, where an employee works remotely for an employer physically based in another country (Kovács-Ondrejko et al., 2021), which is both a threat and an opportunity for the country. While talent outflow worsens the availability of human capital, it can also be beneficial, especially in the case of circular migration (FriesTersch et al., 2020). Attention should therefore also be paid to attracting Slovenian experts who have been working abroad. Experts who have moved abroad for a long period can also contribute to the country's development, but it

<sup>148</sup> According to a survey among companies with foreign capital.

<sup>149</sup> Retaining and attracting national and international talent is therefore an important challenge in this area.

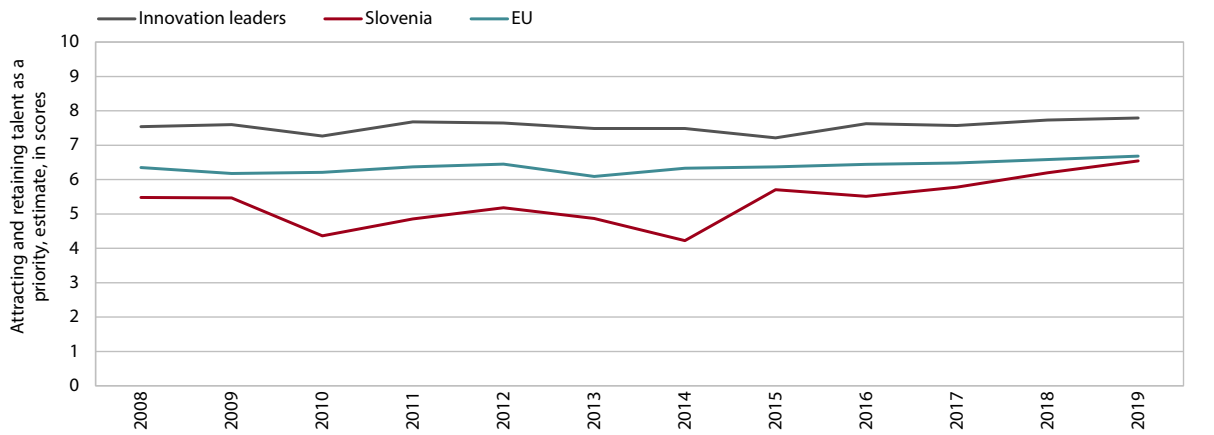
<sup>150</sup> Openness is particularly linked to the fundamental dimensions, such as individualism/collectivism, avoiding uncertainty and power distance, and to values such as rationality, perseverance and determination (de Jong et al., 2006; Korošec, 2001). The literature indicates that open countries are more about individualism and risk-taking and less about hierarchy.

<sup>151</sup> Study results showed that simplifying recruitment processes in higher education and research institutions and increasing public funding for research and development would improve the likelihood of Slovenians returning from abroad.

<sup>152</sup> According to the Global Talent Survey (Kovács-Ondrejko et al., 2021).

is important to maintain contact with them. Many countries are making significant efforts and adopting measures to attract foreign experts, who are in short supply on the market (OECD, 2020a). Another potential source of experts is foreign students. The share of foreign students participating in tertiary education in Slovenia in 2019 was lower than the average of OECD-EU countries (OECD, 2021c). In Slovenia, the attracting of foreign students is also hindered by limitations related to conducting the study process in English and the tightening of the requirement of providing proof of sufficient means of subsistence as of the 2021/2022 academic year.<sup>153</sup>

**Figure 48: While Slovenian companies have paid more attention to attracting and retaining talent<sup>1</sup> in recent years, the gap with the innovation leaders remains significant**



Source: IMD (2021b).  
Note: <sup>1</sup>Answers to the survey question: to which extent is attracting and retaining talents a priority in companies. The answers were valued 0 to 10; the greater the number the greater the priority. Averages are unweighted.

**In Slovenia, entrepreneurship has a positive image in society. People rate their entrepreneurial competences as high. However, as in other European countries, the COVID19 epidemic deepened the fear of failure and had a negative impact on people’s entrepreneurial intentions.** According to the results of a GEM survey,<sup>154</sup> the respect and desirability of the entrepreneurial profession have increased within society in the last five years and media attention on entrepreneurship has also grown (GEM, 2021b; Rebernik et al., 2017; Rebernik and Širec, 2021).<sup>155</sup> The percentage of the population that perceives entrepreneurship as a good career choice (68.7%) and agrees that successful entrepreneurs are respected in Slovenia and receive high status (85.1%) and that there is positive media attention on entrepreneurship (81.3%) was higher for Slovenia in the 2020 survey than the average of the EU Member States included in the survey. In addition to the perceived social support for entrepreneurship, individuals’ characteristics and perception of their own abilities and competences significantly influence the formation of entrepreneurial intentions and the decision to engage in entrepreneurship (Rebernik and Širec, 2021).<sup>156</sup> These factors are also higher in Slovenia than the average of EU Member States

<sup>153</sup> Requirements for student residence in Slovenia were tightened by the Act Amending the Aliens Act (ZTuj-2F) (2021).  
<sup>154</sup> More on GEM survey in Section 3.2.1.  
<sup>155</sup> In the 2016–2020 period, the share of respondents who felt that entrepreneurs are respected in Slovenia increased by 16.1 p.p., and the share of respondents who felt that entrepreneurship is a good career choice increased by 11.9 p.p. (in 2020, both shares reached their record high since Slovenia has been participating in the survey), and the share of respondents finding that there is a lot of positive media attention for entrepreneurship increased by 15.4 p.p. (GEM, 2021b; Rebernik et al., 2017; Rebernik and Širec, 2021).  
<sup>156</sup> Entrepreneurship is a process that starts with the individual, as people’s attitudes, activities and ambitions strongly affect the entrepreneurial process and its dynamics (Rebernik and Širec, 2021: 28).

included in the survey,<sup>157</sup> which can have a positive impact on the perception of business opportunities in the environment. After an earlier increase, the percentage of perceived promising business opportunities dropped in 2020 with the onset of the COVID19 epidemic, while fear of failure increased slightly, which places Slovenia around the EU average. Following a five-year increase, entrepreneurial intentions among the population dropped in 2020 (see Section 4.2.1 for more information on the entrepreneurial activities in 2020).

**Slovenia still lags behind the innovation leaders and the EU average in most institutional performance indicators.** The quality of institutions and their operational capacity are important for investments and business operations, while at the same time they are a relevant productivity factor. Although most indicators of institutional competitiveness improved after 2013, international comparisons (IMD, 2021b; Kaufmann and Kraay, 2021; OECD, 2021d; WEF, 2019) show the country lagging behind the innovation leaders and the country's relatively low effectiveness in supporting the business environment and fostering development.<sup>158</sup> In 2021, some indicators of institutional competitiveness deteriorated due to managing the COVID-19 epidemic's impact,<sup>159</sup> with Slovenia ranking below the EU average, as in previous years<sup>160</sup> (IMD, 2021b). This is also linked to trust, as response to the epidemic has had a significant impact on citizens' trust in the country's institutions (Eurobarometer, 2021b). In addition to government effectiveness indicators, Slovenia ranked below the EU average (19th place) in voice and accountability indicators (Kaufmann and Kraay, 2021), measuring the transparency of policies, the accountability of politicians and civil servants, state interference in business, etc. In the last year, the indicators of political stability and absence of violence/terrorism deteriorated (Kaufmann in Kraay, 2021), the value of which indicates stability, predictability of business policies and security for potential investors.

**In 2020 and 2021, trust in people in Slovenia was higher than in previous years, while trust in the country's main institutions declined.** Trust in people and institutions are key components of both social and economic progress. They make it possible for people to cooperate, which is becoming increasingly important in the course of the fourth industrial revolution (IMAD, 2020a), they make it easier for public institutions to plan and implement policies, because people who trust institutions are more willing to obey the country's laws, pay taxes and take part in collective action, and they have a positive impact on consumers and investors, which is crucial for job creation and the functioning of economies more broadly (Eurofound, 2018b; Perry, 2021). Before the epidemic, interpersonal trust and trust in the country's key institutions were quite low compared to the EU average and innovation leaders.<sup>161</sup> According to the 2021 Eurofound survey,<sup>162</sup> the average level of trust in people increased; however, it remained lower than among innovation leaders. Trust in institutions and satisfaction with democracy, following a rise in previous year, have fallen again since the outbreak of the COVID-19 epidemic in 2020; this more than the EU average. According to the Eurobarometer survey (2021b), carried out in June and July, trust in government, the parliament, political parties and the legal system

<sup>157</sup> In 2020, 59.4% of respondents believed they have the required skills and knowledge to start a business, which is a slight increase on previous years. Among EU Member States, only respondents from Croatia (75%), Italy (60.8%) and Poland (60%) perceived their capabilities higher (GEM, 2021b).

<sup>158</sup> See IMAD (2021c).

<sup>159</sup> The indicators that deteriorated the most are those related to the transparency of government policies, the legal and regulatory environment, bureaucracy, bribery, and corruption. The IMD survey was conducted from February to April 2021.

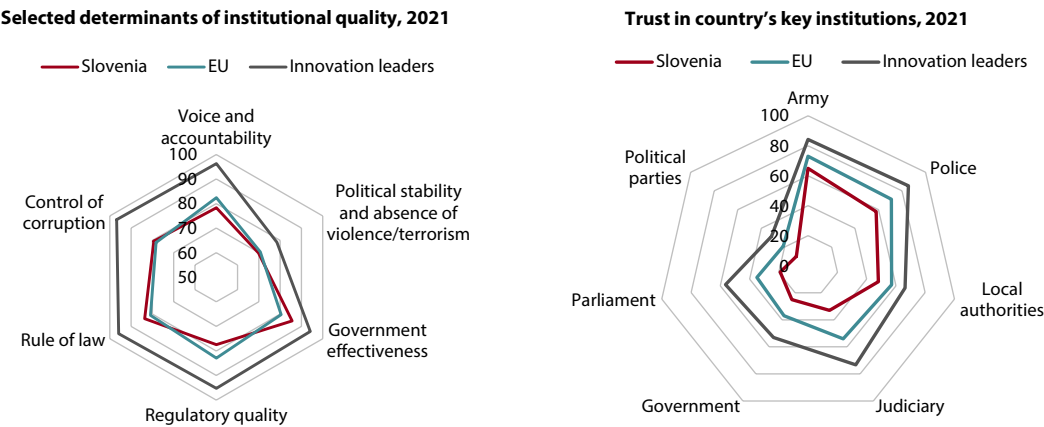
<sup>160</sup> In the 2021 IMD survey, Slovenia's ranking dropped three places to 18th place (of 26 EU Member States).

<sup>161</sup> See IMAD (2021c) and IMAD (2020a).

<sup>162</sup> The study was conducted from February to March 2021 (Eurofound, 2021b).

was among the lowest in the EU, while satisfaction with democracy was the absolute lowest among EU Member States.<sup>163</sup> The epidemic, which led to changes in the economy and in people’s lives, has been an important cause of increased mistrust.<sup>164</sup> In Slovenia, 59% of respondents, above the EU average (50%) and more than among innovation leaders,<sup>165</sup> assessed that things in the country are going in the wrong direction. The majority of respondents also did not expect the economic situation or the overall situation in Slovenia to improve over the next 12 months. In contrast with the previous round (February–March 2021), Slovenia recorded the largest increase of confidence in the future among all EU Member States (10 p.p.). Altogether 68% of respondents expressed confidence in the future, which places Slovenia just below the EU average (69%).

**Figure 49: Slovenia lags far behind the innovation leaders in terms of quality of institutional performance and trust in institutions**



Sources: Kaufmann and Kraay (2021); Eurobarometer (2021b).  
Notes: The definition of innovation leaders stems from the European Innovation Scoreboard. Countries are ranked by determinants of institutional quality on a scale from 0 to 100, according to the distance to the best country. The higher the number, the better. Averages are unweighted.

<sup>163</sup> Altogether 35% of respondents were satisfied with the way the democracy works (EU: 59%), which is 10 p.p. more than in the previous round (February–March 2021) but 12 p.p. less than in 2019. Greece’s satisfaction level was the same as Slovenia’s.  
<sup>164</sup> The lowest levels of trust in institutions, satisfaction with democracy and optimism for the future were recorded in the February–March 2021 round, when numerous restrictive measures were put in place to contain the spread of COVID-19 (Eurobarometer, 2021a).  
<sup>165</sup> Denmark: 22%, Finland: 40%, Belgium: 49%, Sweden: 53% (Eurobarometer, 2021b).

## 5 For successful transition into new normal

This chapter provides an in-depth analysis of the three aspects required for a successful transition to a new normal that were identified as key aspects in the last year's IMAD Productivity Report (IMAD, 2020a). The three aspects are (i) human resources and skills development for the future, (ii) the role of public finance in fostering smart, digital and innovative transformation, and (iii) a sustainable transition towards a low-carbon and circular economy.

### 5.1 HUMAN RESOURCES and skills for the future

#### 5.1.1 Why are education and training systems in need of an upgrade?

**The major changes that we are seeing in the global learning economy require rapid change, new knowledge, and the adaptation of the employees' skills and competences in all fields of work.** Global changes such as green and digital transformation, accelerated technological development, artificial intelligence, and innovation in work processes on the one hand and an ageing population and a range of other trends on the other show that the social system (especially education and the labour market) has been too slow to respond to the current and emerging staffing requirements and professional profiles in the economy (CEDEFOP, 2019; EIB, 2021; EC, 2019a, 2021e; ILO, 2018). There is a lack of comprehensive analysis for Slovenia of the impact these changes have on jobs and of assessments of the adequacy of the skills and competences the employed population needs to meet current and future needs. *The Future of Jobs Survey 2020*, surveying 291 CEOs of global corporations and large national companies with at least 100 employees from 26 countries worldwide,<sup>166</sup> showed that 43% of the companies plan to reduce the current workforce due to technological integration or automation by 2025 and 34% of the companies plan to expand their workforce as a result of deeper technological integration (WEF, 2021). A staggering 42% plan to expand their use of contractors for task-specialized work, while 55% are also looking to transform the composition of their company's value chain by 2025. They estimate that by 2025, the hours worked by machines and algorithms will match the hours worked by human beings (WEF, 2021). Despite the future being fraught with uncertainty (OECD, 2021i), the expectations are that due to rapid digitalisation and automation<sup>167</sup> low-educated staff and staff with upper secondary education will be less in demand<sup>168</sup> (Nedelkoska and Quintini, 2018; OECD, 2019d) and that new jobs requiring tertiary educational qualifications will be created (EIB, 2021).

<sup>166</sup> The US, UK, United Arab Emirates, China, Germany, India, Saudi Arabia, Poland, Russia, Japan, France, Thailand, Australia, Brazil, Canada, the Netherlands, Singapore, Spain, Pakistan, Mexico, Switzerland, Argentina, Indonesia, Italy, South Africa and Malaysia.

<sup>167</sup> For more information on the impact of digitalisation and automation on jobs, see IMAD Productivity Report 2020 (IMAD, 2020a).

<sup>168</sup> Nedelkoska and Quintini (2018) included 32 OECD countries that have participated in the Survey of Adult Skills (PIAAC) in their analysis of the impact of digitalisation and automation on staffing needs.

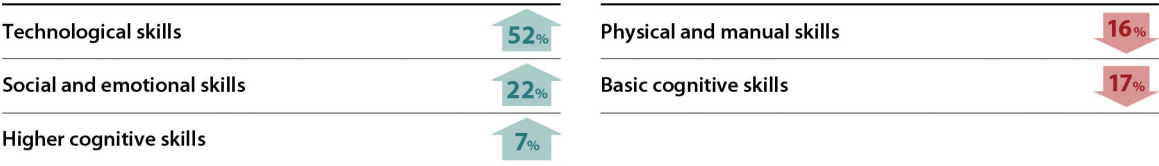


■ By 2025, around 40% of workers will require reskilling and 94% of existing employees will have to pick up new skills on the job.

**Due to rapid and unpredictable changes in the economy, it is important to develop the right skills and competences to be able to successfully meet the challenges ahead.** These rapid changes in the economy have already necessitated continuing education and (re)training of employees over the last decades (EC, 2021a); as a result of the COVID19 epidemic, certain trends have accelerated because of changes in working conditions and work processes (McKinsey, 2021).<sup>169</sup> Entrepreneurs in *The Future of Jobs Survey 2020*, conducted following the first wave of the COVID19 epidemic, estimate that by 2025 around 40% of workers will require reskilling of up to six months and expect 94% of existing employees to pick up new skills on the job. They further estimate that between 2020 and 2025, about 40% of core skills required will change for employees remaining in the same roles (WEF, 2021). With the knowledge and skills required for work changing so rapidly, it is essential to increase the availability and accessibility of education, training and continuous skills development for existing staff and to appropriately plan and adapt the education process to meet the challenges of the economy.

■ **Figure 50: Assessment of the McKinsey Global Institute workforce skills model<sup>1</sup> on the future shift in skills needed in Western European economy for the 2016–2030 period due to the introduction of artificial intelligence and new technologies in work processes (change in hours spent, in %)**

**Skills of the future**



Source: Bughin (2018).  
Note: <sup>1</sup> The conducted analysis is based on quantitative assessments and trend simulations for 14 European countries (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Italy, Netherlands, Norway, Spain, Sweden, Switzerland and the UK). The simulation was updated and corrected through interviews of executives from companies that have adopted at least one new technology and/or AI in their business processes. The respondents came from companies with more than 30 employees and five European countries (France, Germany, Italy, Spain and the UK).

**There is an increased need in the economy for employees to have technological and digital skills, as well as entrepreneurial skills, in particular leadership skills, social and emotional skills, critical thinking and creativity, and complex information processing.** According to the McKinsey Global Institute, AI and automation are expected to cause a structural shift in employment in Western Europe<sup>170</sup> by 2030 in terms of hours worked, increasing the demand for technological skills (expected to constitute on average 17% of hours worked,<sup>171</sup> compared to 11% in 2016) and social and emotional skills (to 22% of hours worked). Basic cognitive skills are expected to be less in demand due to the economy’s increased demand for higher<sup>172</sup> cognitive skills (falling from 18% of hours worked in 2018 to 14%) (Bughin et al., 2018). The OECD (2019c) also finds that occupations requiring social skills and

<sup>169</sup>In the post-COVID-19 period, the number of employees that will have to be retrained for another occupation is expected to be 21% higher in Germany and 12% higher in France than it was in the preCOVID19 period (McKinsey, 2021).  
<sup>170</sup>The conducted analysis is based on quantitative data as a trend simulation for 14 European countries (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Italy, the Netherlands, Norway, Spain, Sweden, Switzerland and the UK). The simulation was updated through interviews of executives from companies that have more than 30 employees and adopted at least one new technology and/or AI in their business processes. The respondents are from five European countries: France, Germany, Italy, Spain and the UK.  
<sup>171</sup>The data on various skill categories required are calculated using the McKinsey Global institute workforce skills model, which is based on data on the number of hours worked by skill category in 2016, and estimates the number of hours worked in 2030 and changes in the structural shift of hours worked, taking into account the impact of automation and AI (Bughin et al., 2018).  
<sup>172</sup>Strategic planning, logical, analytical and deductive thinking, conflict and problem solving, critical thinking and creativity, advanced communication, etc.



creativity, entrepreneurial and leadership skills, and problem-solving skills are less likely to be at risk in the future, while according to some analyses, demand for digital skills will grow to meet the needs of both the changing economy and the world (Novak et al., 2018). Detailed analyses on the strengths and shortcomings in the skills of current and future employees in Slovenia are not available; however, according to the CEDEFOP forecast,<sup>173</sup> between 2021 and 2030 Slovenia will see the highest total of job openings for science and engineering professionals and business and administration associate professionals (CEDEFOP, 2021b).

**In addition to job-specific skills, transversal skills,<sup>174</sup> including higher cognitive skills, digital skills and a range of others, are gaining importance as they allow employees to successfully manage constant change.** With these skills, employees can be more flexible, work in complex and fast-changing work environments, and contribute to better performance. In addition to well-developed basic skills (e.g. reading, mathematical and scientific literacy, etc.), transversal skills (foreign language skills, digital skills, communication skills, conflict resolution, social skills, leadership skills, etc.) are also essential for employees to confront constant changes at work and should thus be encouraged (OECD, 2019a), especially since the demand for transversal skills is expected to grow in the future (WEF, 2021). The McKinsey Global Institute estimates that the education systems in Central and Eastern Europe focus primarily on the delivery of skills that will be less in demand in the future and not enough on the delivery of skills that will be important in the future (Figure 51).<sup>175</sup> Compared to Western Europe, there is greater emphasis on teaching skills that will be less in demand in the future and less on teaching skills for the future, so introducing new content and teaching methods requires considerable attention. At the same time, an unclear picture of future needs in Slovenia prevents effective career guidance, which leads to young people being encouraged to enrol in study programmes that train for occupations that will be less in demand in the future. For example, a high percentage of 15-year-olds believes they will work in occupations the needs for which are expected to drop from 2018 to 2029<sup>176</sup>, while shortage occupations are defined, for scholarship purposes, based on the past needs of the labour market<sup>177</sup> and not its future needs, which will be substantially different (IMAD, 2020a).

<sup>173</sup> From 2021 to 2030 the number of job openings in Slovenia is expected to rise (recruitment to new posts and replacement of vacant posts) for science and engineering professionals (by 30.2 thousand) and business and administration associate professionals (by 33.8 thousand). The highest average annual growth in total number of employees from 2021 to 2030 is expected for legal, social, cultural and related associate professionals and for labourers in mining, construction, manufacturing and transport. The CEDEFOP prepared estimates of skills required in the future based on short-term macroeconomic forecasts of the European Commission from 2019 that disregard the impact of digital transformation and other trends and the impact of the COVID-19 epidemic on the labour market (CEDEFOP, 2021b).

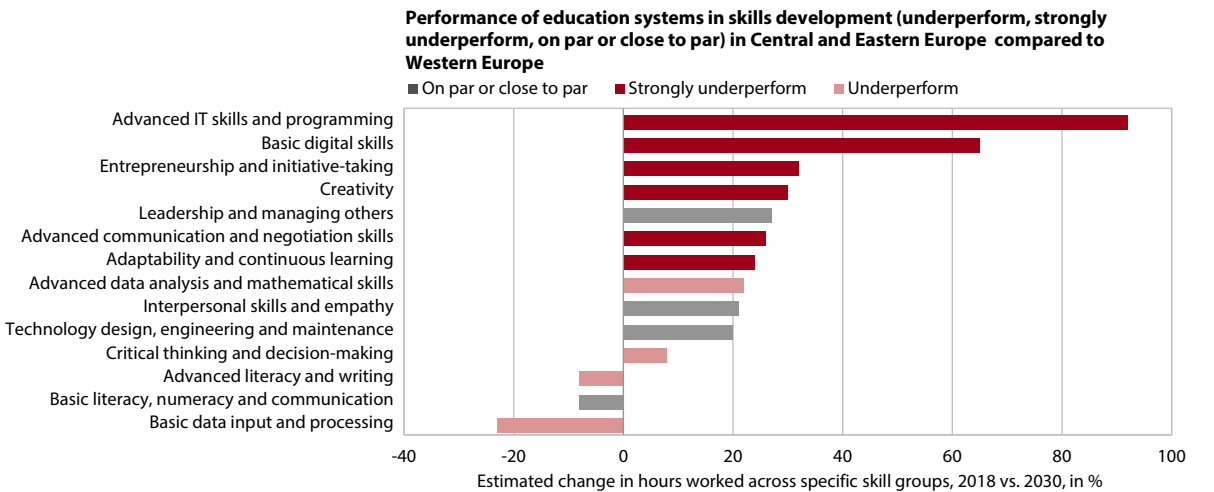
<sup>174</sup> Transversal skills are not job-specific or occupation-specific and can thus be used in various occupation and jobs (OECD, 2021e). These skills include cognitive skills, problem-solving skills, digital skills, leadership skills, etc. (OECD, 2021f).

<sup>175</sup> The countries included in the analysis are Bulgaria, Croatia, the Czech Republic, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia.

<sup>176</sup> According to the PISA 2018 survey, 28.5% of 15-year-olds in Slovenia expect to work in occupations the demand for which will fall from 2025 to 2030, which is above the OECD average (25%) (OECD, 2021i).

<sup>177</sup> The scholarship policy defines occupations that are at higher risk of automation as shortage occupations.

**Figure 51: The McKinsey Global Institute<sup>1</sup> estimates that the demand for transversal, IT, engineering and mathematical skills in Central and Eastern Europe will grow from 2018 to 2030; compared to Western Europe, education systems in Central Europe underperform precisely in the delivery of these skills**



Sources: Novak et al. (2018).  
Note: <sup>1</sup> Quantitative data on each type of skill used is simulated using the McKinsey Global Institute workforce skills model for Bulgaria, Croatia, the Czech Republic, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia.

**There is a growing need in vocational education and training uppersecondary level to focus more on the development of a broader set of skills and less on vocational preparation.** The EU-level Advisory Committee on Vocational Training believes that vocational education and training should enable young people to develop basic skills, professional competences and transversal skills (Advisory Committee on Vocational Training, 2018). Experts taking part in the CEDEFOP project “The changing nature and role of vocational education and training (VET) in Europe”<sup>178</sup> listed three potential future paths of VET development in Europe. The “job-oriented training at the heart – special purpose or marginalised VET” scenario foresees marginalisation of the traditional role of vocational education and training at uppersecondary level, which is expected to arise from the increasing importance of higher-level skills provided by tertiary education.<sup>179</sup> According to the “occupational and professional competence at the heart – distinctive VET” scenario, vocational education and training will focus on developing occupational and professional competence for specific and clearly defined occupation(s) and will be predominantly based on practice-based learning (apprenticeships). The “lifelong learning at the heart – pluralistic VET” scenario, meanwhile, implies a redefinition of the overall position of (upper secondary) vocational education and training in light of changing occupations with lower focus on preparing people for a specific occupation or job and greater emphasis on providing a broader set of professional competences and transversal skills (CEDEFOP, 2020b). It is difficult to predict which of the scenarios will materialise, but given the rapid changes in skills needs due to technological and other developments, as already mentioned, there is a growing

<sup>178</sup>In 2015, the CEDEFOP started the project entitled “The changing nature and role of vocational education and training (VET) in Europe”, which aims to analyse past trends in vocational education and training and identify future challenges and opportunities (for the next 15 years). A research involving 1,500 European experts was conducted as part of the project. The experts analysed past and current trends and estimated potential future trends in the development of vocational education and training. Future trends include vocational education and training at upper-secondary level for young people and adults and non-formal vocational education and training programmes for employed persons.

<sup>179</sup>It focuses on meeting short-term labour market needs, with vocational education and training aimed primarily at adults.

need for vocational education and training to focus more on the development of a broader set of professional competence and transversal skills.

■ *In Slovenia, insufficient knowledge of medium-term skills needs and the absence of a skills needs forecasting system are also problematic.*

**It is crucial to make vocational education and training at uppersecondary level more responsive to technological development.** Due to the lengthy curricular reform,<sup>180</sup> the upper-secondary level vocational education and training in Slovenia is often unable to keep up with the rapid technological progress of the economy. Vocational education and training experts thus propose a reform of vocational education and training so that it will (i) become learner-centred and personalised, i.e. tailored to the individual in a way that supports them in discovering and developing their own potential, (ii) become agile, flexible and digital, and (iii) educate people to be independent persons responsible towards the society and the environment. To reach these goals, the experts propose changes to learning,<sup>181</sup> teaching,<sup>182</sup> and the organisation of educational institutions and processes<sup>183</sup> (Hodak, 2021). A similar development of vocation education and training according to the pluralistic scenario for vocational education and training, developed by experts from various European countries<sup>184</sup> within the CEDEFOP project is expected to provide individually tailored learning solutions, project- and problem-focused learning, and a wide range of learning forms (CEDEFOP, 2020b).

**While there have been some shifts in tertiary enrolments by field of education in Slovenia in recent years, increased attention should be paid to tertiary education being more responsive to the medium-term needs of the economy.**

In previous years, Slovenia experienced a structural shift in graduates and persons enrolled in tertiary education (Figure 52); however, these changes do not meet all the needs of the labour market. For example, the shortage of ICT professionals and other engineers is a particularly pressing challenge in terms of digital transformation (see Section 5.1.2). The discrepancies in workers with tertiary education are associated with the insufficient number of places in some study programmes on the one hand and, on the other, a lack of interest in some study programmes among young people, the inadequate cooperation between higher education and the economy (IMAD, 2021c), and insufficient public investments in tertiary education (see Section 3.2.4, "Human capital"). Furthermore, insufficient knowledge of medium-term skills needs and the absence of a skills needs forecasting system, which is a prerequisite for a comprehensive picture of future needs, are also problematic. While Slovenia has an

<sup>180</sup> Curriculum reforms usually take several years to complete (MIZŠ, 2021b).

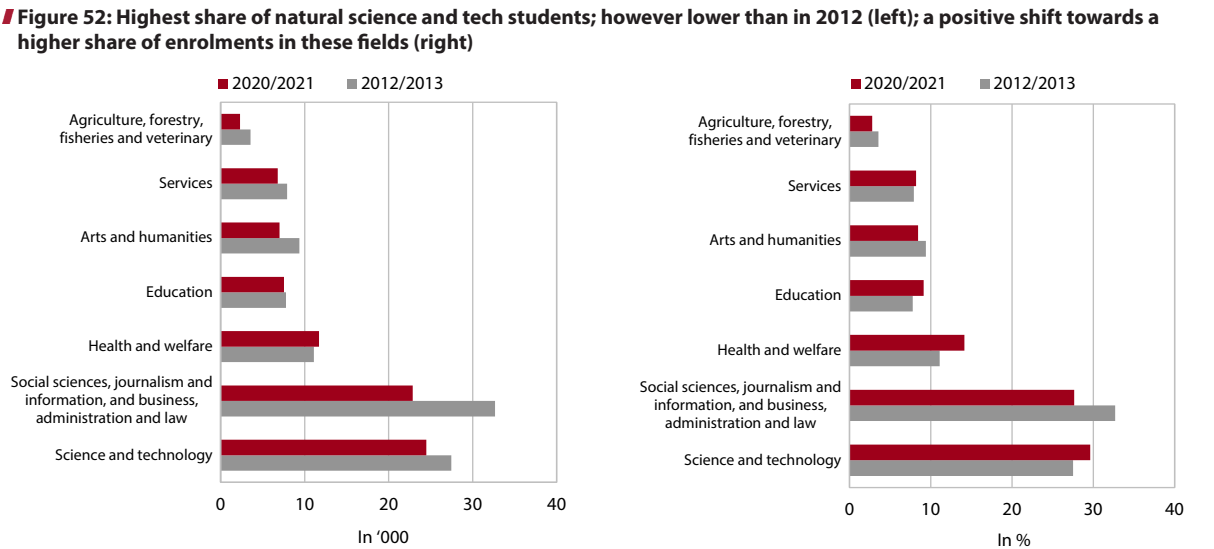
<sup>181</sup> For learning, experts propose an educational process codesigned by the learners, developing new learning models, a holistic approach to learner success, including the development of micro-credentials and individual learning accounts, developing digital channels (setting up a personal virtual space for the learner, introducing on-line learning, etc.).

<sup>182</sup> For teaching, experts propose that the teacher should assume the role of tutor and organiser of the teaching process, setting goals together with the learner. The teacher should have experience from industry and create a network of partners composed of various stakeholders in vocational education and training. The experts also propose maintaining a digital channel, including evaluating existing online platforms, establishing links between platforms that have proven useful and of high quality, developing and deploying the "digital tutor" model, etc.

<sup>183</sup> Regarding the ecosystem and organisation, the experts propose (i) a different organisation of all processes within the vocational education and training system (staffing, organisation of learning processes, career guidance, personalised approaches, funding, open space infrastructure, digitalisation of processes, continuous professional training for teachers/mentors/management, networking and collaboration with different ecosystems of VET stakeholders to promote knowledge circulation, internationalisation), (ii) transforming the role of the school management which should become a "network manager", transferring trends from industry and society to school, and (iii) transforming the education system so that the learner is at the heart of all educational processes and the schools set up departments for digitalisation of processes.

<sup>184</sup> In 2015, CEDEFOP started the project entitled "The changing nature and role of vocational education and training (VET) in Europe", which aims to analyse past trends in vocational education and training and identify future challenges and opportunities (for the next 15 years). A research involving 1,500 European experts was conducted as part of the project. The experts analysed past and current trends and estimated potential future trends in the development of vocational education and training.

Employment Forecast (ESS, 2021) and an Occupational Barometer (ESS, 2020c) to monitor short-term occupational needs, these do not address the need to forecast medium-term skills needs.



Source: SURS (2022).

**The complementarity of skills requires an interdisciplinary approach to successfully address the increasingly complex challenges in tertiary education.** The challenges and opportunities brought on by climate change, productivity and population ageing can be successfully addressed by experts from different scientific disciplines (EC, n.d.-c). It is therefore essential to facilitate enrolment in different fields of education and study programmes at tertiary level, including interdisciplinary study programmes, which should receive considerable attention. At the same time, the development of new study programmes (e.g. in the field of AI) also calls for attention because of the need for new occupations/professions in the context of green and digital transformation of the economy. Tertiary education also offers students the opportunity to develop transversal skills (OECD, 2019e). Probst et al. (2019) and Bodell (2021) thus highlight the growing needs for experts who, in addition to STEM skills, engineering skills, etc., also possess leadership skills, problem-solving skills, critical thinking skills, etc. Bodell (2021) further highlights the importance of being able to quickly learn new things and effectively perform tasks outside one’s primary area of expertise.

**Numerous countries have already developed systems for monitoring and forecasting the economy’s medium-term skills needs, their experience revealing the great importance of a partnership approach.** The OECD (2021a) suggests that countries identify possible scenarios for future social developments and their impact on the education system, as for example Finland does through strategic foresight,<sup>185</sup> while some other countries have already developed systems which monitor and forecast medium-term skills needs (ILO, 2017; IMAD, 2020a). In this regard, a partnership approach based on incorporating education systems,

<sup>185</sup> Strategic foresight is characterised by identifying future changes, assessing current strategic documents from a forwardlooking perspective and developing new policy innovations. In Finland, the public and private sectors identify megatrends and prepare scenarios and visions built from the national to the local level; Finland also established a standing Committee for the Future in the parliament and a national foresight network (OECD, 2021a).

trade unions and companies in skilling, upskilling and reskilling (ILO, 2021)<sup>186</sup> and allowing for a more efficient skills management is crucial (ILO, 2017; OECD, 2019g). A prerequisite for successful cooperation is establishing a collaborative culture (Whiteley and Casasbuenas, 2020). The ILO (2021) highlights the importance of the engagement of social partners, which is rather uncertain in Slovenia (IMAD, 2021a). Furthermore, where trends in future technological changes and/or skills needs are unclear, big data analysis and AI-driven data analysis are particularly useful (CEDEFOP, 2021c). A responsive system for forecasting skills needs and a collaborative approach, following the example of other countries, should also be a priority for Slovenia.

**The development of transversal skills in the education of children and young people requires significantly greater attention and should be supported in a systemic rather than project-based way.** In Slovenia, basic and uppersecondary schools have organised various activities over the years to foster entrepreneurial creativity, entrepreneurship and innovation skills in pupils,<sup>187</sup> and higher education institutions have organised various activities in this regard for university students.<sup>188</sup> Several measures for developing the creativity of children are included in the Programme for Children for the 2020–2025 period (MDDSZ, 2020). Basic and uppersecondary schools are also increasingly engaged in education for sustainable development (ESD).<sup>189</sup> A shortcoming of otherwise numerous activities to develop transversal skills is the mainly projectbased approach of the implementation of measures, which means that, as opposed to in a systemic approach, the measures do not reach all children and young people. Despite the White Paper on Education in the Republic of Slovenia (Krek and Metljak, 2011) highlighting the need for the development of transversal skills, Rupnik Vec (2018) points to the lack of guidance and professional literature on teaching transversal skills in Slovenian for teaching staff. In the document *Pogled na izzive slovenske vzgoje* (Overview of the challenges of Slovenian education, only available in Slovenian), MIZŠ (2021a) agrees that improvements are needed in the skills development of children and young people and proposes different measures for teaching transversal skills at all levels of formal education.

**The development of transversal skills, in particular social intelligence, also requires more attention in adult education.** Adults have numerous opportunities to develop creativity (study clubs, amateur cultural activities, etc.) (IMAD, 2021c). It is also encouraging that adults are increasingly confident in their entrepreneurial skills (GEM, 2021b), while they lack in social and communication skills (OECD, 2021h), verbal abilities, cooperation with others and flexibility (OECD, 2021h). As this also increased the need for self-management and effective organisation of one's work, as well as the need for leadership skills to manage employees and teams (OECD, 2020b), the development of these skills requires additional attention. Further attention should also be paid to the development of managerial practices, where Slovenia lags behind most EU Member States (IMD, 2021a).

<sup>186</sup> An example of such a partnership is the Danish think tank DEA (Whiteley and Casasbuenas, 2020).

<sup>187</sup> Examples of measures include fostering creativity, entrepreneurship and innovation skills among young people, innovative learning environments and flexible learning, the innovation and creativity festival, activities in the House of Experiments (see also IMAD (2021c), the measure *PODVIG – Podjetnost V Gimnaziji* (Entrepreneurship in the Secondary School) (ZRSŠ, 2021), and the basic school optional subject "Through creativity and innovation to entrepreneurship" (MIZŠ and ZRSŠ, 2014).

<sup>188</sup> Examples of such measures are innovative and flexible forms of teaching and learning (MIZŠ, 2018a) and the Students Innovative Projects for the Benefit of Society (Public Scholarship, Development, Disability and Maintenance Fund of the Republic of Slovenia, 2021).

<sup>189</sup> Numerous activities are carried out by basic and uppersecondary schools under the Integrating Climate Change into the Broad Process of Education Development programme (IJS et al., 2020).

**To meet adults' needs for new skills, it is essential to develop education and (re)training programmes and to enable and encourage adults to participate in them.** Due to changes in the workplace and rapidly changing skills need, also perceived by companies in Slovenia,<sup>190</sup> adults' needs for education and (re)training are increasing (EC, n.d.-a; OECD, 2019d), as is their need to improve their level of education, especially that of loweducated adults (Thum-Thysen et al., 2021). Slovenia has been encouraging adult education and retraining,<sup>191</sup> recognising non-formally acquired knowledge with a NVQ (national vocational qualification), and in 2020 provided non-formal education and training or verification and certification of professional qualifications for temporary laid-off workers and part-time employees (ESS, 2020a).<sup>192</sup> However, for a successful green and digital transformation, priority should be given to reinforcing programmes for (re)skilling adults while taking into account future skills needs, as several other EU Member States have done (EC, 2019b).<sup>193</sup> This will enable rapid retraining and redeployment from sectors and occupations in decline to other sectors and occupations (OECD, n. d.). It is therefore essential to ensure that the adult education system is responsive to the needs and challenges of the present and the future (OECD, 2019a; Thum-Thysen et al., 2021), which is currently one of the main shortcomings of the adult education system in Slovenia (OECD, 2019a). In Slovenia, an example of good practice is the development of new training and upskilling programmes in vocational education and training at upper-secondary level and supplementary study programmes in higher vocational education, intended primarily for employed persons (CPI, 2021).<sup>194</sup> In this regard, promoting the accessibility of education and training programmes is crucial, as this is often a barrier to participation, especially for the low-educated (IMAD, 2021a). Informing adults on the impact of green and digital transformation on jobs and redeployment needs and motivating adults to participate in education and retraining,<sup>195</sup> in particular adults who need them but are not motivated for them, also require attention.

## 5.1.2

## Skills for digital transformation

**In Slovenia, digital skills of adults, essential for digital transformation, are close to the EU average but lower than among the innovation leaders.** Digital skills are a necessary requirement for a successful digital transformation of the economy and society. According to the data for 2019, the percentage of young people (aged 16–19) with basic or above basic overall digital skills was higher than in the innovation

<sup>190</sup> According to the European Company Survey, 41% of Slovenian managers estimated that the knowledge and skills needed from the employees are changing (very) quickly (Eurofound, 2021b).

<sup>191</sup> Examples of such measures include cofinancing education and training to raise education levels, the Competence Centres for Human Resources Development programme, the Comprehensive Support to Companies for Active Ageing of Employees (ASI) programme, (Public Scholarship, Development, Disability and Maintenance Fund of the Republic of Slovenia, 2021), and further vocational education and training programmes (MIZŠ, 2018b).

<sup>192</sup> Very few people benefited from this measure (ESS, 2020b).

<sup>193</sup> Some countries (Estonia, France, Ireland, Latvia and the Czech Republic) provide education for loweducated workers employed in declining sectors. In 2018, Germany adopted a law which provided additional support for the retraining of low-educated workers in jobs threatened by digitalisation (EC, 2019b).

<sup>194</sup> The needs of specific jobs are the primary focus of the preparation of new programmes. Upskilling programmes: complement the vocational education and training programmes at uppersecondary level and short-cycle higher education study programmes. Training programmes: designed to provide knowledge and skills for areas of work or for occupations (or parts of occupations) for which there is no regular vocational or professional education or training (CPI, 2021). A new programme can be proposed by an employer, chamber, employers' association or school to the Institute of the Republic of Slovenia for Vocational Education and Training. The institute issues an opinion on the relevance of the proposal based in several criteria – it may accept it, reject it or ask for it to be supplemented (CPI, n. d.).

<sup>195</sup> In 2020, the percentage of Slovenian employees willing to retrain for a completely new occupation was 54%, one of the lowest among 15 EU Member States included in the research (Boston Consulting Group, 2021), and adults' motivation for education was relatively low (IMAD, 2021a).



leaders, while the percentage of the population aged 16–74 with these skills was close to the EU average but lower than among innovation leaders. Low skills levels among the low-educated, older people and the unemployed stand out (Eurostat, 2022). The percentage of the population aged 16–74 with advanced digital skills is also lower than among innovation leaders and equal to the EU average. The level of digital skills of employed persons is relatively low (Figure 53, left), while companies' investments in their development are also low (Eurostat, 2022),<sup>196</sup> which is not in line with the objective of accelerating digital transformation to boost the competitiveness of the economy. Measures to boost digital skills are also required in the public sector (Ubaldi et al., 2021). Closer attention should also be paid to the development of AI skills,<sup>197</sup> an area where Slovenia ranks among the poor EU performers (OECD, 2021j, 2021e). The COVID-19 epidemic accelerated the digital transformation and caused the demand for digital skills to grow. Investing in the development of digital skills of adults, especially those with low skills, should therefore be a priority.

■ *The share of companies that had hard-to-fill vacancies for jobs requiring ICT specialists in Slovenia is the fourth highest in the EU.*

**Digital transformation of the economy is constrained by the shortage of ICT and related specialists.** The digital transformation caused the demand for technical and ICT specialists (Bughin et al., 2018; Eurofound, 2018a) and for experts to work in the technology and data analysis sectors (statisticians, data security analysts, software quality assurance analysts, etc.) to grow (OECD, 2021i). In Slovenia, companies already face an above-average shortage of ICT specialists (Figure 53, right), which is particularly challenging given the urgency and importance of digital transformation. These issues are mainly related to an insufficient number of ICT graduates, which in 2019 and 2020 did not even reach the 2012 level due the smaller generations of young people (Eurostat, 2022);<sup>198</sup> even after an increase in the number in 2019, the percentage of ICT graduates in Slovenia was still lower than among innovation leaders (Eurostat, 2022). Given the estimate that the demand for ICT professionals will continue to grow and in light of the global competition for such talent, this could become a much more pressing issue in the future. Young people should therefore be encouraged to enrol in ICT studies and the number of available places in ICT studies should be increased. At the same time, due the emergence of new occupations as a result of automation (WEF, 2021) and the estimated growing future demand for professionals with a combination of ICT and technical skills (Bughin et al., 2018; Eurofound, 2018a), including professionals with interdisciplinary skills,<sup>199</sup> new study programmes addressing the above need should be developed. Furthermore, a condition for successful digital transformation is introducing more ICT-related content in the education of children and young people, as computer science is not a compulsory subject in basic schools in Slovenia, unlike in some other EU Member States (EC/EACEA/Eurydice, 2019), nor is it compulsory in uppersecondary vocational schools (EC, 2020c), and this is not addressed in the Recovery and Resilience Plan (2020). However, the Slovenian Digital Coalition (Slovenian Digital Coalition, 2020) (2020) and the Strategic Council for Digitalisation (2021) proposed that computer science becomes a compulsory subject.<sup>200</sup> It is also worth to take advantage of the benefits of AI, especially those related to personalised learning (OECD, 2021g; Vincent and van der Vlies, 2020).

<sup>196</sup>In 2019, the percentage of companies that provided training to their personnel to develop their ICT skills was lower than among innovation leaders (Eurostat, 2022).

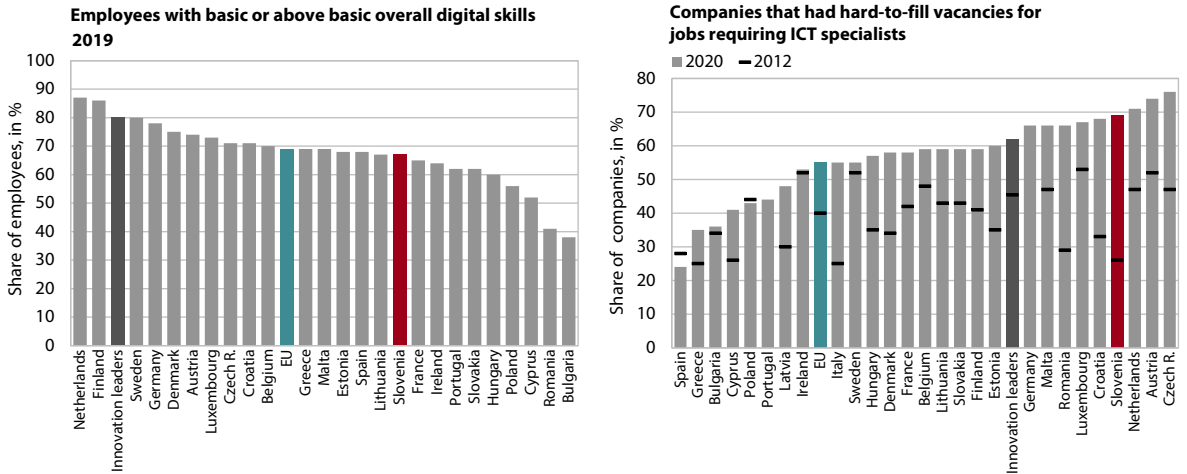
<sup>197</sup>In economically developed countries, the demand for AI skills is growing (Squicciarini and Nachtigall, 2021).

<sup>198</sup>The Eurostat data available as time series since 2012.

<sup>199</sup>Eurofound (2018a) estimates that the demand for profiles such as bioinformatics and managers with advanced data analysis/statistical competences will grow in the future.

<sup>200</sup>The Slovenian Digital Coalition calls for the introduction of computer science and informatics as a compulsory subject in both basic and upper-secondary schools (Slovenian Digital Coalition, 2020).

Figure 53: Relatively low digital skills of employed persons (left) and companies encountering increasing difficulties in filling ICT specialists vacancies (right)

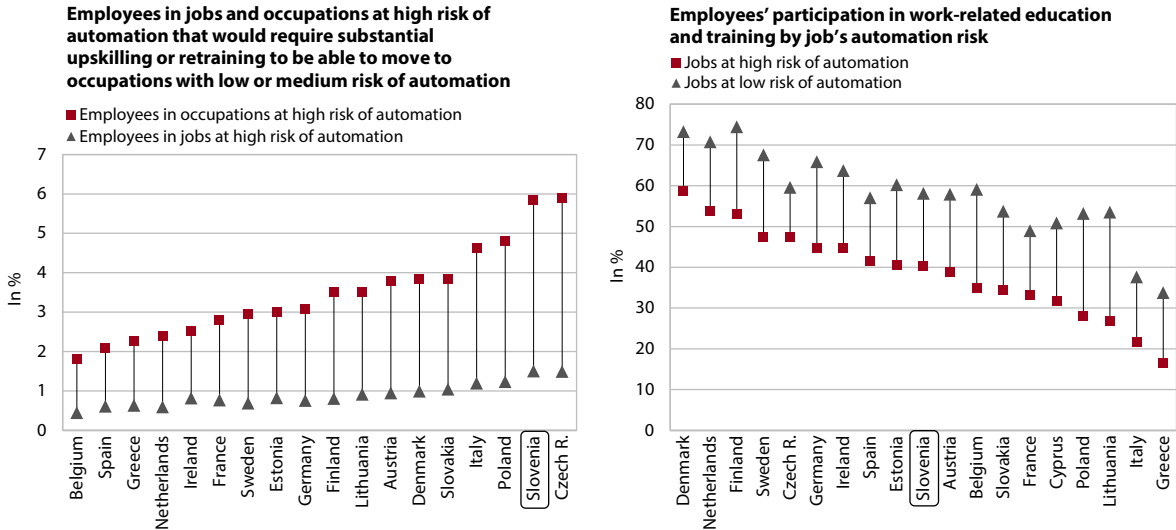


Sources: Eurostat (2022).  
Note: Basic or above basic overall digital skills include basic and advanced digital skills.

**Digital transformation increases the risk of job losses and the need to retrain for other occupations.** In addition to increased demand for certain occupational profiles, digital transformation also brings risks of job losses. In Slovenia, a large share of employees work in occupations that face a high risk of automation and would need a great deal of training to acquire the skills that would enable them to work in occupations with a low or medium risk of automation. The situation in other countries is similar (Figure 54, left), but this does not make Slovenia’s issue any less pressing. While the need to retrain employees is relatively high (Figure 54, left), the participation of employees whose jobs are a high risk of automation in education and training is low (Figure 54, right). This has a negative impact on the employment prospects of those at risk of losing their jobs, limits the possibilities of securing adequate labour force in the labour market, and is disadvantageous in terms of digital and green transformation. It is therefore sensible to give higher priority to the retraining of employees at risk of losing their jobs for occupations where demand is expected to increase.



Figure 54: A high percentage of employees in occupation and jobs facing risk a high risk of automation, 2015 (left), and low participation of employees in jobs with a high risk of automation in education and training, 2015 (right)



Source: OECD (2019d).  
Note: In the left figure, employees in jobs with a high risk of automation are considered for the lower bound estimate, and employees in occupations with a high risk of automation are considered for the upper bound estimate. In the right figure, high risk of automation means the probability of automation exceeds 50%; with low risk of automation, the probability of automation is below 50%.

**Several EU Member States have already started addressing the challenges of digital transformation by developing and renewing education and (re)training programmes.** Several EU Member States<sup>201</sup> developed adult education programmes aimed at increasing digital skills, and some countries<sup>202</sup> provide training for low-educated workers in declining sectors. In 2018, Germany adopted a law that promotes the retraining of low-skilled workers in jobs threatened by digitalisation (EC, 2019b). Several EU Member States<sup>203</sup> provide financial incentives to companies for adult education and training, for example Finland and Sweden finance uppersecondary education to all low-qualified adults (EC, 2021a). Estonia reformed the guidance service for adults participating in education, while in Denmark and Finland, the assessment of adult skills is part of the enrolment process for general and vocational education programmes and part of the assessing of professional competences that employees acquired outside formal education. Estonia also stepped up popularisation activities to promote adult education, focusing primarily on low-skilled adults (EC, 2019b). Sweden, Belgium (Flanders) and France provide adult education at the basic and uppersecondary levels in the form of distance learning, while Spain has a large number of non-formal adult education programmes in the form of distance learning (EC, 2021a).

**In the coming years, Slovenia will have access to funds from the Recovery and Resilience Facility and the European Cohesion Policy to develop skills of children, young people and adults relevant for green and digital transformation and meet other development challenges.** In Slovenia, basic and uppersecondary education of children and young people is mainly financed by public expenditure, while various activities aimed at development of education are (co-)financed by the EU. EU funding plays a greater role in adult education than in the education of

<sup>201</sup> Bulgaria, Cyprus, the Czech Republic, Germany, Denmark, Estonia, Spain, Finland, France, Hungary, Lithuania, Latvia and Poland.  
<sup>202</sup> Estonia, France, Ireland, Latvia and Czech Republic.  
<sup>203</sup> Belgium (Flanders), Austria, Poland, Germany, Estonia, France, Lithuania, Denmark, Romania and Netherlands.

children and young people, as a significant proportion of adult education providers depend on the availability of this funding to function. Many activities in the education for children, young people and adults will continue to be supported by this funding. A positive development is that the Slovenian recovery and resilience plan (SVRK, 2021b) provides for measures to equip young people with the skills they need for green and digital transformation, to enhance adults' skills relevant for work, etc. The Partnership Agreement between Slovenia and the European Commission for the 2021–2027 period (SVRK, 2021d) also provides that development gaps are addressed through education and training. However, the implementation of activities alone does not guarantee the right effect. It is essential to adopt and implement measures that actually equip children, young people and adults with the right skills for green and digital transformation. Only evaluations can verify whether the planned activities have had the desired effect.

5.2

Analysis of public expenditure for SMART, digital and innovative transformation

This section provides an analysis of public expenditure promoting smart, digital and innovative transformation of Slovenia (hereinafter smart transformation), consequently as directly as possible contributing to the shift towards higher value-added products. The methodology used is based on EU agreed cohesion policy, the principal objective of which was “a more competitive and smarter Europe by promoting innovative and smart economic transformation and regional ICT connectivity”.<sup>204</sup> This is the policy objective that, based on EU rules, receives the most generous support under the thematic concentration<sup>205</sup>. The following are expected to contribute to this specific objective: (i) developing research and innovation; (ii) digitisation; (iii) entrepreneurship; (iv) developing skills for smart specialisation, industrial transition and entrepreneurship; and (v) digital connectivity (ibid., Article 3).

5.2.1

International comparison of existing public expenditure

An international comparison of public expenditure targeted at smart transformation is made possible by the COFOG methodology, which classifies general government expenditure by purpose.<sup>206</sup> Based on the methodology presented above, the following categories of purposes were included among the expenditure contributing to smart transformation: basic research, R&D, general economic, commercial and labour affairs, communications, and economic affairs n.e.c.<sup>207</sup>

**Slovenia spends 0.5 p.p. of GDP less on smart transformation than the EU average and 2 p.p. of GDP less than the top five countries, with the gap increasing over time.** In the 2017–2019 period, Slovenia ranked 19th in the EU in

<sup>204</sup> See Regulation (EU) 2021/1060 of the European Parliament and of the Council of 24 June 2021 laying down common provisions on the European Regional Development Fund, the European Social Fund Plus, the Cohesion Fund, the Just Transition Fund and the European Maritime, Fisheries and Aquaculture Fund and financial rules for those and for the Asylum, Migration and Integration Fund, the Internal Security Fund and the Instrument for Financial Support for Border Management and Visa Policy, 20211.

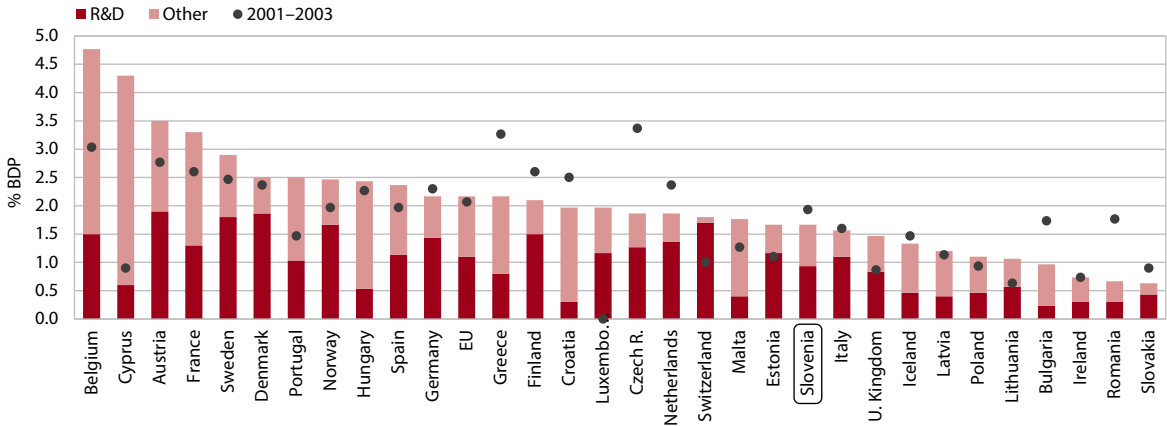
<sup>205</sup> See Regulation (EU) 2021/1058 of the European Parliament and of the Council of 24 June 2021 on the European Regional Development Fund and on the Cohesion Fund.

<sup>206</sup> See <https://www.stat.si/statweb/File/DocSysFile/8285>.

<sup>207</sup> Included were expenditure groups with the following classifications: 01.4, 01.5, 02.4, 03.5, 04.1, 04.6, 04.8, 04.9, 05.5, 06.5, 07.5, 08.5, 09.7 and 10.8. The COFOG classification is not optimal for the purpose of the analysis, which is why it has been complemented by the approaches presented below.

terms of the share of public expenditure for these purposes, at 1.7% of GDP. 20 years ago, Slovenia lagged 0.1 p.p. of GDP behind the EU average and 0.5 p.p. of GDP at the end of the period. At the start of the period, Slovenia was 1.1 p.p. of GDP behind the top five countries; it was more than 2 p.p. behind at the end of the period.<sup>208</sup> Slovenia was one of the ten EU Member States that have reduced their share of GDP devoted to public spending on smart transformation over the same period, Slovenia by 0.3 p.p., while most countries increased their share, on average by 0.7 p.p. of GDP. A comparison of the shares that public expenditure targeted at smart transformation represents in total public expenditure revealed that the shares of this expenditure are not related to the size of the public sector. According to this comparison, Slovenia ranks 19th the EU at the end of the period, with 3.8% compared to the EU average of 4.6%.

Figure 55: Public expenditure targeted at smart transformation, 2017–2019 average compared to 2001–2003 average



Source: Eurostat (2022); calculations by IMAD.

5.2.2

A detailed analysis of existing government budget expenditure

Given that the COFOG classification is rather broad, the structure of government budget expenditure was further analysed in greater detail on the basis of data from the Ministry of Finance's information system SAPPrA. According to the reference categories of purpose set out in the introduction, the expenditure most conducive to smart transformation includes expenditure on science, technological development, ICT, active labour market policy, investment in the business environment, internationalisation and the promotion of tourism.<sup>209</sup> Also analysed was how

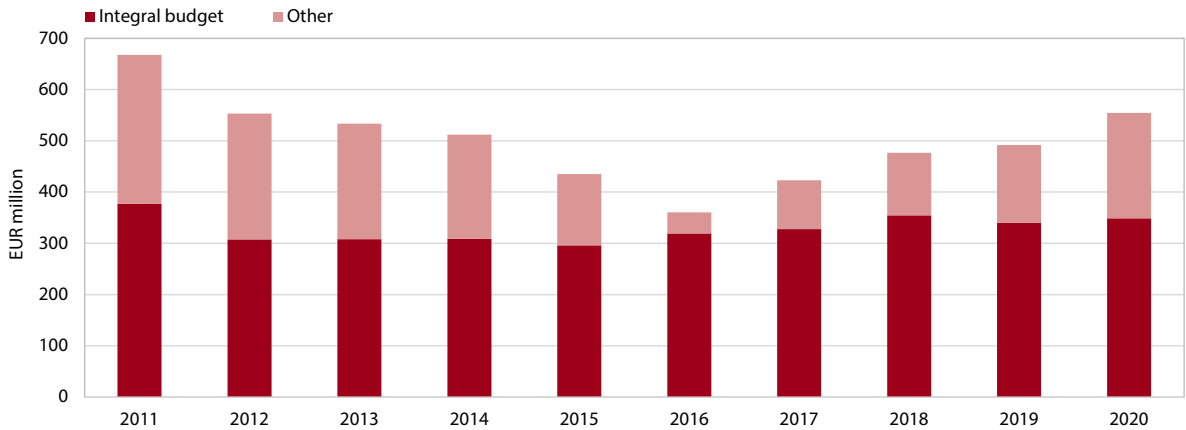
<sup>208</sup> Belgium, Cyprus, Austria, France and Sweden.

<sup>209</sup> The following main programmes of the programme classification of government budget expenditure were included: 0401 E-governance and IT infrastructure, 0502 Scientific research activity, 0503 Human resources in support of science, 0504 Support for technology development projects, 0505 Information society and electronic communications, 1002 AEP – Training and education, 1004 AEP – Employment incentives, 1005 AEP – Job creation, 1402 Business environment for entrepreneurship and competitiveness, 1403 Promotion of growth and development of enterprises, 1404 Promotion of foreign investment and openness of the economy, and 1405 Support for tourism development. These were further grouped by subject, namely ICT (0401 and 0505), science (0502 and 0503), technology (0504 and 1403), active labour market policy, AEP (1002, 1004 and 1005), business environment (1402), and other (1404 and 1405). While according to the defined methodology tourism can be financed through various objectives of the cohesion policy, the actual purpose for which the funds have been spent are largely in line with the smart transformation. For example, promotion of networking within tourist destinations, the introduction of the green scheme of Slovenian tourism, international promotion or the modernisation of tourist infrastructure and accommodation, all of which contribute to increasing the added value in this sector, which is why it was included; however, the sector is not a key item, as at the end of the period its expenditure accounted for only 3.2% of the total expenditure on smart transformation.

much funding came from the integral budget<sup>210</sup> and how much from other funds, predominantly EU funds, especially cohesion policy funds. The quality of the data only allows analysis from 2011 onwards, and the outturn data used were deflated for year-on-year comparisons.<sup>211</sup>

**Two-thirds of smart transformation expenditures are financed from the national budget; however, due to a seven-year long implementation cycle,<sup>212</sup> the overall dynamics are characterised by the remaining third of expenditures, financed mainly with EU funds.** In 2020, EUR 554 million from the Slovenian government budget went towards smart transformation. On average, two-thirds of the entire 2011–2020 period came from the funds of the national budget and one-third from other, mainly EU, sources. Despite representing the smaller share, it is EU funding that has the strongest impact on the dynamics of smart transformation spending, which is largely related to the implementation cycle of EU funding within the EU's seven-year financial perspectives. The expenditures from the national budget were the lowest in the 2012–2016 period, amounting to about EUR 300 million, followed by an increase of an additional EUR 50 million over the next period, until 2020. At the end of the period, the nominal value of expenditures from national budget that went towards smart transformation was still EUR 28 million below the 2011 expenditures, which amounted to EUR 377 million.

**Figure 56: Government budget expenditures targeted at smart transformation, in 2020 constant prices**



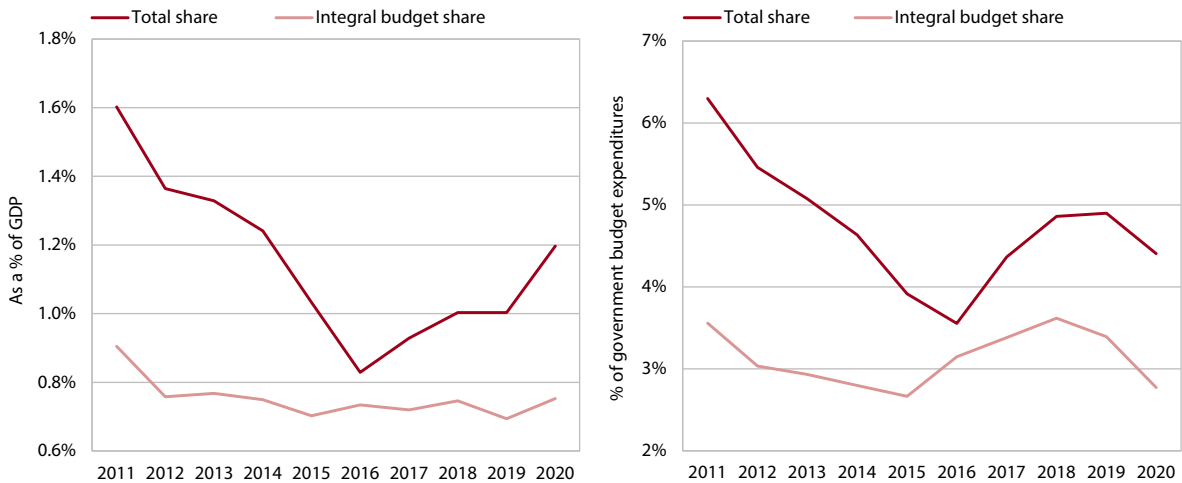
Sources: MF (n.d.); calculation by IMAD.

**Public expenditure on smart transformation is highly cyclical as a share of GDP due to EU funding, while expenditure from national public funding is stagnating, even falling as a share of the budget from 2018 to 2020.** Similarly to the nominal value of expenditures, the total volume of public spending on smart transformation as a share of GDP is also influenced by the dynamics of the absorption of EU funds. From 2011 to 2016, the total expenditure thus halved due to fluctuations in EU funding from 1.6% of GDP to 0.8%; however, by 2020 it increased to 1.2% of GDP, reflecting the highly cyclical nature of this part of public expenditure on smart transformation. In contrast, funding for this purpose from the national budget has remained almost unchanged and stagnates at around the same level over the whole period, i.e. 0.74% GDP, with only one year standing out – 2011, when 0.91% of integral funds GDP from the government budget went towards digital transformation. More dynamism can be observed in the share of national smart

<sup>210</sup>Item type 1 “budget expenditures”.  
<sup>211</sup>The absolute figures below are expressed in 2020 constant prices.  
<sup>212</sup>For a more detailed explanation, see Section 5.2.3.

transformation funds in total government budget expenditure, which shows that fiscal consolidation has decreased smart transformation spending above average, as its share fell by a quarter in the 2011–2015 period. By 2018, the share was back to the baseline level of 3.6% of total budget expenditure, but it then fell to 2.8% by 2020<sup>213</sup>. For a more detailed analysis of public expenditure by purpose, see Appendix 5.

Figure 57: Share of the government budget targeted at smart transformation in % of GDP (left) and as share of total government budget expenditures (right)



Source: MF (n.d.); calculation by IMAD.

### 5.2.3 EU funds' contribution to smart transformation by 2027

Unlike national funds, which are programmed annually, the EU funds are programmed for a seven-year framework called the financial perspective. The volume of funds disbursed in a given year is thus a function of the amount of funds allocated for each purpose over a seven-year period, and the dynamics by year are mainly shaped by the number of years that have elapsed since the start of the programming period. Considering that the cycles in the absorption of EU funds are not unique to Slovenia and are common in all countries (EC, 2017), the analysis below mainly focuses on the level of EU funding that Slovenia earmarks for purposes related to smart transformation. The two key sources of funding smart transformation in the EU, also analysed below, are the NextGenerationEU, implemented through recovery and resilience plans (hereinafter RRP), and EU Cohesion Policy funds, including the Just Transition Fund.<sup>214</sup>

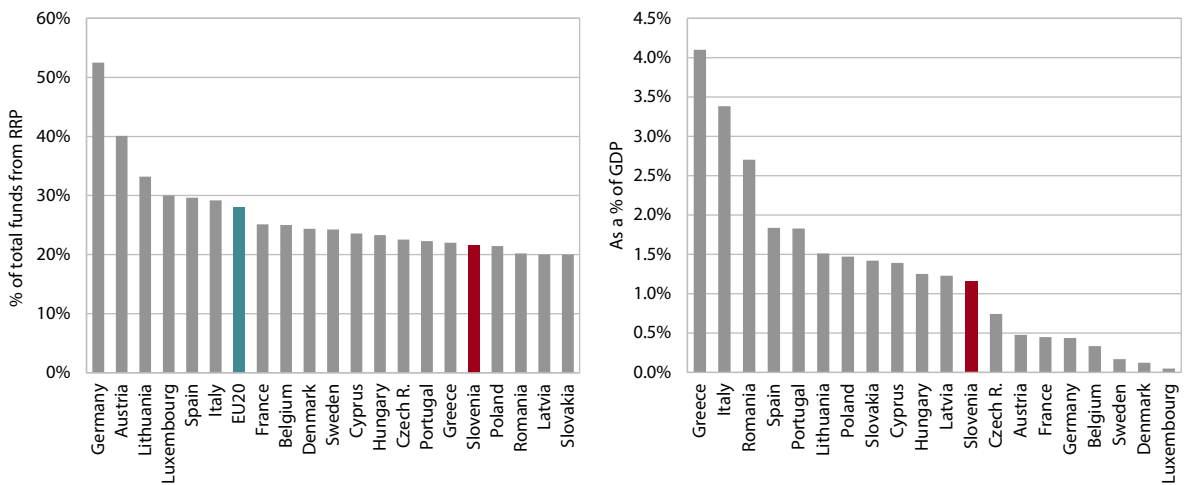
**The funds from the Slovenian national recovery and resilience plan earmark 43% for smart transformation; however, in terms of funds for digitalisation, Slovenia falls in the dominant group of countries with shares around the 20% EU minimum.** The approved recovery and resilience plan provides for EUR 705 million in loans in addition to EUR 1.8 billion in grants. Using the analogue current methodology, we can identify the funds for digital transformation, research, development and innovation, raising productivity, the labour market, tourism, and

<sup>213</sup> The difference of 0.8 p.p. in the share of integral funds for smart transformation in the total budget between the 2018 peak and 2020 peak amounts to EUR 106 million in nominal terms.

<sup>214</sup> React-EU funding was more short-term oriented and also implemented through the existing programming documents; it is therefore not included in the set of actions for the 2021–2027 period.

competence building as relevant for smart transformation.<sup>215</sup> In total, the recovery and resilience plan provides for EUR 1.08 billion or 43% of all funds for these areas. While there are no data available to allow a more accurate comparison with other countries, at least at the time of writing this report, the Darvas et al. (2021) methodology provides a rough estimate according to which Slovenia falls within the EU average in this regard.<sup>216</sup> However, due to a more clearly defined methodology by the EU, the comparison of the share of funds allocated for digitalisation is much more credible.<sup>217</sup> According to this comparison, at EUR 536.41 million or 21.86%, Slovenia falls in the group of countries with shares around or just above the EU minimum of 20%, as shown in Figure 58.

**Figure 58: Funds for digitalisation provided for in the national recovery and resilience plans: in the share of total EU funds and in % of GDP in 2020**



Sources: Darvas et al. (2021), Eurostat; calculation by IMAD.

**The countries of Eastern and Southern Europe spend on average 1.9% of GDP for digitalisation under their RRP, while Slovenia spends 1.2% of GDP.** The analysis of digitalisation funding shares masks the differences in the level of EU support that countries receive from the NextGenerationEU. To this end the digitalisation budget has been converted to GDP,<sup>218</sup> as shown in Figure 58, right. The figure shows that Greece, for example, which earmarked a similar share of its RRP for digitalisation as Slovenia, will actually invest more of its GDP in digitalisation than any other country. Bulgaria and Italy also have high levels of investment in digitalisation as a share of GDP, while at 1.2% of GDP, Slovenia only ranks above Estonia, Malta and the Czech Republic<sup>219</sup> out of the countries of Eastern and Southern Europe.<sup>220</sup> If Slovenia wished

<sup>215</sup> We do not go into a more detailed analysis of the content, i.e. to what extent the measures under each heading are actually directly linked to the heading itself.

<sup>216</sup> The estimate is based on shares earmarked for the second and third pillars, i.e. digital transformation and investments in smart, sustainable and inclusive growth, which, in particular the latter, may include measures that greatly vary from one country to another, so this is only a rough, less reliable estimate. A more detailed, content-related estimate, e.g. the share of funding for research, development and innovation as one of the key instruments for raising productivity (IMAD, 2020b), for which Slovenia allocated EUR 133 million or 5.3% of funding, is not possible at this stage.

<sup>217</sup> See [https://ec.europa.eu/info/files/guidance-member-states-recovery-and-resilience-plans\\_en](https://ec.europa.eu/info/files/guidance-member-states-recovery-and-resilience-plans_en).

<sup>218</sup> According to the 2020 GDP.

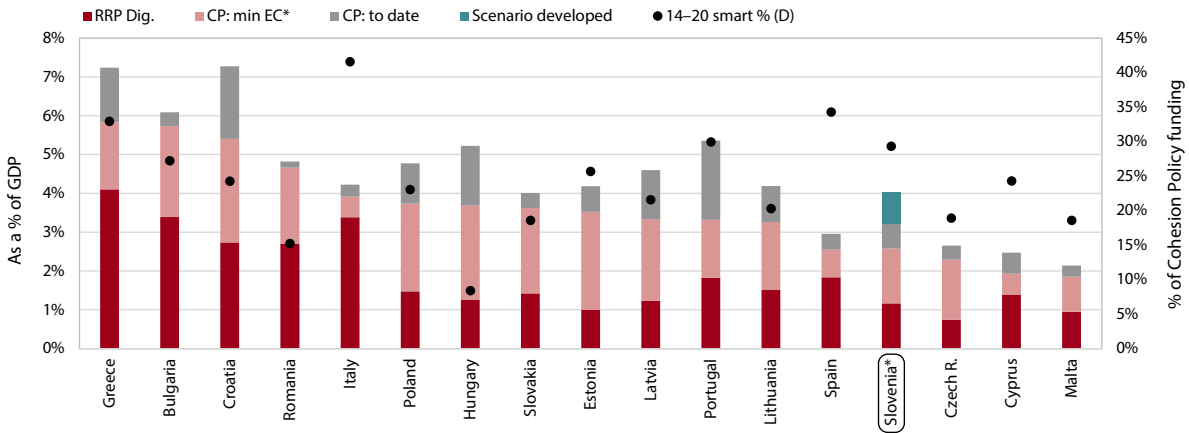
<sup>219</sup> It should also be noted that the Czech Republic invests the second highest share in the EU in ICT and that between 2010 and 2019, it invested on average 1.9 p.p. of GDP more in ICT than Slovenia. The situation is even worse when total investment in ICT, R&D and other buildings and equipment is taken into account: according to this indicator, the Czech Republic has the third highest GDP share of these investments in the EU; however, between 2010 and 2019, it invested on average 3.5 p.p. of GDP more than Slovenia.

<sup>220</sup> The countries of Southern Europe include Greece, Italy, Spain, Portugal and Cyprus, and the countries of Eastern

to invest in digitalisation similarly to the countries mentioned above, i.e. 1.9% of GDP, it would have to increase investment therein by EUR 335 million or by 62%.

**At the same time, the share of funding for smart transformation in the Cohesion Policy 2021–2027 is to be cut from the current 29% to 18% or 20%...** Considering that Slovenia is eligible for almost twice as much grant funding from Cohesion Policy as from RRP, the comparatively lower allocations in RRP could be compensated by a higher smart transformation funding in Cohesion Policy. Smart transformation is supported by Policy Objective 1, a smarter Europe, which covers research, development and innovation, digitisation and SMEs, including retraining. While data for other countries is not yet available, Slovenia also presented the estimated allocations of all key European resources by objective by 2029 when sending the RRP to the European Commission (SVRK, 2021c). Within the Cohesion Policy, EUR 96 million or 3% of all available Cohesion Policy funding for Slovenia are allocated for digitisation and EUR 439 million or 13% are allocated for other purposes, i.e. research, development, innovation and SMEs. This means that a total of 16% of funding is allocated for smart transformation, which is significantly less than the current 29% and close to the lower limit acceptable under the European Cohesion Policy rules.<sup>221</sup> The updated Baseline of the Programme for the Implementation of the EU Cohesion Policy of 8 November 2021 (SVRK, 2021a) raised the mentioned share to 18% or EUR 591 million, or rather, taking into account the transfer of funds to the Horizon Europe programme, to 20% or EUR 662 million.<sup>222</sup>

**Figure 59: Even if Slovenia were to increase Cohesion Policy funding for smart transformation to the level of the most progressive countries, it would still spend less on smart transformation than the average of other countries<sup>223</sup>**



Sources: EC (n.d.-b), Eurostat (2022); calculation by IMAD  
Note: Digitalisation funding in RRP (RRP Dig.), Cohesion Policy funding for smart transformation for the 2021–2027 period, the minimum scenario allowed by the Cohesion Regulations (CP: min EC) or taking into account the share of funds in the 2014–2020 period (CP: to date), the scenario developed for Slovenia implies that Slovenia would allocate the same share for smart growth as Ireland and Finland (41%); shares smart transformation funding between 2014 and 2020 are on the right (14–20 smart %). For Slovenia, the 20% share proposed in the baselines of 8 November 2021 is taken into account instead of the minimum share of Cohesion Policy funding for smart transformation, i.e. also taking into account the transfer of funds to the Horizon Europe programme. Smart transformation funding for 2014–2020 includes thematic objectives 1–3, i.e. research, development and innovation, ICT, and SMEs, while for 2021–2027 it includes funding for Policy Objective 1, A smarter Europe, which addresses the same purposes, including retraining related to smart transformation. The countries in the figure are ranked according to the total share of digitalisation funding in the Recovery and Resilience Plan and the minimum share of smart transformation funding in cohesion policy as a share of GDP.

Europe include Romania, Lithuania, Poland, Slovakia, Hungary, Latvia and the Czech Republic.  
<sup>221</sup> Regulation (EU) 2021/1058 of the European Parliament and of the Council of 24 June 2021 on the European Regional Development Fund and on the Cohesion Fund, 2021.  
<sup>222</sup> According to the material, funding for digital connectivity is “still a matter of discussion at this point” and is therefore “not yet provided for in the table” (SVRK, 2021a, p. 7).  
<sup>223</sup> Provided that other countries maintain the current share of smart transformation funding.



**... which would mean that Slovenia would not catch up in investments in smart transformation even if other countries of Eastern and Southern Europe were to allocate the minimum share possible for smart transformation.** Despite its comparatively high share in cohesion policy funds in the 2014–2020 financial perspective, Slovenia's total investment in smart transformation has so far been comparatively less than the EU average and considerably less than the leading countries.<sup>224</sup> Since in the future Slovenia will invest an average share of RRP in smart transformation<sup>225</sup> and noticeably less in digitalisation than other countries of Eastern and Southern Europe, it is all the more important what the distribution of resources by cohesion policy goals will be.<sup>226</sup> Figure 59 shows that even if all other countries in the cohesion system were to opt for the minimum possible shares for smart transformation, Slovenia would in total only spend more on smart transformation, using funds from RRP and the cohesion policy, in accordance with the baselines of 8 November 2021, than the Czech Republic, Malta and Cyprus and 1.2 p.p. of GDP below the average of other Central and Eastern European Countries. This is primarily due to the lower aid intensity in relation to GDP because of the higher development of Slovenia compared to other countries. Consequently, if Slovenia wanted to match the investments in smart transformation, it would not be enough to maintain the current share of cohesion funding for smart transformation, but it would have to increase<sup>227</sup> it by following the example of countries such as Ireland (42%) or Finland (40%), which allocate the highest share of funding to smart transformation within the group of developed countries.<sup>228</sup> Even by opting for such an advanced-development scenario, Slovenia would still only rank 12th out of 17 countries or still invest 0.5 p.p. of GDP below the average of the other countries.<sup>229</sup>

## 5.3

### SUSTAINABLE transformation towards a low-carbon circular economy

**The transition towards a low-carbon circular economy is becoming an increasingly important factor in ensuring long-term productivity growth and the resilience of economies and societies.** The economic recovery from the COVID-19 crisis will be centred around international agreements on sustaining life on Earth and the related goal of significantly reducing greenhouse gas emissions. Human influence on climate change is significant (IPCC, 2021), and in consequence the EU is pushing for a faster and systematic green transition across key areas such as energy, transport, land use and taxation. The main target is to reduce the net greenhouse gas emissions by at least 55% by 2030 compared to 1990 levels and

<sup>224</sup>For the backlog estimate, see Sections 4.2.1 (investments in research and development activities) and 4.2.2.5 (investments in ICT and digitalisation) or Section 5.2.1 for joint comparative analysis of smart transformation investments.

<sup>225</sup>As the methodology for estimating total smart transformation investments from the RRP is rather weak, the digitalisation share, the estimate of which is much more credible, has been used in further analysis – see the beginning of the subsection for more details.

<sup>226</sup>It is implicitly assumed that there will be no significant change in the level of Member States' own public investments in smart transformation in the coming period compared to the previous period, which does not seem to be a strong assumption in the light of the need for a gradual reinstatement of fiscal rules and the additional investment needed due to new challenges related to climate change and, for example, to the epidemic.

<sup>227</sup>In accordance with the economic policy recommendations (IMAD, 2021c).

<sup>228</sup>From 2014 to 2020, the average share of cohesion funding for smart transformation in the more developed countries was 32% – a weighted average, using the size of all cohesion funding as weight; a simple average amounts to 30%.

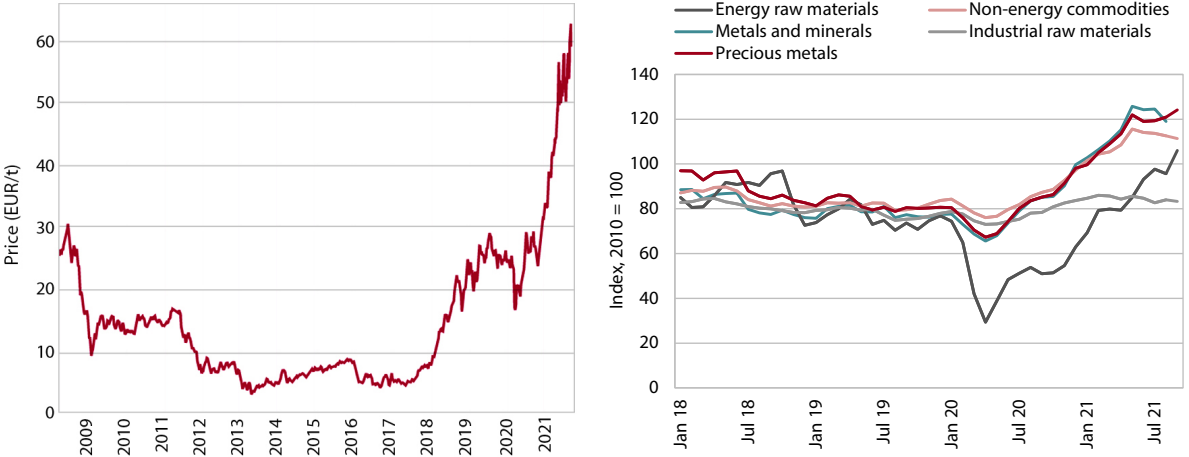
<sup>229</sup>Assuming that other countries would maintain the same shares of cohesion funding for smart transformation as under the cohesion policy in the 2014–2020 period. However, if all other countries were to reduce these shares to the minimum, then Slovenia would move up to fifth place, investing 0.4 p.p. of GDP more in smart transformation than the average for Southern and Eastern European countries.



achieve climate neutrality by 2050. Systematic development of new skills, innovation and sustainable investment in clean technologies will create new high-quality jobs in all sectors, boosting overall productivity growth in the economy (EC, 2019c, 2020b).

**The rising emissions allowance prices increasingly challenge emissions-intensive economies included in the GHG emissions trading scheme to seek low-carbon solutions.**<sup>230</sup> As most of these emissions come from the energy, transport and buildings sectors, these are the areas where changes will be most profound. Major future actions will include the introduction of emissions trading in new sectors,<sup>231</sup> tightening the trading system by reducing the amount of free emission allowances and phasing them out by 2035, promoting greater use of renewable energy, greater energy efficiency, and a faster roll-out of low-emission transport modes and the infrastructure to support them. As the reductions in GHG emissions achieved at the beginning of the COVID-19 pandemic could be short-lived without radical systemic changes (UNEP, 2021), changing the energy products taxation system and eliminating all exemptions and incentives that do not contribute to achieving climate targets will be important for long-term success (IJS, 2021; Government of the Republic of Slovenia, 2020).

**Figure 60: A faster transition to a lowcarbon circular economy is also driven by rising prices of emission allowances (left) and commodities (right)**



Sources: Sandbag (n.d.), WB (2021).

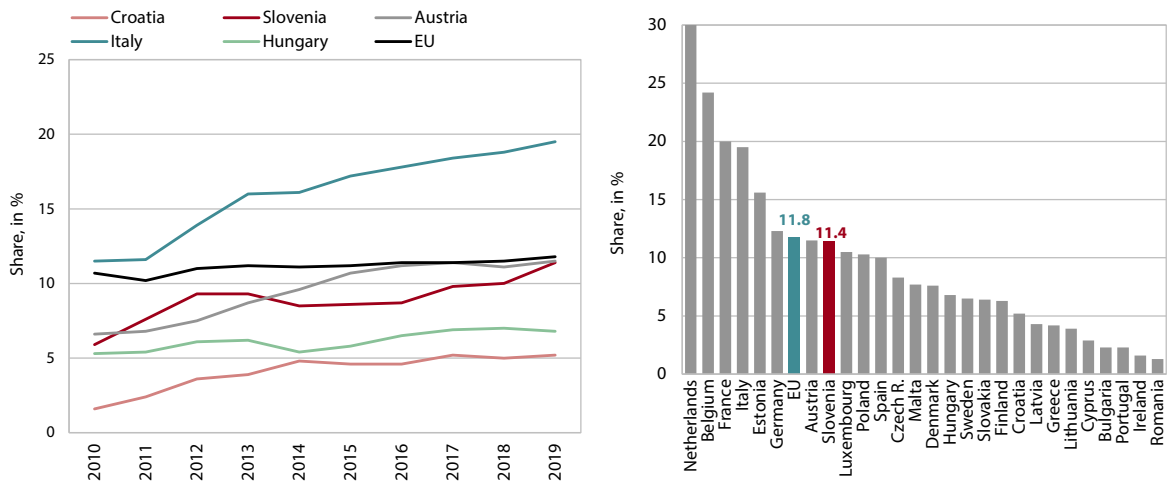
**The circularity of the Slovenian economy, measured by the circular material use rate, has increased in the 2016–2019 period; however, the potential for further more efficient sustainable use of recovered materials is significant.**

**In an uncertain environment of rapidly rising energy and commodity prices and supply chain disruptions, it will be necessary to enhance circularity and resource efficiency, thereby reducing production costs.** Commodity prices rebounded sharply in spring 2021 following a decline and remained at higher levels than before the epidemic. Due to the world's limited supplies and the expectation that the energy transition from fossil fuels to renewables will significantly increase the demand for metals, metal prices increased the most (IMAD, 2021b; WB, 2021), while in summer 2021, energy prices soared (see Figure 60). As primary commodity prices are expected to continue to rise due to finite resources, while secondary commodity prices are expected to decrease in the long term (OECD, 2019b), increased processing and decoupling of economic growth from the use of primary resources will also reduce operating costs and dependence on commodities (UN,

<sup>230</sup> Emissions allowance prices have risen due to higher demand, which, along with higher natural gas prices, is also likely to be linked to increased activity at coal-fired power plants.  
<sup>231</sup> Air, waterborne and road transport will also be included in the emission trading system.

2019).<sup>232</sup> The circularity of the Slovenian economy, measured by the circular material use rate, has increased in the 2016–2019 period; however, the potential for further more efficient sustainable use of recovered materials is significant (IMAD, 2021c).

**Figure 61: Slovenia's circular material use rate increased in the last decade (left) and was close to the EU average in 2019 (right)**



Source: Eurostat (2022).

**Green transformation of the economy is an opportunity to create new jobs** (CEDEFOP, 2019). The EC estimates that the transition to a low-carbon circular economy will create over one million jobs in the EU by 2030 (EC, 2020c). In Slovenia, the potential for green jobs is high but under-exploited (Karba et al., 2014; Plut and Klemenc, 2014).<sup>233</sup> A measure of providing financial assistance to employers for employing the unemployed in green jobs was therefore adopted in 2021.<sup>234</sup> In the 2008–2018 period, the number of persons employed in circular economy sectors increased by around a tenth, while their share of total employment remained unchanged but higher than the EU average<sup>235</sup> (Eurostat, 2022). Because the green transition represents a major transformation of companies and their production and business models (EIB, 2021), it not only brings opportunities to create new jobs but also the risk of job reductions, especially in polluting industries (OECD, n. d.; EIB, 2021).

**The impact of green transformation will be seen in the structural changes, changes in the content of occupations and the need for new skills (EIB, 2021; ILO, 2018).** Slovenia is implementing a number of activities to address these changes,<sup>236</sup> and there is a great need to strengthen education for sustainable development among young people and adults (IMAD, 2021c). Various training courses

<sup>232</sup>When we reduce the amount of materials we use, re-use and recycle, we recover valuable materials and help reduce emissions. For example, recycling aluminium saves around 95% of the energy that would otherwise be used to extract the material (EC, n.d.-b).

<sup>233</sup>Plut and Klemenc (2014) estimate the total green jobs potential in Slovenia to about 250,000. The greatest potential lies in organic farming, the forest-wood chain, waste management, renewable energy, energy efficiency, energy renovation of buildings and sustainable tourism.

<sup>234</sup>Slovenia is financing a subsidy scheme for employers who will employ unemployed persons in green jobs on a permanent basis. To this end, the Employment Service of Slovenia published the Green Jobs 2021 invitation to tender in 2021 (ESS, 2021c).

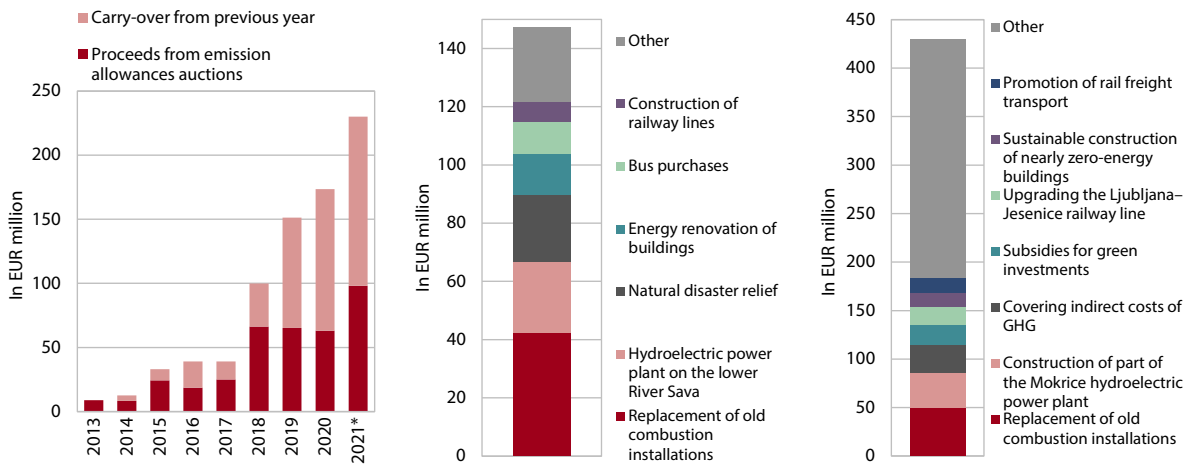
<sup>235</sup>In 2018, the share of persons employed in the circular economy sectors in Slovenia was 2% (EU: 1.7%).

<sup>236</sup>The Integrating Climate Topics into the Broad Process of Education Development programme is being implemented, and numerous activities are being carried out at the pre-school, basic school and upper-secondary school levels and in adult education (MIZŠ, 2021a). Adults can also take part in education for sustainable development, available through the Slovenian Institute for Adult Education (SIAE, n.d.) under the cross-sectoral project LIFE IP CARE4CLIMATE (MOP, 2019).

are being provided to help employees transition to a low-carbon society, but despite high demand, these courses have been poorly attended (IJS et al., 2020). Green skills development<sup>237</sup> should be strengthened and education and (re)training programmes should be developed, especially for employees whose jobs will be at risk as a result of the green transition and who will move to occupations with growing demand. A number of education and training programmes are also being rapidly developed and renewed in the EU to meet these needs.<sup>238</sup>

**Making good use of all available European and national resources will be key to speeding up the recovery and the transition to a green and resilient economy. The *Recovery and Resilience Plan*, with EUR 1.8 billion in grants and EUR 705 million in loans for reforms and investments, allocates 43% of its funding to the green transition (SVRK, 2021b).** As the main focus is on incentives for a clean and safe environment and sustainable mobility, only a minor part is devoted to the circular economy and the creation of systemic conditions for transformation in businesses and value chains. The green transition is also supported by the *Climate Change Fund*, which is collected from the sale of emission allowances paid by polluters, who need to adapt their behaviour as quickly as possible. As the remaining balance in this fund has been increasing for several years, it would be reasonable to create a single platform to improve transparency and access to information and to speed up the use of the appropriations (Chamber of Commerce and Industry of Slovenia, 2021), while at the same time optimising the payout structure towards achieving priority climate and environmental targets (see Figure 62). Measures for sustainable development will also be supported by the *European Cohesion Policy*, which, in addition to traditional environmental infrastructure, places a strong emphasis on sustainable transformation. Making good use of all available resources is an opportunity to recover quickly from the crisis and to move towards the envisaged green digital economy, which will be more productive and more resilient to possible new crises.

**Figure 62: Climate Change Fund: inflows and annual transfers (left); payout structure for the 2013–2020 period (middle) and budgeted payout structure for the 2021–2023 period (right)**



Source: MOP (2021).  
Note: \*estimate for 2021.

<sup>237</sup> Green skills are those skills needed to adapt products, services and processes to climate change and the related environmental requirements and regulations (OECD and CEDEFOP, 2014). They can range from very technical and job-specific skills to “softer” ones, such as responsible use of resources, which can be relevant across occupations and sectors (CEDEFOP, 2019).

<sup>238</sup> Austria, Latvia and Portugal increased funding in education and (re)training aimed at adapting to climate change (Eurofound, 2021d). Denmark developed new education programmes to meet the skills need for green jobs (ILO, 2018), while Estonia adapted many occupational standards in architecture, construction, transport, engineering, energy, mining, the chemicals industry, etc. (CEDEFOP, 2019).

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## Appendix 1

## High-growth enterprises in terms of productivity

### Methodology

High-growth enterprises are generally defined as such on the basis of their employment growth, as is the case with the SURS method, for example, or on the basis of their revenue growth, as is the case with the method used by the Ministry of Economic Development and Technology (MGRT).<sup>239</sup> Analyses of high-growth enterprises in terms of productivity are not very common (Guillamnn et al., 2017), but this does not mean that such an analysis is any less important from the point of view of understanding productivity, which is the central theme of this Report. According to Delmar et al. (2003), the measurement method, the analysis period and the criteria used to determine when an enterprise is considered high-growth are crucial in determining the methodology for high-growth enterprises in terms of productivity. In addition to the above differences, it is also necessary to clean up the database used, in our case data on companies prepared by the Agency of the Republic of Slovenia for Public Legal Records and Related Services (AJPES).

**The difference between the averages for 2017–2019 and 2014–2016 was analysed in terms both of absolute and of relative productivity growth.**<sup>240</sup>

According to the literature, the use of absolute changes in the indicator used favours large enterprises, while the use of relative changes favours small enterprises (Daunfeldt et al., 2014; Delmar et al., 2003). Given that the definition of productivity itself is relative, this problem is not very pronounced (Guillamnn et al., 2017), but analysis of the data shows that not only do the two approaches yield different results, but from an analytical point of view they are both relevant and interesting. Therefore no summary indices combining the two approaches were used,<sup>241</sup> but the two indices were used simultaneously, i.e. separately for absolute and relative productivity growth. As far as time period is concerned, the analysis does not cover the asymmetric sectoral impact of the COVID-19 crisis, nor the 2009–2013 period, which was marked by the previous crisis. Consequently, the 2014–2019 period, i.e. the period of economic expansion, was analysed, which must also be taken into account when interpreting the results, as it is possible that companies from cyclically more sensitive sectors are slightly more over-represented in the results.<sup>242</sup> To ignore emergency situations, shocks and anomalies, the analysis is based on three-year averages, i.e. the difference between the averages for the 2017–2019 and 2014–2016 periods.

**The fastest-growing companies in terms of productivity included the top 5% of the most successful companies; in addition, an analysis was also carried out for 25% of the most dynamic large enterprises.** In determining the threshold for defining a high-growth company in terms of productivity, several tests of the most commonly used thresholds (1%, 5% and 10%) were carried out, although from a pragmatic point of view, the number of companies analysed and their characteristics must also be taken into account (Daunfeldt et al., 2014; New Zealand Productivity Commission, 2021). Based on the number of companies and their performance,

<sup>239</sup> At the international level, the OECD and EUROSTAT, 2008, which use the same indicators, are considered a reference in this area; for an overview of other studies, see Daunfeldt et al., 2014.

<sup>240</sup> Labour productivity, i.e. value added per employee (AOP 188), where value added is calculated as gross operating yield (AOP 126), minus costs of goods, materials and services (AOP 128), minus other operating expenses (AOP 148).

<sup>241</sup> E.g. Birch-Schreyer Indicator in accordance with (Birch, 1987) and (Schreyer, 2000).

<sup>242</sup> One such example is the trade sector, which does not have a significant impact on the identification of successful companies in other sectors because, due to the fact that a larger number of companies is analysed, the number of the fastest growing companies is also higher.



the threshold of the most successful 5% of companies that showed the highest productivity growth in the period under consideration according to both indicators, i.e. absolute and relative, was used for the aggregate analysis. Since this method only includes a very small number of large enterprises, which nevertheless have a significant impact on overall productivity, a separate analysis was also carried out for this group of enterprises, for which the threshold was raised to 25% in order to achieve a critical mass of enterprises.<sup>243</sup>

**After data cleaning, 7,153, i.e. 10.6% of the companies for which data are available were included in the analysis.** Data cleaning was based on the methodology previously established by IMAD for the analysis of microdata (IMAD, 2017, 2019). At the same time, an attempt was made, where relevant, to align the methodology as much as possible with the MGRT methodology for defining high-growth companies in terms of turnover to ensure consistency. In line with the practice of the CompNet project set up by the European System of Central Banks, the lower and upper percentages of extreme values in terms of productivity by year and industry were ignored at the two-digit level. In addition, companies that had negative value added, capital or labour costs in any year of the 2014–2019 period were excluded, and the included companies had to have data available for all years considered (the current business performance condition). Following IMAD (2017), companies with at least five employees in 2019 were included in the analysis, and companies had to have at least the same number of employees at the end of the period than at the beginning, as the objective is to identify companies that are successful not only in terms of productivity growth, but also in terms of employment.<sup>244</sup> Also excluded were enterprises that, according to NACE and by analogy with the MGRT methodology, belong to the economic activities L, O, S, T, U, i.e. the largest part of the non-business sector, as were financial and insurance activities and activities auxiliary to financial services and insurance activities (Nos. 64 and 66), activities of head offices (70), and electric power generation, transmission and distribution (35), the last due to the strong role of public enterprises operating in particularly regulated markets, which could not otherwise be excluded due to data limitations. In accordance with the established methodology, 7,153, i.e. 10.6% of all companies for which data is available by individual year, were included in the analysis. The companies included in the sample thus represent 57% of the total value added and 55% of the employees of all companies for which data are available.

<sup>243</sup>The fastest-growing companies in terms of productivity included 25% of the companies that achieved productivity growth in the period analysed, which is not the case for all companies in the sample, meaning that the final share of large companies was 20%. The lower share in the total sample is also due to the fact that in the group of large companies, both criteria, i.e. absolute and relative, were fulfilled by as many as 20 of the 30 companies.

<sup>244</sup>In this way, the methodology avoids including enterprises that do not increase their value added but increase their productivity at the expense of reducing the number of employees, which can also be an important lever for increasing productivity (Bailey et al., 1996).

Sectoral structure of the fastest growing companies  
 at the level of activities

// Table 1: Structure of 5% of the most dynamic companies and 25% of the most dynamic large enterprises by categories of activities based on NACE classification

NACE Rev. 2	Name	5% of all enterprises		25% of large enterprises	
		No.	%	No.	%
8	Other mining and quarrying	1	0.3%		
10	Manufacture of food products	1	0.3%	1	3.3%
11	Manufacture of beverages	1	0.3%	1	3.3%
14	Manufacture of wearing apparel	1	0.3%		
15	Manufacture of leather and related products	1	0.3%		
16	Manufacture of wood and of products of wood and cork, except furniture, manufacture of articles of straw and plaiting materials	7	1.9%		
18	Printing and reproduction of recorded media	2	0.6%	1	3.3%
20	Manufacture of chemicals and chemical products	1	0.3%	1	3.3%
21	Manufacture of chemicals and chemical products			2	6.7%
22	Manufacture of rubber and plastic products	3	0.8%	1	3.3%
23	Manufacture of other non-metallic mineral products	5	1.4%	1	3.3%
24	Manufacture of basic metals	1	0.3%		
25	Manufacture of fabricated metal products, except machinery and equipment	14	3.9%	1	3.3%
26	Manufacture of computer, electronic and optical products	6	1.7%		
27	Manufacture of electrical equipment	5	1.4%	1	3.3%
28	Manufacture of machinery and equipment n.e.c.	7	1.9%	1	3.3%
29	Manufacture of motor vehicles, trailers and semi-trailers	2	0.6%	2	6.7%
30	Manufacture of other transport equipment	1	0.3%		
31	Manufacture of furniture	2	0.6%	1	3.3%
32	Other manufacturing	4	1.1%	2	6.7%
33	Repair and installation of machinery and equipment	8	2.2%		
36	Repair and installation of machinery and equipment			1	3.3%
38	Waste collection, treatment and disposal activities, materials recovery	3	0.8%		
39	Remediation activities and other waste management services	1	0.3%		
41	Construction of buildings	10	2.8%	1	3.3%
42	Civil engineering	4	1.1%	2	6.7%
43	Specialised construction activities	33	9.2%		
45	Wholesale and retail trade and repair of motor vehicles and motorcycles	11	3.1%		
46	Wholesale trade, except of motor vehicles and motorcycles	85	23.6%	1	3.3%
47	Retail trade, except of motor vehicles and motorcycles	8	2.2%	4	13.3%
49	Land transport and transport via pipelines	19	5.3%		
51	Air transport	1	0.3%		
52	Warehousing and support activities for transportation	16	4.4%	1	3.3%
55	Accommodation	5	1.4%	1	3.3%
56	Food and beverage service activities	7	1.9%		
58	Publishing activities	2	0.6%		
59	Motion picture, video and television programme production, sound recording and music publishing activities	1	0.3%	1	3.3%
60	Programming and broadcasting activities	1	0.3%		
61	Telecommunications	1	0.3%		
62	Computer programming, consultancy and related activities	14	3.9%		
63	Information service activities	6	1.7%		

NACE Rev. 2	Name	5% of all enterprises		25% of large enterprises	
		No.	%	No.	%
69	Legal and accounting activities	5	1.4%		
71	Architectural and engineering activities, technical testing and analysis	20	5.6%		
72	Scientific research and development	4	1.1%		
73	Advertising and market research	10	2.8%		
74	Other professional, scientific and technical activities	2	0.6%		
77	Rental and leasing activities	3	0.8%		
78	Employment activities	1	0.3%	2	6.7%
79	Travel agency, tour operator and other reservation service and related activities	2	0.6%		
80	Security and investigation activities	1	0.3%		
82	Office administrative, office support and other business support activities	1	0.3%		
86	Human health activities	5	1.4%		
92	Gambling and betting activities	2	0.6%		
93	Sports activities and amusement and recreation activities	2	0.6%		
95	Repair of computers and personal and household goods	1	0.3%		
	<b>Total</b>	<b>360</b>	<b>100%</b>	<b>30</b>	<b>100%</b>

Source: AJPES (n.d.-b); calculations by IMAD.

Appendix 2

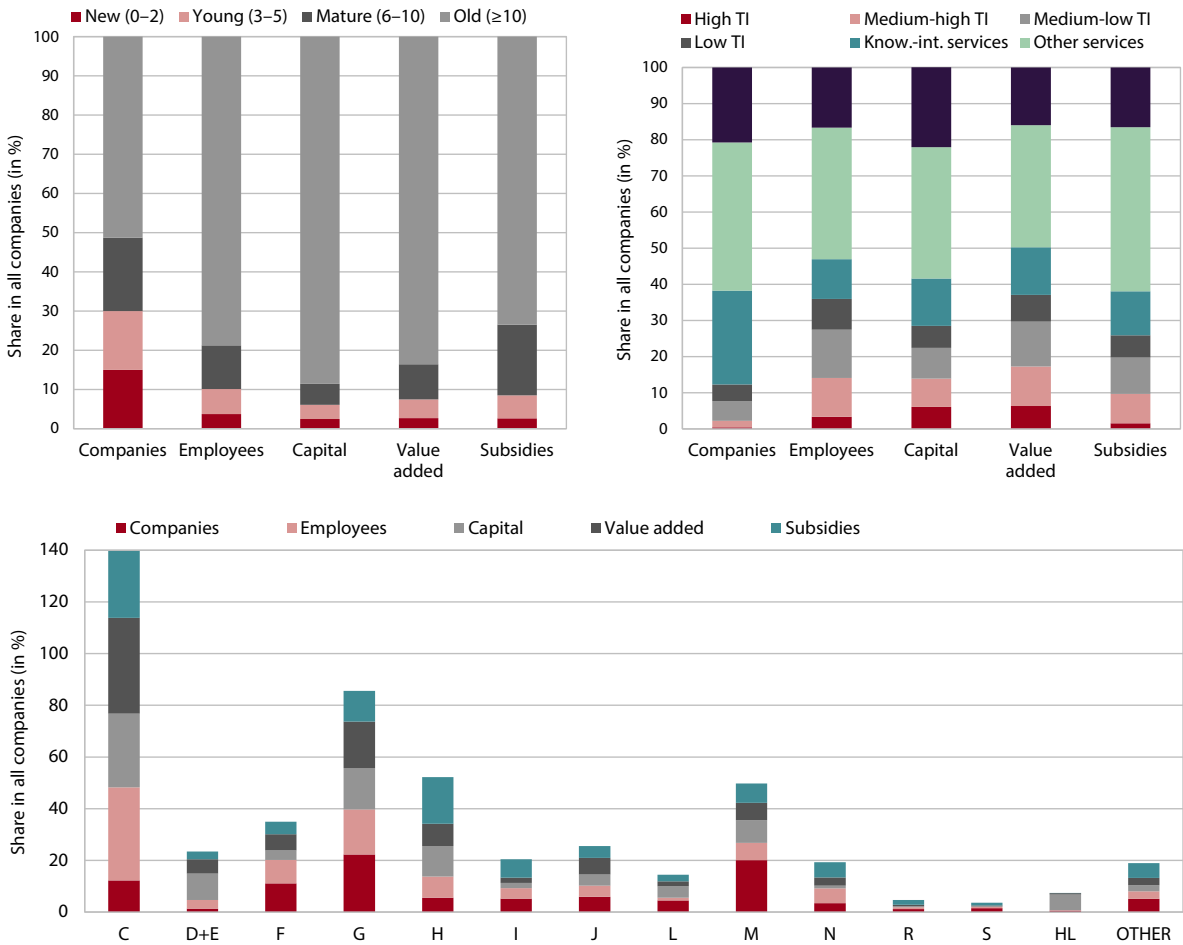
Detailed data on the impact of the COVID-19 epidemic on the financial situation of companies

Figure 1: Shares of companies by export orientation, size,<sup>245</sup> activity, technology intensity, knowledge intensity and age, 2020



<sup>245</sup> Since the 2016 financial year, the criteria for determining company size have changed (for details see (ZGD-11, 2015); net sales revenue and value of assets), which is why this analysis uses only the criterion that has remained unchanged during the entire observation period. i.e. the average number of employees during the financial year.

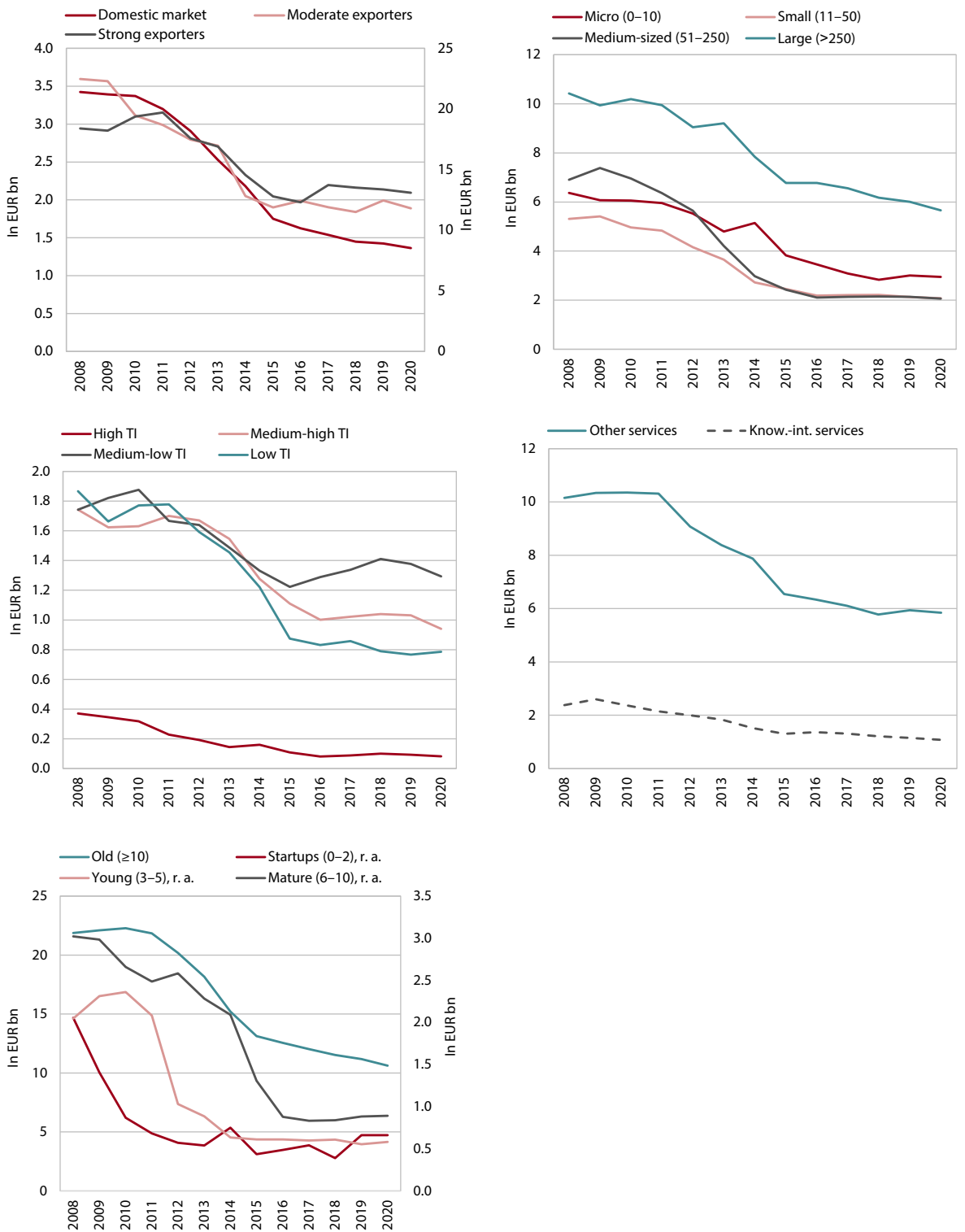




Source: AJPES (n.d.-b); calculations by IMAD.

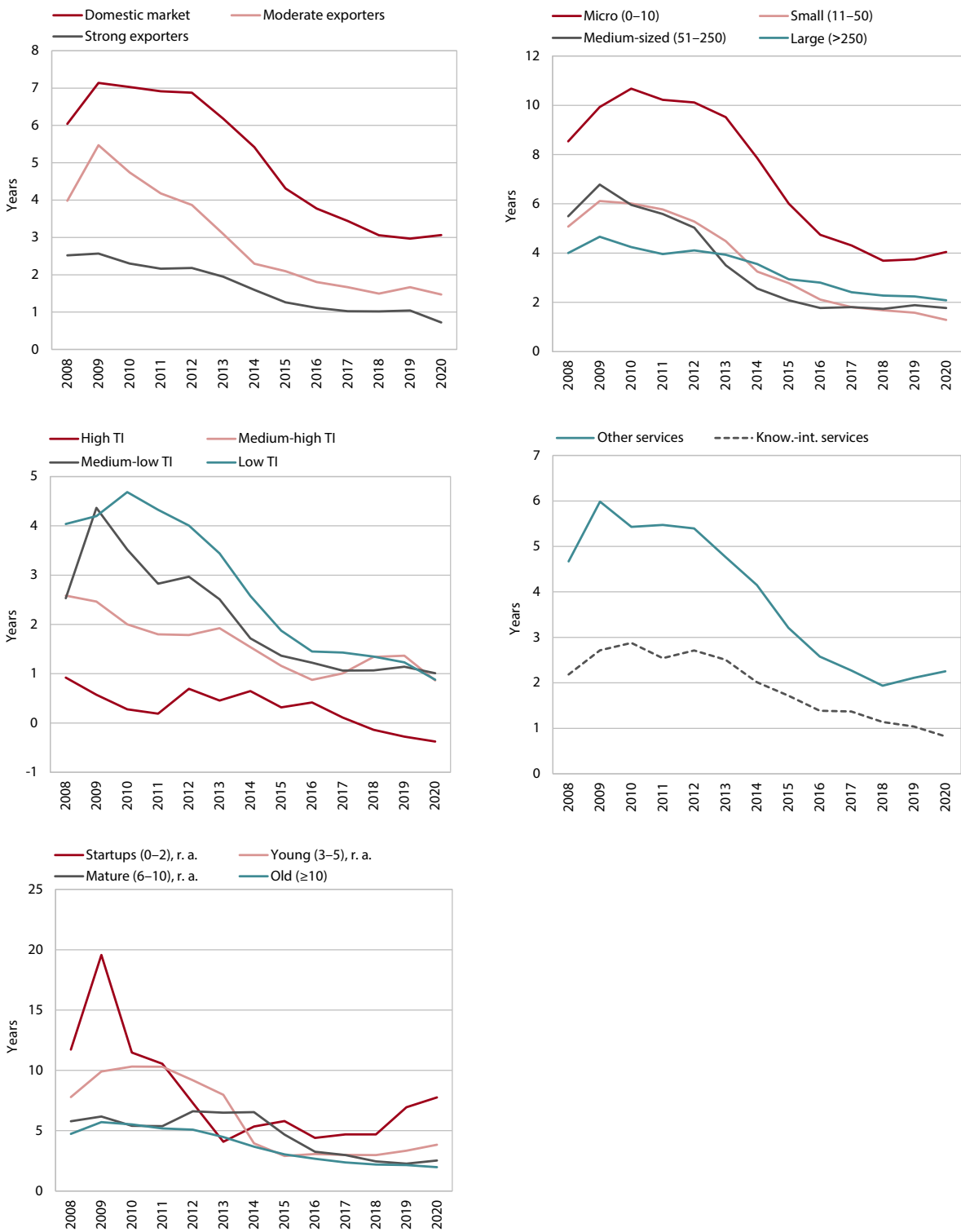
Notes: OTHER (A, B, part of K, O–Q, T); Med. – medium; TI – technology intensity; Know.-int. serv. – knowledge-intensive non-financial market services. Activities not classified by technology intensity are the following: A, B, D+E, F, P, Q, R, and S. The aggregation of manufacturing according to technology intensity is based on Eurostat methodology (Eurostat, 2018a). The classification of services is based on the OECD definition (Eurostat, 2018b; OECD, 2006), according to which knowledge-intensive non-financial market services include the following activities: J, M, G, H, I, L and N; Domestic market (export share <25%), moderate exporters (export share 25–75%), strong exporters (export share >75%) and unclassified exporters – enterprises for which export orientation cannot be calculated because of a lack of data (data on turnover on the domestic market and net turnover are not available). Their share in value added tends to be negligible. Subsidies – subsidies, grants, holiday allowances, compensations and other revenue related to business effects (AOP 124).

**Figure 2: In 2020, bank debt increased for startups and mature companies and for low-technology manufacturing companies**



Source: AJPEs (n.d.-b); calculations by IMAD.  
Notes: For definitions of different groups of companies and their basic characteristics, see Appendix 2, Figure 1 and its note; Med. – medium; TI – technology intensity; Know.-int. serv. – knowledge-intensive non-financial services, r. a. – right axis.

**Figure 3: In the first year of the epidemic, financial leverage deteriorated for other service activities (which include majority of the activities most severely hit by the epidemic), domestic market, micro, startup, young and mature companies**



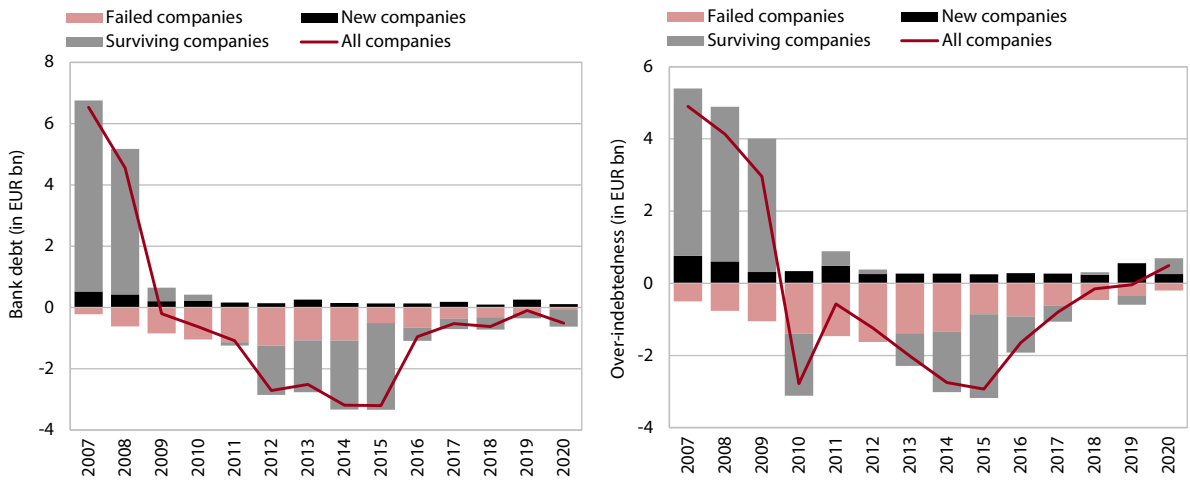
Source: AJPEs (n.d.-b); calculations by IMAD.  
Note: For definitions of different groups of companies and their basic characteristics, see Appendix 2, Figure 1 and its note; Med. – medium; TI – technology intensity; Know-int. serv. – knowledge-intensive non-financial services.

**Figure 4: Over-indebtedness increased during the COVID-19 crisis in all categories of companies, with the exception of strong exporters, startup, and medium-high and high-technology companies**



Source: AJPES (n.d.-b); calculations by IMAD.  
Note: For definitions of different groups of companies and their basic characteristics, see Appendix 2, Figure 1 and its note; Med. – medium; TI – technology intensity; Know.-int. serv. – knowledge-intensive non-financial services, r. a. – right axis.

**Figure 5: In 2020, bank debt increased while over-indebtedness decreased, especially in surviving companies**

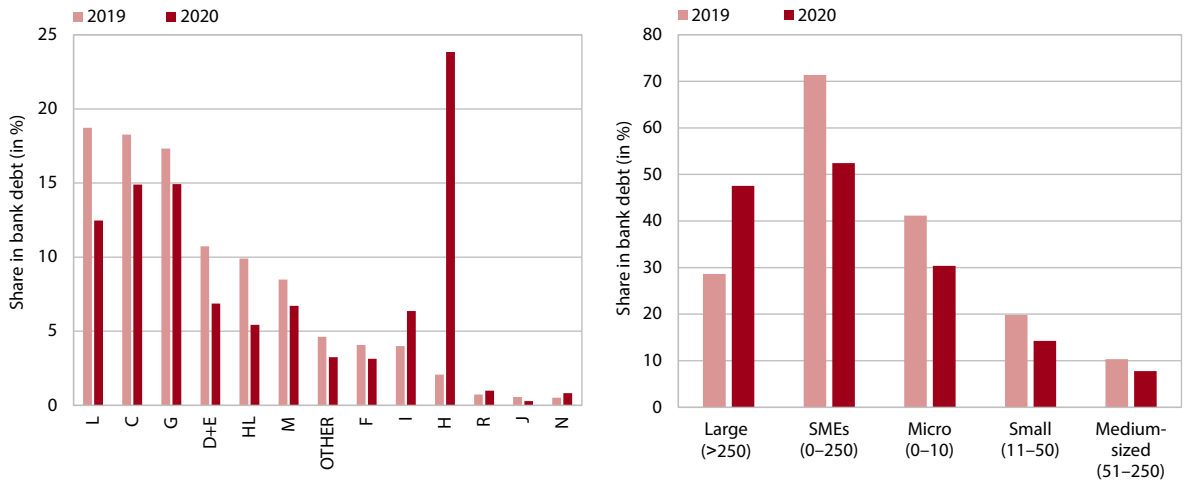


Source: AJPES (n.d.-b); calculations by IMAD.  
Note: surviving companies – change in debt of companies that operated in both consecutive years; new companies – increase in debt at the end of two consecutive years as a result of the entry of new companies (i.e. companies established in the second of the two consecutive years); failed companies – decrease in debt between two consecutive years owing to the winding-down of companies; all companies – change in total debt between two consecutive years (new companies+failed companies+surviving companies).

Corporate leverage decreased during the COVID-19 crisis (in 2020), while over-indebtedness increased slightly. This was mainly due to the surviving companies, most of which (with the exception of the most affected service sectors) still had sufficient liquidity to repay their debts and could apply for support under various intervention measures. The dynamics of total debt (decline and moderate growth in the three years before the epidemic) were mainly influenced by the dynamics of bank debt reduction, especially in 2012–2015 (for details, see Lušina (2020)). In 2020, bank debt deleveraging was more pronounced than in 2019, reflecting the deleveraging of surviving companies in most activities (see Figure 5), while the contribution of companies that have ceased operating<sup>246</sup> was the lowest throughout the observed period (consistent with financial stability and the state of insolvency proceedings in 2020). Over-indebtedness increased in 2020 for the first time since 2009, mainly due to surviving companies in the service sector, which have been hit hardest by the crisis (see Appendix 2, Figure 4).

<sup>246</sup>In this analysis, the term “ceased operating” is used for failure to submit annual financial statements.

**Figure 6: In 2020, the bank debt of over-indebted companies increased in all activities most affected by the epidemic, especially in transportation and storage; in terms of size, it has risen in large enterprises**



Source: AJPES (n.d.-b); calculations by IMAD.  
Notes: SMEs – micro, small and medium-sized companies; for the basic characteristics of all groups of companies, see Appendix 2, Figure 1 and Table 1; OTHER – A, B, part of K, O–Q and T.

The banking sector’s exposure to over-indebted companies increased by 39.5% during the COVID-19 crisis (in 2020). Their bank debt amounted to EUR 7.4 billion. Exposure increased in large companies and transportation and storage (in both cases, most of the dynamics can be attributed to a large company active in transportation and storage, i.e. warehousing and support activities for transportation – NACE Rev. 2: 52, which was not among the over-indebted companies in 2019 but ranks first among over-indebted companies in 2020 by level of net financial debt).

**Table 1: Basic characteristics of companies according to the level of indebtedness (2008, 2019 and 2020)**

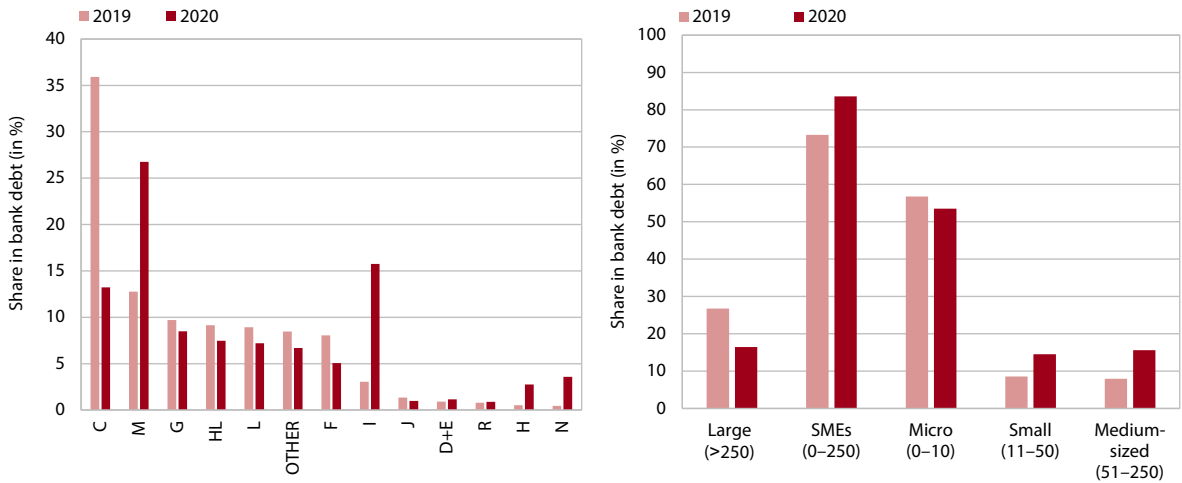
Share in all companies (in %)	2008	2019	2020
<b>Number of companies</b>	<b>51,997</b>	<b>67,178</b>	<b>68,125</b>
Over-indebted	25.8	25.8	28.7
<i>of which the most problematic</i>	13.0	13.6	16.9
Less indebted	24.0	22.7	19.4
Not indebted	50.2	51.6	51.9
<b>Number of employees</b>	<b>510,754</b>	<b>519,505</b>	<b>509,700</b>
Over-indebted	32.7	17.3	20.1
<i>of which the most problematic</i>	6.4	4.8	6.1
Less indebted	46.3	52.2	46.0
Not indebted	21.0	30.5	33.9
<b>Capital (in EUR bn)</b>	<b>36.3</b>	<b>51.0</b>	<b>53.1</b>
Over-indebted	33.3	14.3	22.0
<i>of which the most problematic</i>	8.0	4.3	5.2
Less indebted	46.0	54.4	41.9
Not indebted	20.7	31.3	36.1
<b>Value-added (in EUR bn)</b>	<b>18.0</b>	<b>24.3</b>	<b>24.0</b>
Over-indebted	25.8	12.0	14.7
<i>of which the most problematic</i>	1.4	1.5	1.8
Less indebted	54.2	57.1	49.9
Not indebted	20.0	31.0	35.4

Share in all companies (in %)	2008	2019	2020
<b>Total debt (in EUR bn)</b>	<b>68.0</b>	<b>53.6</b>	<b>53.4</b>
Over-indebted	62.6	37.2	44.6
<i>of which the most problematic</i>	13.9	11.6	13.8
Less indebted	29.4	47.1	38.2
Not indebted	7.9	15.7	17.2
<b>Financial debt (in EUR bn)</b>	<b>40.0</b>	<b>28.9</b>	<b>28.2</b>
Over-indebted	76.9	52.0	62.6
<i>of which the most problematic</i>	18.5	16.2	19.0
Less indebted	22.7	45.7	34.4
Not indebted	0.4	2.3	3.0
<b>Bank debt (in EUR bn)</b>	<b>29.0</b>	<b>13.3</b>	<b>12.8</b>
Over-indebted	76.6	39.8	57.7
<i>of which the most problematic</i>	16.0	5.7	6.9
Less indebted	23.1	58.8	40.3
Not indebted	0.2	1.4	2.0
<b>Cash (in EUR bn)</b>	<b>2.4</b>	<b>6.6</b>	<b>8.2</b>
Over-indebted	24.5	8.9	11.8
<i>of which the most problematic</i>	7.7	3.4	3.5
Less indebted	26.1	25.0	20.4
Not indebted	49.4	66.2	67.8
<b>Subsidies (in EUR bn)</b>	<b>0.45</b>	<b>0.53</b>	<b>1.35</b>
Over-indebted	58.1	17.1	23.0
<i>of which the most problematic</i>	6.0	3.2	8.4
Less indebted	21.2	55.0	45.0
Not indebted	20.7	27.9	31.9
<b>EBITDA (in EUR bn)</b>	<b>7.1</b>	<b>9.7</b>	<b>9.1</b>
Over-indebted	17.7	6.3	9.5
<i>of which the most problematic</i>	-5.2	-2.7	-3.9
Less indebted	64.2	64.3	55.3
Not indebted	18.1	29.5	35.2

Source: AJPES (n.d.-b); calculations by IMAD.

Notes: Subsidies – subsidies, grants, holiday allowances, compensations and other revenue related to business effects (AOP 124); FL – financial leverage (so-called net financial debt/EBITDA); over-indebted companies (which include the most problematic companies – FL<0, and FL≥5 with EBITDA>0); less indebted companies (0>FL<5 with EBITDA>0); Not indebted companies that have no net financial debt but negative or positive EBITDA (FL=0), unclassified companies (FL=.) and companies with negative net financial debt (NETFD<0).

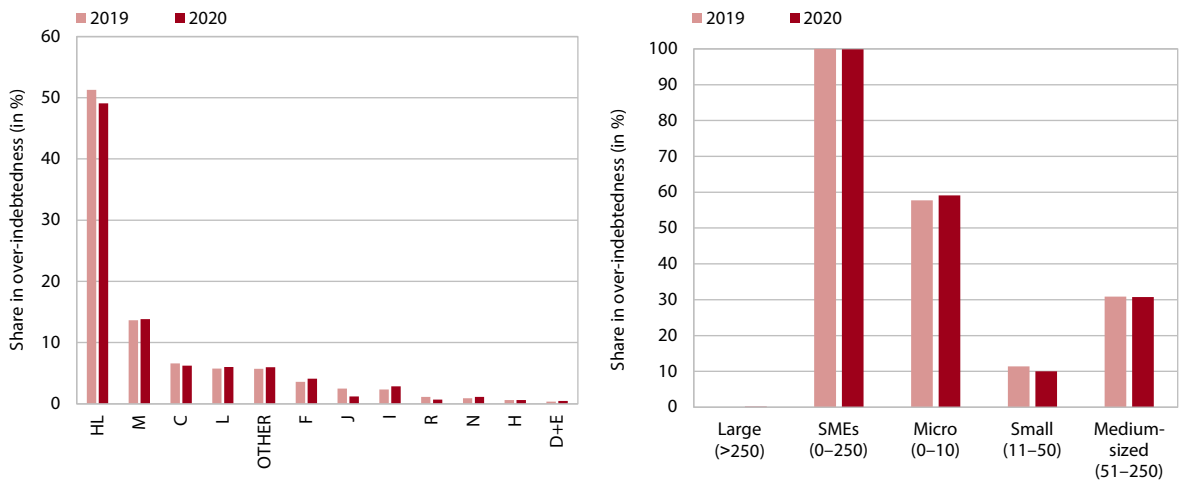
**Figure 7: In 2020, the bank debt of the most problematic over-indebted companies increased, most significantly in professional and technical activities and in accommodation and food service activities; in terms of company size, it increased in SMEs**



Source: AJPES (n.d.-b); calculations by IMAD.  
Notes: SMEs – micro, small and medium-sized companies; OTHER (A, B, part of K, O–Q, S and T).

During the COVID-19 crisis (in 2020), the banking sector’s exposure to the most problematic companies increased by 17.8%. It increased mainly in SMEs, while it decreased in large enterprises. In terms of activities, as is the case for over-indebtedness, exposure increased most in professional and technical activities and in accommodation and food service activities, which were also the most affected by the COVID-19 crisis. This was followed, with much smaller shares and increases, by other service activities, which were the hardest hit in 2020: administrative and support service activities, transportation and storage, the arts, entertainment and recreation, and energy.

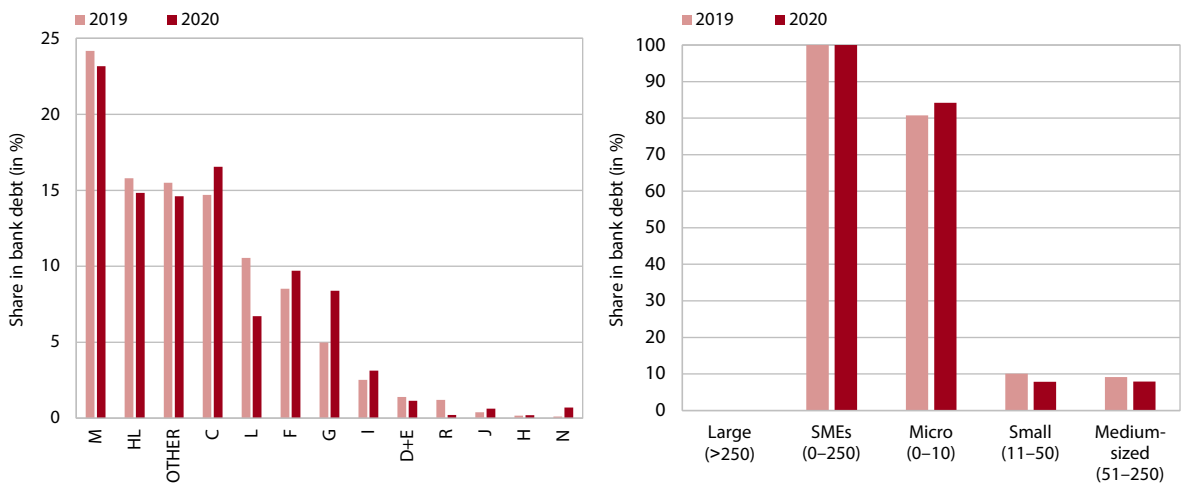
**Figure 8: In the COVID-19 crisis of 2020, over-indebtedness of zombie companies increased; over-indebtedness was highest in micro-companies; by activities, it was highest in holding and leasing companies and professional and technical activities**



Source: AJPES (n.d.-b); calculations by IMAD.  
Note: SMEs – micro, small and medium-sized companies; OTHER (A, B, part of K, O–Q, S and T).



**Figure 9: In 2020, bank debt of zombie companies increased, especially in trade, manufacturing and construction; it was concentrated only in SMEs**



Source: AJPES (n.d.-b); calculations by IMAD.  
Note: SMEs – micro, small and medium-sized companies; OTHER (A, B, part of K, O–Q, S and T).

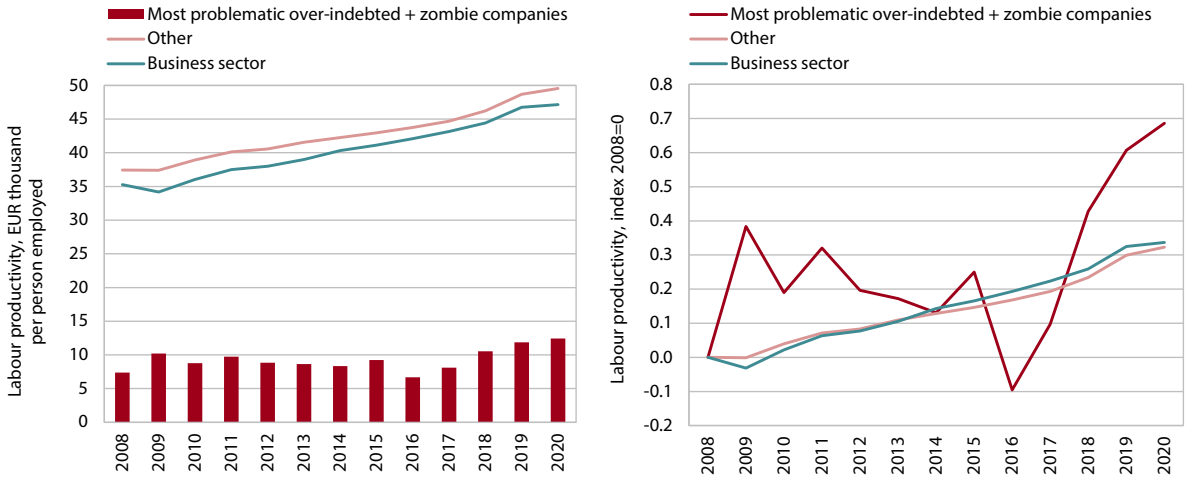
During the COVID-19 crisis (in 2020), the banking sector’s exposure to zombie companies increased by 5.5%. Bank debt increased in more than half of activities, especially in trade, manufacturing and construction, which is also reflected in the fact that their share in total over-indebtedness increased by more than 1 p.p. Debt also increased in the activities severely hit by the epidemic – accommodation and food service activities and administrative and support service activities. It also increased slightly in information and communication activities.

**Figure 10: Basic characteristics of the most problematic over-indebted and zombie companies**



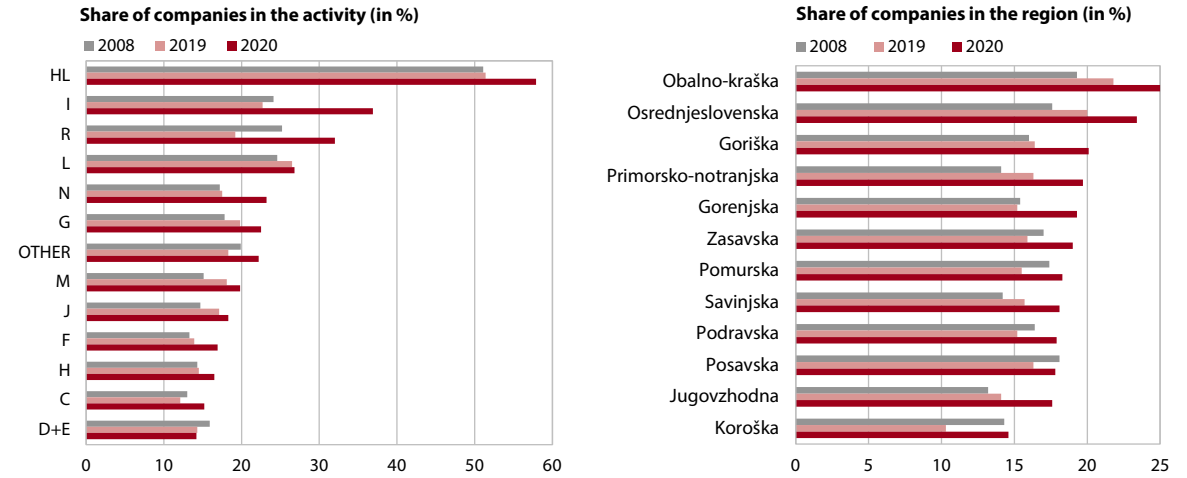
Source: AJPES (n.d.-b); calculations by IMAD.  
Note: Subsidies – subsidies, grants, holiday allowances, compensations and other revenue related to business effects (AOP 124).

**Figure 11: Labour productivity of the most problematic over-indebted and zombie companies over the entire period observed is three-quarters below the level of the business sector**



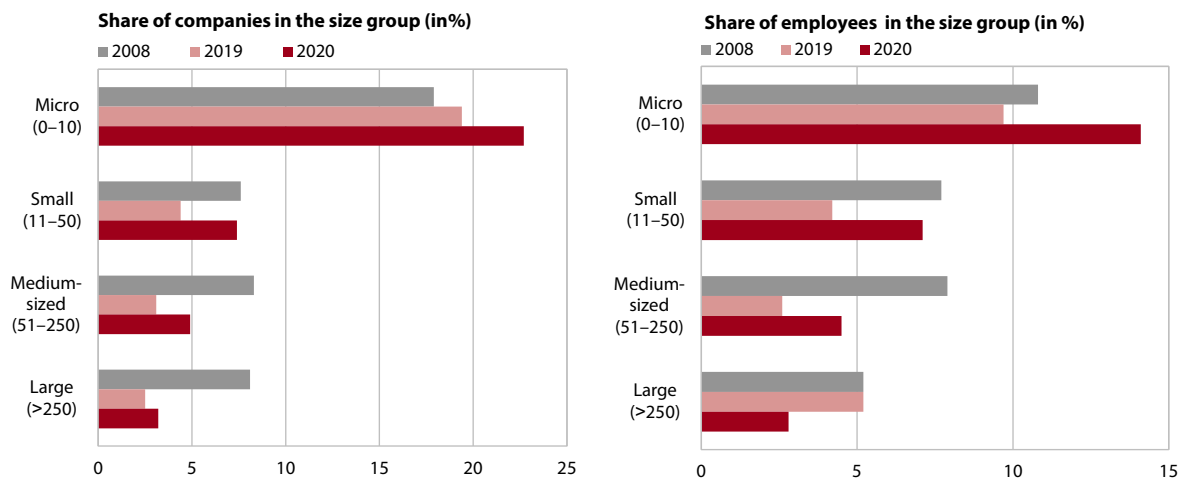
Source: AJPES (n.d.-b); calculations by IMAD.

**Figure 12: In 2020, the share of the most problematic over-indebted and zombie companies increased, especially in holding and leasing companies and in the most affected market service activities; by regions, it increased in the Obalno-kraška, Osrednjeslovenska and Goriška regions**



Source: AJPES (n.d.-b); calculations by IMAD.  
Note: OTHER (A, B, part of K, O-Q, S, T).

**Figure 13:** During the 2020 COVID-19 crisis, both the share of the most problematic and zombie companies and the share of employees in all size classes of these companies increased, except for the share of employees in large enterprises, which decreased



Source: AJPES (n.d.-b); calculations by IMAD.  
Note: For the definition of size, see Appendix 2, note under Figure 1.

Appendix 3

Econometric assessment of the factors affecting the take-up of the temporary layoff measure by companies

For the purpose of the analysis, three databases were merged, namely the AJPES annual accounts database for 2019, the ESS database, which contains data on companies that received state aid under the temporary layoff measure in 2020, and the Business Register of the Republic of Slovenia database. Companies that had no employees and companies with extreme values of labour productivity and total debt-to-EBITDA (below the 1<sup>st</sup> and above the 99<sup>th</sup> percentile) were excluded from the analysis. The final database includes nearly 45,000 companies, of which just over 18,600 benefited from the temporary lay-off measure in 2020. The following basic regression model was estimated:

$$P(layoff_i=1)=\beta_0 + \beta_1 ageC_i + \beta_2 No\_of\_emp_i + \beta_3 prodL_i + \beta_4 EX\_or_i + \beta_5 tot\_debt\_in\_EBITDA_i + \sum \beta_{6,j} NACE2\_code_j + \sum \beta_{7,k} REGION\_AJPES_k \tag{1}$$

The regression function was estimated using the logit model, where the dependent variable  $layoff_i$  has the value of 1 where the firm benefited from the temporary lay-off measure and a value of 0 where it did not. The variable  $ageC_i$  indicates the age of the company in years,  $No\_of\_emp_i$  the number of employees in the company,  $prodL_i$  the level of labour productivity in EUR '000,  $EX\_or$  export orientation or the share of exports in the company's revenues,  $tot\_debt\_in\_EBITDA$  represents the share of total debt in EBITDA,  $NACE2\_code_j$  dummy variables for two-digit codes of activities according to NACE classification, and  $REGION\_AJPES$  dummy variables for regions as defined in the AJPES code list. In addition to the basic regression model (1), three other variations of the basic model were estimated. Dummy variables for regions were thus excluded from models (2)–(4). Model (3) included the variable over-indebtedness instead of the variable total debt-to-EBITDA. The variable over-indebtedness has the value 1 if financial debt is greater than five times EBITDA or EBITDA is less than 0; otherwise it has the value 0. Model (2) is the basis for model (4), except that it includes an additional variable for negative capital. Robust standard errors were used while estimating all regression functions. Table 1 shows the results of the regression analysis in terms of average marginal effects.

Table 1: Regression analysis results

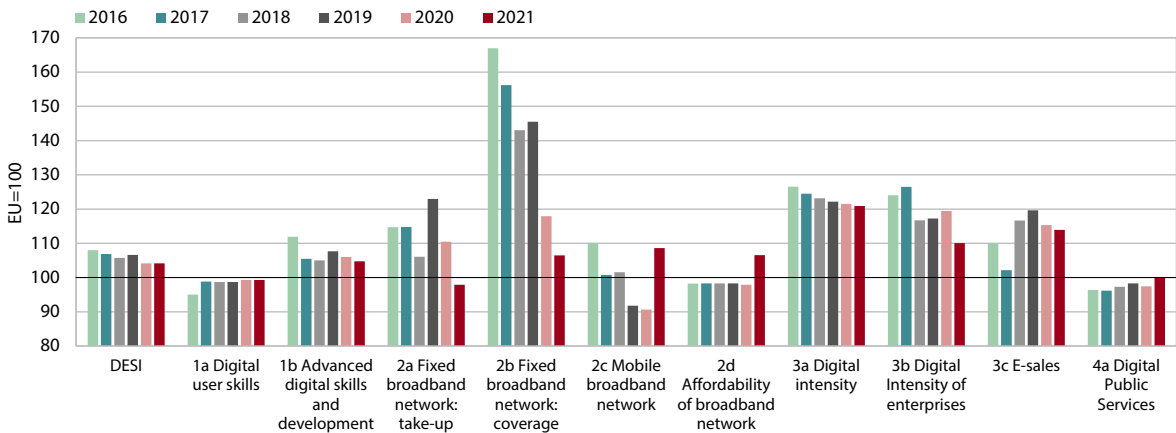
Variables	(1)	(2)	(3)	(4)
Age of the company	0.00280*** (0.000250)	0.00279*** (0.000249)	0.00280*** (0.000249)	0.00258*** (0.000248)
Number of employees	0.000310** (0.000122)	0.000309** (0.000121)	0.000305** (0.000120)	0.000287** (0.000113)
Labour productivity	-0.00116*** (0.000075)	-0.00116*** (0.000075)	-0.00120*** (0.000078)	-0.00142*** (0.00008)
Export orientation	-0.0309*** (0.00785)	-0.0299*** (0.00783)	-0.0301*** (0.00782)	-0.0295*** (0.00779)
Total debt-to-EBITDA ratio	0.000571*** (0.000099)	0.000568*** (0.000099)		0.000489*** (0.0001)
Over-indebtedness			-0.0111** (0.00542)	
Negative capital				-0.103*** (0.00683)
Regions	YES	NO	NO	NO
NACE Rev. 2	YES	YES	YES	YES
Pseudo R <sup>2</sup>	0.0692	0.0687	0.0682	0.056
No. of observations	44162	44162	44162	44162

Sources: ZRSZ, AJPES, IMAD’s estimates.  
Note: Standard errors are in parentheses; \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

The results show that the influence of the factors included in the analysis on the take-up of the temporary layoff measure is statistically significant but relatively small. Thus the age of the company, the number of employees and the share of total debt in EBITDA had a positive effect on the take-up of the temporary layoff measure, while higher labour productivity and export orientation had a negative effect. For example, an incremental increase in labour productivity reduces the probability of the take-up of the temporary layoff measure by about 0.1 p.p. on average, and an incremental increase in export orientation by about 3 p.p. Over-indebted companies and companies with negative capital were also less likely to use the temporary layoff measure.

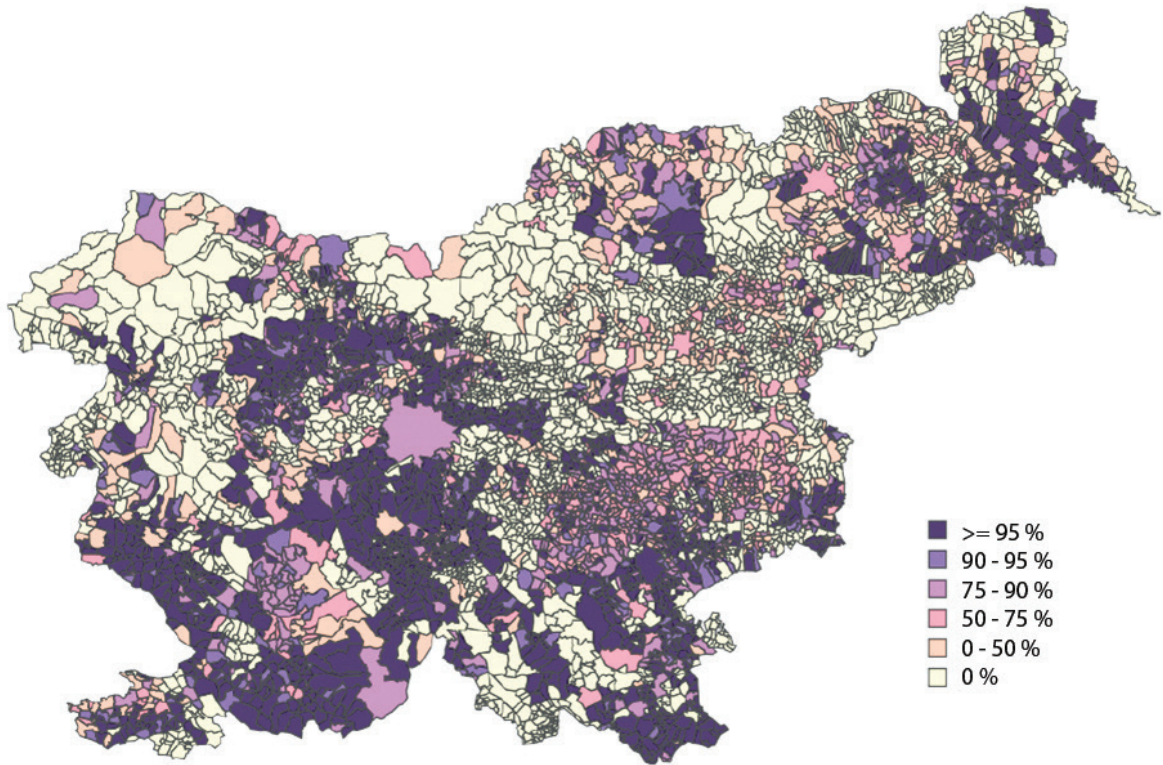
## Appendix 4 Additional data on digitalisation in Slovenia

**Figure 1: Presentation of Slovenia’s performance according to subcomponents of the Digital Economy and Society Index (DESI)**

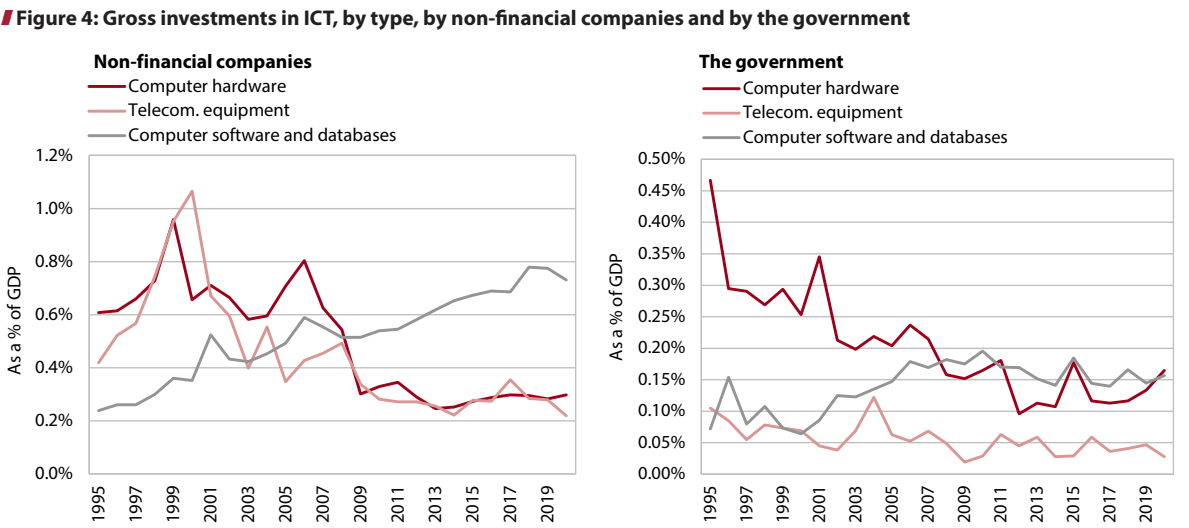
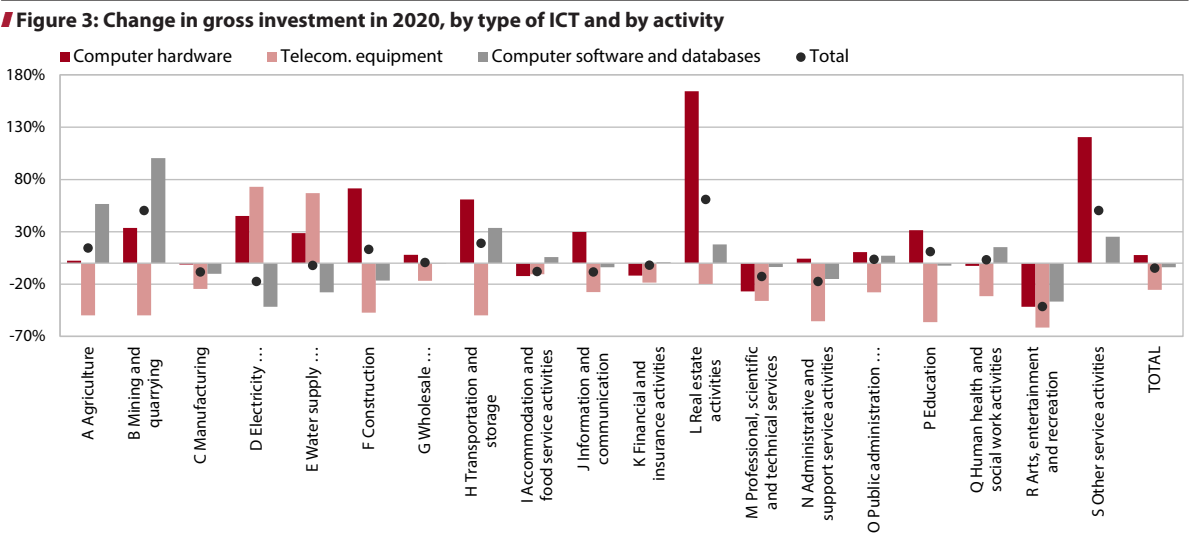


Source: EC (2022); calculations by IMAD.

**Figure 2: The share of households with fibre-optic internet access remains low in some areas**



Source: AKOS (n.d.).



## Appendix 5 Detailed analysis of general government expenditure by purpose

Below we present a more detailed dynamics of general government expenditure in terms of integral and EU funds for smart, digital-innovative transformation.

**Since 2016**, the initial year of absorption of EU funds from the 2014–2020 perspective, **expenditure on technological development<sup>247</sup> started to increase markedly, reaching by 2020 the level (as a share of GDP) that Slovenia had reached in this area in 2011**. This is the only area where Slovenia has been able to reach its largest relative investment volume since 2011, at 0.23% of GDP in 2020, while at the same time the integrated budget resources have been steadily decreasing. The share of integral expenditure in total public spending on technology averaged 36% over the whole period, the lowest of all purposes, and the share dropped to only 5% by 2020. In nominal terms, Slovenia allocated EUR 24 million from integral resources for technological development in 2011, but by the end of the period the figure fell to just under EUR 6 million, with total investment amounting to EUR 106 million.

**After declining in at the beginning of the period, expenditure on science<sup>248</sup> began to increase in 2017, reaching a peak of EUR 275 million in nominal terms in 2020, while falling 0.12 p.p. short of the 2011 level as a share of GDP**. During the period of fiscal consolidation between 2011 and 2016, expenditure on science decreased by EUR 88 million in real terms (or by 0.28 percentage points of GDP) and then increased to EUR 275 million by 2020, reaching the maximum nominal value of the analysed period. 87% of funding for science comes from integral resources, but this proportion fell slightly (to 82%) at the end of the period. The volume of expenditure from integral resources was the same at the beginning and end of the period, i.e. around EUR 220 million.<sup>249</sup> Expenditure on science amounted to 0.71% of GDP in 2011, then fell to 0.43% of GDP in 2016, and then rose again to 0.59% of GDP by 2020, which is still 0.12 percentage points of GDP behind the 2011 level.

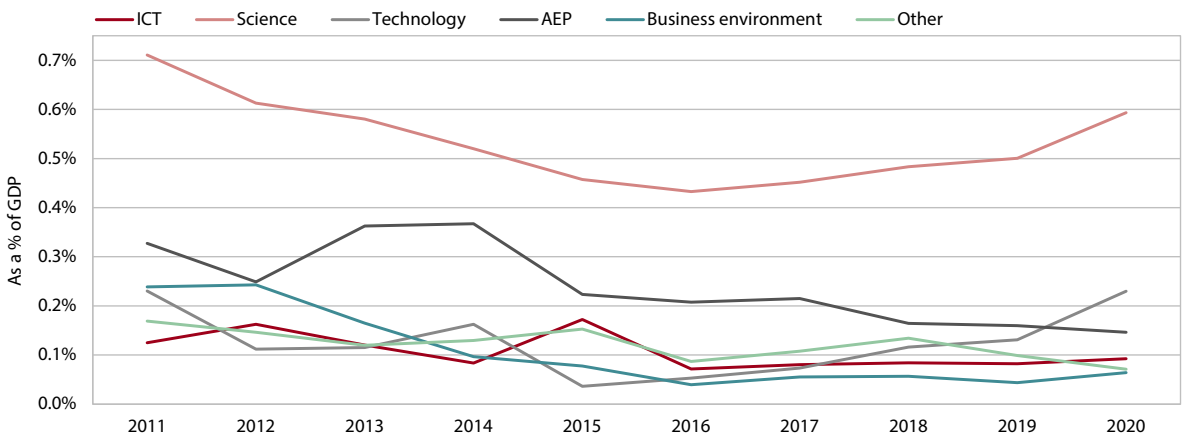
<sup>247</sup> The main programmes of the programme classification of budget expenditures: 0504 "Support for technological development projects" and 1403 "Incentives for growth and development of enterprises".

<sup>248</sup> The main programmes of the programme classification of budget expenditures: 0502 "Scientific research" and 0503 "Human resources in support of science".

<sup>249</sup> To illustrate the contribution of science to fiscal consolidation, it was calculated what the total amount of expenditure on science would be if the state budget were to allocate the same real amount to science from integral funds in the period 2012–2019 as it did at the beginning or end of the period, i.e. in 2011 or 2020: in this case, a total of EUR 322 million more integral resources would be invested in science than the actual value.



**Figure 1: Dynamics of government budget expenditure for smart transformation, by purpose, as a % of GDP**



Source: SAPPrA; calculation and presentation by IMAD.  
Note: AEP – active employment policy.

**Expenditure on ICT and other expenditure showed a moderate decrease.**

Expenditure on ICT<sup>250</sup> has stabilised from around 0.14% of GDP in 2011–2013 to 0.08% of GDP since 2016, reaching EUR 43 million in 2020. The decrease in the total volume of resources is mainly due to EU funds, as the integral resources for ICT after 2017 exceeded the real values from the beginning of the period. Among other expenditure, which includes internationalisation and tourism, the former is fully financed from the integral budget, which, apart from the more intensive years of 2016 and 2017, amounts to around EUR 18 million per year. In the last three-year period, the volume of tourism expenditure also decreased in real terms compared to the first year, by EUR 11 million or one-third, but this is entirely due to the dynamics of EU funds, as at the same time the volume of expenditure from integral resources increased by EUR 10 million.

**Expenditure on active employment policies (AEP) fell significantly in 2018–2020 compared to 2011–2013, by a third in real terms, largely due to reduced EU funding and partly due to a cut in integral funding.**

In nominal terms, the most funds were allocated to the AEP in 2014, at EUR 138 million, but thereafter the volume of expenditure dropped significantly, first to around EUR 90 million and then to EUR 68 million in 2020. Integral funding, which peaked at EUR 63 million in 2014 and then steadily declined to EUR 31 million in 2020, shows very similar dynamics: a decrease in integral funding that was half the decrease in total funding in 2018–2020 compared to 2011–2013.

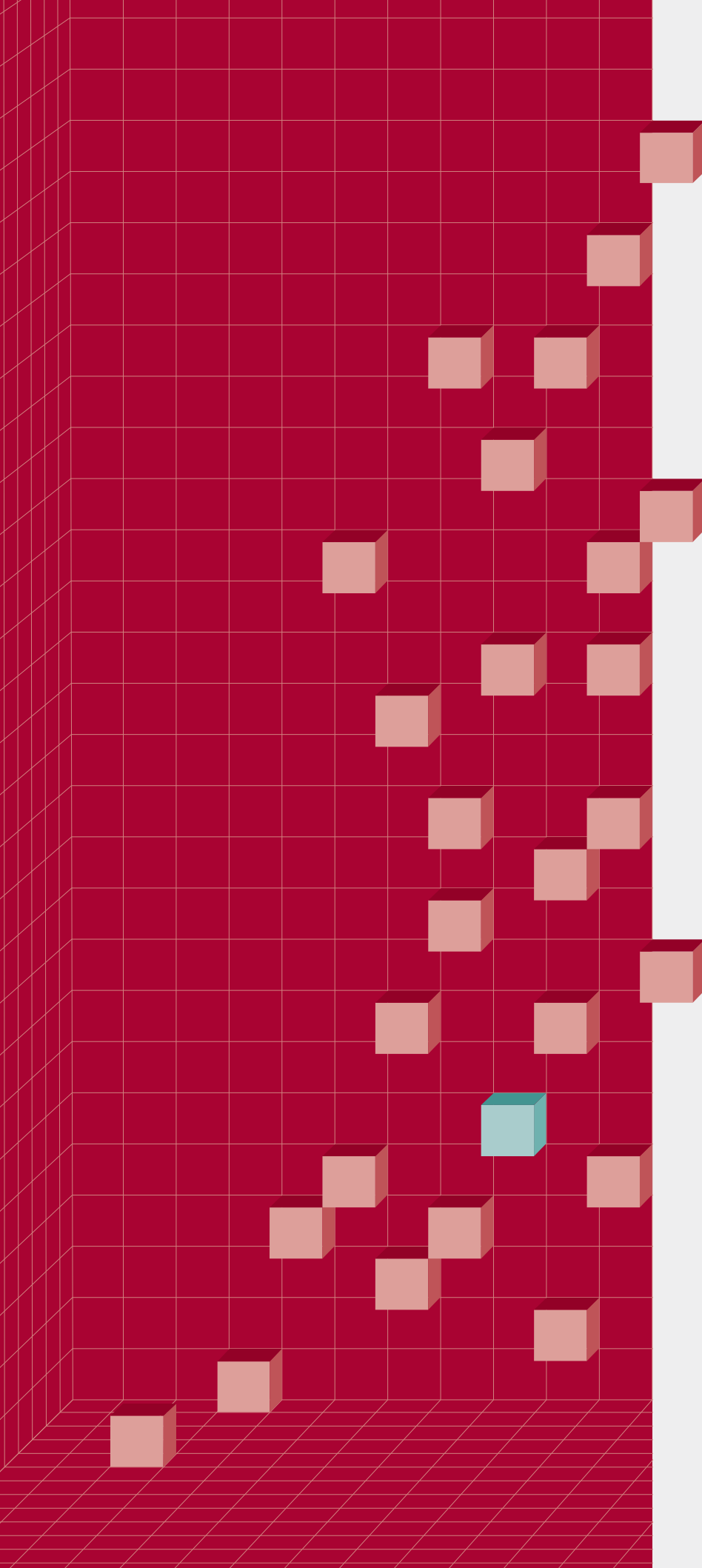
**Expenditure on the business environment declined the most, falling by two-thirds in real terms, from EUR 79 million in 2011–2013 to EUR 29 million in 2018–2020.** Over the same periods, the share fell from 0.22% to 0.05% of GDP, a difference that would amount to EUR 74 million in nominal terms relative to GDP in 2020. The volume of integral resources remained at a constant level of around EUR 17 million, which means that the entire reduction was realised on the EU funds side.

<sup>250</sup>The main programmes of the programme classification of budget expenditures: 0401 “E-government and information infrastructure” and 0505 “Information society and electronic communication”.

List of acronyms

AJPES	Agency for Public Legal Records and Related Services
ARRS	Slovenian Research Agency
BoS	Bank of Slovenia
CEDEFOP	European Centre for the Development of Vocational Training
CEE-4	Czech Republic, Hungary, Poland and Slovakia
CPI	Institute of the Republic of Slovenia for Vocational Education and Training
EBA	European Banking Authority
EBITDA	Earnings before interest, tax, depreciation and amortisation
EC	The European Commission
ECB	European Central Bank
EIB	European Investment Bank
EII	European Innovation Index
ESS	Employment Service of Slovenia
EU	The European Union
EUR	Euro
Eurofound	European Foundation for the Improvement of Living and Working Conditions
Eurostat	Statistical Office of the European Communities
FDI	Foreign direct investment
FL	Financial leverage (net financial debt/EBITDA)
GDP	Gross domestic product
GEM	Global Entrepreneurship Monitor
GHG	Greenhouse gases
GVCs	Global value chains
HLs	Holding and leasing companies
IAEs	Innovation-active enterprises and Innovation activity of enterprises
IC	Interest coverage (EBITDA/interest expenses)
IFRS	International Financial Reporting Standards
IJS	Jožef Stefan Institute
ILO	International Labour Organization
IMAD	Institute of Macroeconomic Analysis and Development
IMD	Institute for Management Development
Innovation leaders	Belgium, Denmark, Finland and Sweden
JŠRIPS	Public Scholarship, Development, Disability and Maintenance Fund of the Republic of Slovenia
MIZŠ	Ministry of Education, Science and Sport
MOP	Ministry of the Environment and Spatial Planning
NACE A	Agriculture, forestry and fishing
NACE B	Mining and quarrying
NACE C	Manufacturing
NACE D + E	Energy
NACE D	Electricity, gas, steam and air-conditioning supply
NACE E	Water supply, sewerage, waste management and remediation activities
NACE F	Construction
NACE G	Wholesale and retail trade, repair of motor vehicles and motorcycles
NACE G-N, R-T	Non-financial market services
NACE H	Transportation and storage
NACE I	Accommodation and food service activities
NACE J	Information and communication

NACE K	Financial and insurance activities
NACE L	Real estate activities
NACE M	Professional, scientific and technical activities
NACE N	Administrative and support-service activities
NACE O	Public administration and defence, compulsory social security
NACE OPQ	Public services
NACE P	Education
NACE Q	Human health and social-work activities
NACE R	Arts, entertainment and recreation
NACE S	Other service activities
NACE T	Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use
NACE U	Activities of extraterritorial organisations and bodies
NACE	Statistical classification of economic activities
OECD	Organisation for Economic Co-operation and Development
PPS	Purchasing power standard
REER hicp	Real effective exchange rate deflated by the harmonised index of consumer prices
REER ppi	Real effective exchange rate deflated by the industrial producer price index
REER ulc	Real effective exchange rate deflated by unit labour costs
R&D	Research and development activity
SAS	Slovenian accounting standards
SIR	Slovenian institute of auditing
SMEs	Small and medium-sized enterprises
SURS	Statistical Office of the Republic of Slovenia
SVRK	Government Office for Development and European Cohesion Policy
TFP	Total factor productivity
ULC	Unit labour costs
WEF	World Economic Forum
ZRSŠ	The National Education Institute



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