



DIGITALISATION IN EUROPE 2021-2022

Evidence from
the EIB Investment Survey



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Digitalisation in Europe 2021-2022: Evidence from the EIB Investment Survey

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About the EIB Investment Survey (EIBIS)

The EIB Group Survey on Investment and Investment Finance is a unique, annual survey of some 13 500 firms. It comprises firms in all EU Member States and the UK, as well as a sample of US firms which serves as a benchmark. It collects data on firm characteristics and performance, past investment activities and future plans, sources of finance, financing issues and other challenges that businesses face. Using a stratified sampling methodology, EIBIS is representative across all Member States of the EU and for the US, as well as for firm size classes (micro to large) and four main sectors. It is designed to build a panel of observations to support time series analysis, and these observations can also be linked to firm balance sheet and profit and loss data. EIBIS has been developed and is managed by the Economics Department of the EIB, with support for development and implementation by Ipsos MORI.

For more information see: <http://www.eib.org/eibis>.

About this publication

This is a report by the EIB Economics Department. The data source for this report is the EIB Investment Survey (EIBIS) 2021. Results are weighted by industry group (sector), firm size-class and country. The methodology of the EIBIS survey is available at: <https://www.eib.org/en/about/economic-research/surveys-data/about-eibis>.

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About the EIB Economics Department

The mission of the EIB Economics Department is to provide economic analyses and studies to support the Bank in its operations and in the definition of its positioning, strategy and policy. The department, a team of 45 economists, is headed by Director Debora Revoltella.

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Overview

The coronavirus crisis has accelerated the digital transformation of Europe's economy.

Close to half of firms in the European Union report investing in digitalisation as a response to COVID-19 — for example, by providing services online — according to the results of the EIB Investment Survey (EIBIS) conducted from April to July 2021. Until recently, the implementation of digital technologies was considered important for market success and was usually associated with the most innovative and modern companies. However, the pandemic has made the digital transformation an integral part of society — and integral to firms' survival.

Digital firms were better able to cope with the disruption unleashed by the pandemic.

They were less likely than non-digital firms to experience a strong decrease in sales from the beginning of 2020. In addition, while policy support for the private sector was widespread and did not target digital firms in particular, digital firms report more often than other firms that they used the crisis as an opportunity to accelerate digitalisation. This suggests that the crisis forced them to find more efficient ways of working with digital technologies. Overall, digital firms tend to perform better than non-digital firms. They are more productive, export more, invest more, are more innovative, grow faster and pay higher wages on average.

With digitalisation advancing, the digital divide in Europe is also increasing, opening a digital dilemma.

Digitalisation can transform business dynamics, work organisation, education, health and government services. Some EU firms are at risk of being left behind, in particular in regions where digital infrastructure is lacking. One in six EU firms consider access to digital infrastructure to be a major obstacle to investment, but there are differences across EU countries and among regions within the same country. Significant investment in digital infrastructure is needed across the European Union to support a broad-based economic recovery. Firms' characteristics also play a role. Small firms are less likely to adopt digital technologies, with negative implications for long-term competitiveness. These firms need to embrace transformation, exploiting the opportunities offered by the new technologies and investing in skills. Digital investment will help ensure survival and future competitiveness in a new, more digital environment.

To accelerate the pace of digital innovation and adoption, Europe needs to focus above all on three elements:

an enabling ecosystem, a European vision to counter the imbalances across the European Union and adequate policy support to address finance and skills gaps. The EIB Group is playing an important role in all three aspects. As we recover from the pandemic, Europe will need to push forward with the green and digital transformation to lead the way.

Debora Revoltella

Director, Economics Department

European Investment Bank

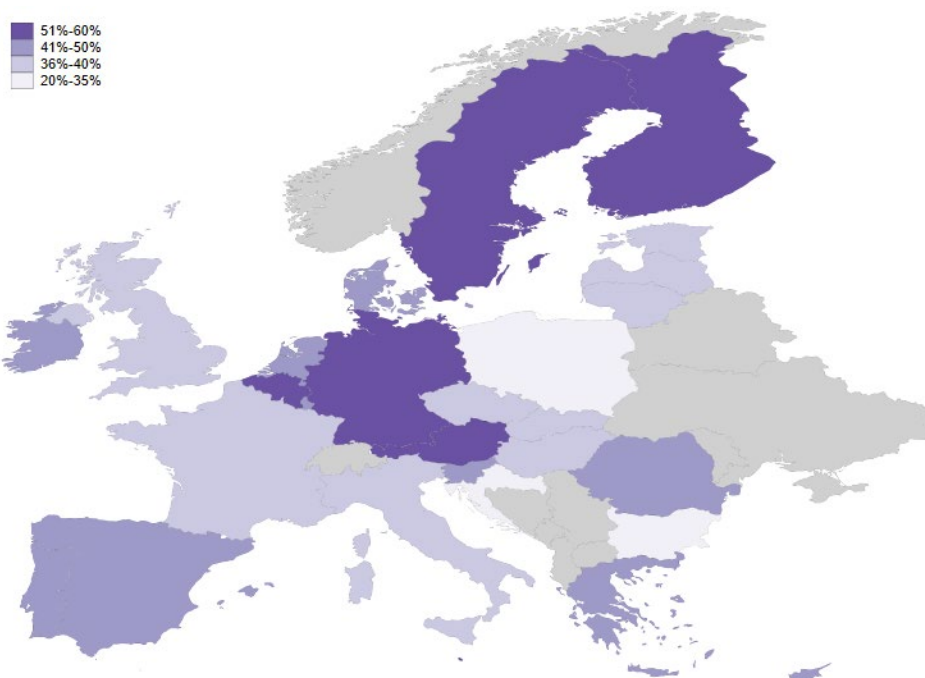
Digitalisation in the European Union

The pandemic led to wider recognition of the importance of the digital transformation.

Until recently, the implementation of digital technologies was considered important for market success and was usually associated with the most innovative and modern companies. Now, however, the pandemic has made the digital transformation integral to firms' survival. Many of the changes associated with digitalisation — services provided remotely, teleworking and online meetings — are likely to stay. Investment in digitalisation is vital to preventing business disruption, organising work remotely, improving communication with customers, suppliers and employees and selling products and services online.

As a response to the COVID-19 crisis, many firms invested in digitalisation. In the European Union, 46% of firms report that they took action to become more digital — for example, by providing services online — according to the results of the EIB Investment Survey (EIBIS) conducted from April to July 2021.¹ However, significant differences exist across firm size classes, sectors and countries. Comparing the different EU regions, 48% of firms in Western and Northern Europe reported taking steps or investing to become more digital, compared with 43% in Southern Europe and 37% in Central and Eastern Europe.

Firms that invested to become more digital as a response to COVID-19 (in %), by country



Source: EIBIS (2021).

During the COVID-19 crisis, firms put more complex digitalisation processes on hold. In contrast to the more general digital transformation, the adoption of new advanced digital

¹ All figures relying on EIBIS data are weighted using value added to make the sample of firms covered by EIBIS representative of the economy.

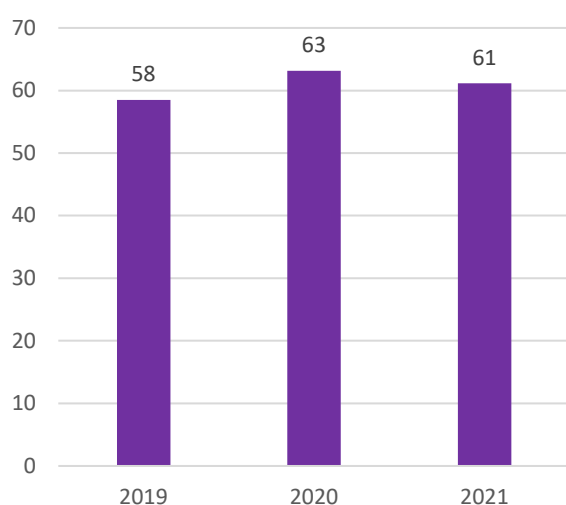
² [Digitalisation in Europe 2021-2022: Evidence from the EIB Investment Survey](#)

technologies is stalling. Beyond the short-term response to COVID-19, another structural element for the digital transformation of the EU economy is the implementation of advanced digital technologies such as 3-D printing, advanced robotics, the internet of things, big data analytics and artificial intelligence, drones, augmented or virtual reality, or platforms. The share of EU firms implementing advanced digital technologies in their business increased significantly from 2019 to 2020. However, this share stayed more or less constant from 2020 to 2021, reaching 61% in 2021, compared to 63% 2020 and 58% in 2019.

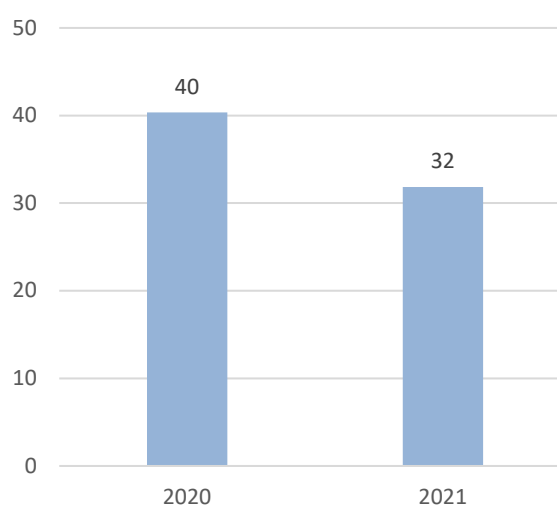
The share of firms that report having implemented new advanced digital technologies in their business in the past year was lower in 2020 than in 2019. Adopting advanced digital technologies is often a complex process, requiring a reorganisation of the company’s business and retraining of staff. It is likely that, against the backdrop of the pandemic, firms have been delaying the most complex investment projects, focusing on their immediate needs. New, advanced and complex digital technologies appear to have been less of a priority for many firms during the COVID-19 crisis. It is also not surprising that firms using multiple advanced technologies are more likely to have introduced another advanced digital technology in 2020.

Use of advanced digital technologies

Use of advanced digital technologies (in %), 2019-2021



Uptake of advanced digital technologies in the last year (in %), 2020-2021

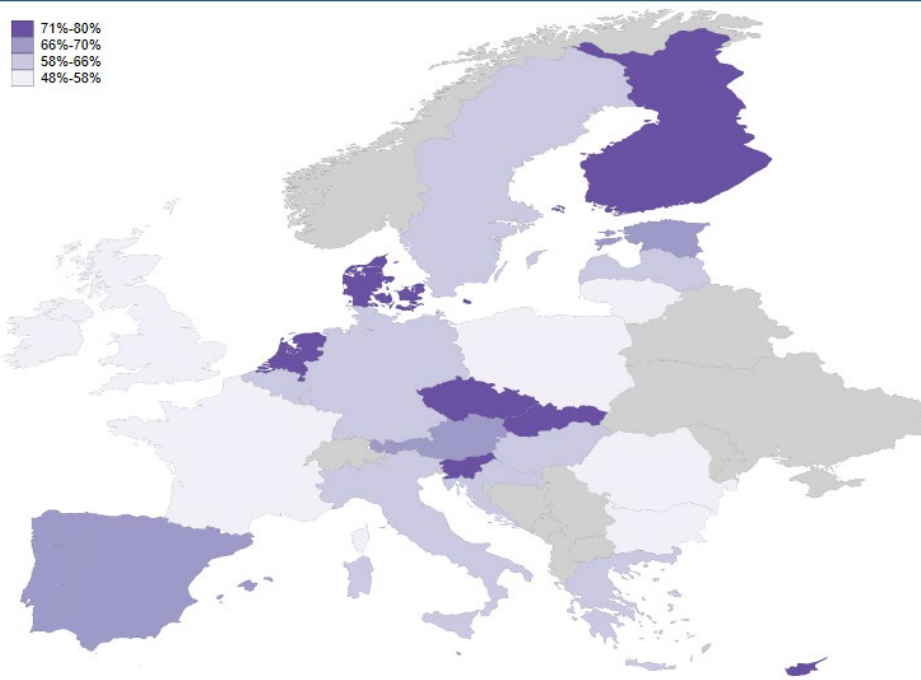


Source: EIBIS (2019, 2020, 2021), firms in EU27.

Note: A firm is identified as having adopted an “advanced digital technology” if at least one digital technology specific to its sector was implemented in parts of the business and/or if the entire business is organised around at least one digital technology. The question on whether any new digital technology was introduced in the last year was not asked in EIBIS 2019.

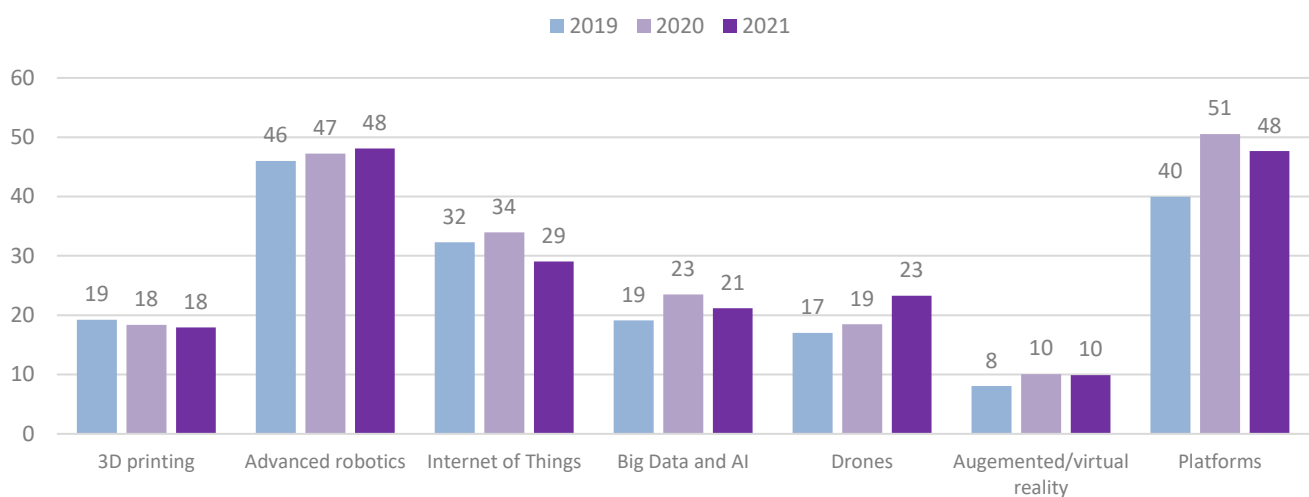
The uptake of advanced digital technologies is very mixed among EU countries. Although there are notable digital success stories in Europe, the position of many countries may have to be strengthened as not all of them are near the cutting edge of dissemination and adoption of digital technologies.

Use of advanced digital technologies (in %), by country



Platforms and advanced robotics remain the most widespread digital technologies. The implementation of most advanced digital technologies has not changed significantly since the beginning of the pandemic. An exception is the implementation of the internet of things, which has decreased slightly across all sectors, while the adoption of drones (used by firms in the construction sector) has increased.

Use of specific digital technologies (in %)



Source: EIBIS (2019, 2020, 2021), firms in the EU27.

Box 1. Digital technologies in the EIB Investment Survey (EIBIS)

In EIBIS, firms are polled about the use of four advanced digital technologies that are specific to their sector. They are asked the following question: “Can you tell me for each of the following digital technologies if you have heard about them, not heard about them, implemented them in parts of your business, or whether your entire business is organised around them?”

A firm is identified as “**digital**” if at least one digital technology is implemented in parts of the business and/or if the entire business is organised around one digital technology.

Firms in *manufacturing* are surveyed about the use of: (a) 3-D printing, also known as additive manufacturing; (b) robotics: automation via advanced robotics; (c) the internet of things, such as electronic devices that communicate with each other without human assistance; and (d) big data/artificial intelligence: cognitive technologies, such as big data analytics and artificial intelligence.

Firms in *construction* are surveyed about the use of: (a) 3-D printing; (b) drones: unmanned aerial vehicles; (c) the internet of things; and (d) virtual reality: augmented or virtual reality, such as when information is integrated with real-world objects and presented using a head-mounted display.

Firms in *services* are surveyed about the use of: (a) virtual reality; (b) platforms: a platform that connects customers with businesses or customers with other customers; (c) the internet of things; and (d) big data/artificial intelligence.

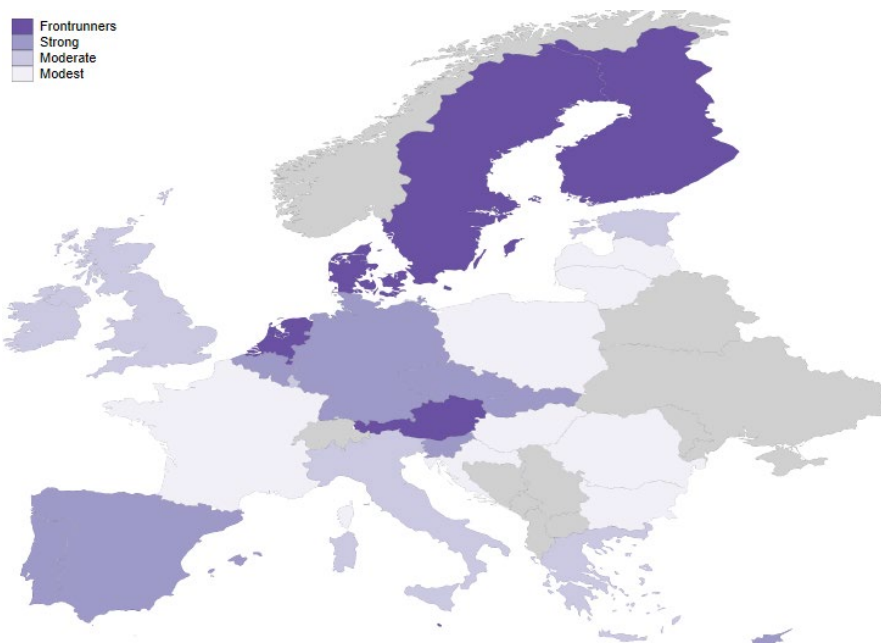
Firms in *infrastructure* are surveyed about the use of: (a) 3-D printing; (b) platforms; (c) the internet of things; and (d) big data/artificial intelligence.

The EIB Corporate Digitalisation Index

The EIBIS Corporate Digitalisation Index explores the degree of digital adoption in the European Union and the United States from various perspectives. This composite index summarises indicators on digitalisation as well as firms' assessments of digital infrastructure and investments. The EIBIS Corporate Digitalisation Index consists of six components: use of advanced digital technologies, digital uptake during COVID-19, digital infrastructure, investment in software and data, investment in training of employees, and the use of a strategic monitoring system. It is based on firm-level data collected by EIBIS in 2021. Appendix A contains more details on the components and how the index has been constructed.

The EIBIS Corporate Digitalisation Index allows us to group countries according to firms' assessment of digitalisation: frontrunners, strong, moderate and modest. Based on the index, Finland and Malta are the top two digital countries, followed by Denmark, Austria, the Netherlands and Sweden.

EIBIS Corporate Digitalisation Index

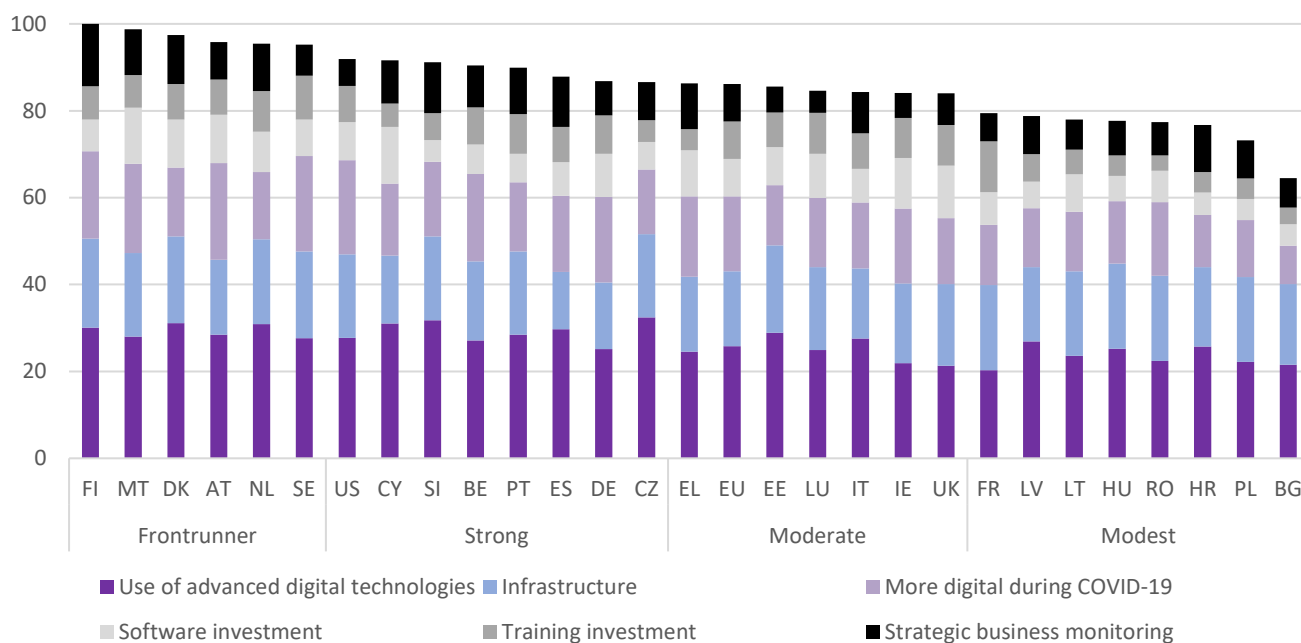


Source: EIBIS (2021).

The key findings of the EIBIS Corporate Digitalisation Index are:

- The top-performing EU countries, in selected areas of digitalisation, are: the Czech Republic for the use of advanced digital technologies, Finland for digital infrastructure and for the use of formal strategic business monitoring, Austria for uptake of digitalisation during the COVID-19 pandemic, Cyprus for investment in software and data, and Sweden for investment in employee training.

EIBIS Corporate Digitalisation Index, by country



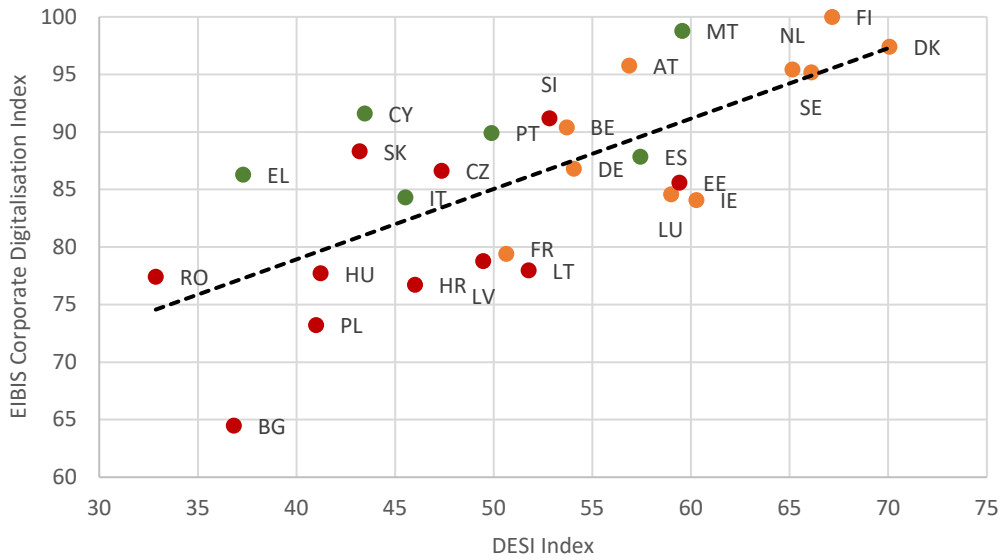
Source: EIBIS (2021).

The EIBIS Corporate Digitalisation Index rounds out the European Commission’s Digitalisation Economy and Society Index (DESI) index by adding the unique perception of firms. However, the two indices display a strong positive correlation across countries. The main differences between the two are:

- All six components of the EIBIS Corporate Digitalisation Index are based on firms’ assessment of digitalisation and questions from the same survey, which makes it easy to make comparisons across countries. The various components of DESI combine data on households, individuals, e-government services and enterprises from different sources and data providers.
- DESI does not include US firms, yet their data are of paramount importance for the analysis of the digitalisation gap or the digital divide between the European Union and the United States.
- The infrastructure component of the EIBIS Corporate Digitalisation Index captures whether firms consider digital infrastructure as an obstacle to their investment activities, whereas the connectivity component of DESI captures household connectivity by broadband market developments in the European Union.

- The EIBIS Corporate Digitalisation Index does not cover digital public services, in contrast to DESI. However, the EIBIS index does capture whether firms use formal strategic business monitoring systems, which is an indicator of management practices. Similarly, as EIBIS is dedicated to firms, it does not cover citizens' use of internet services and online transactions, which are included in DESI.

DESI and EIBIS Corporate Digitalisation Index, by country

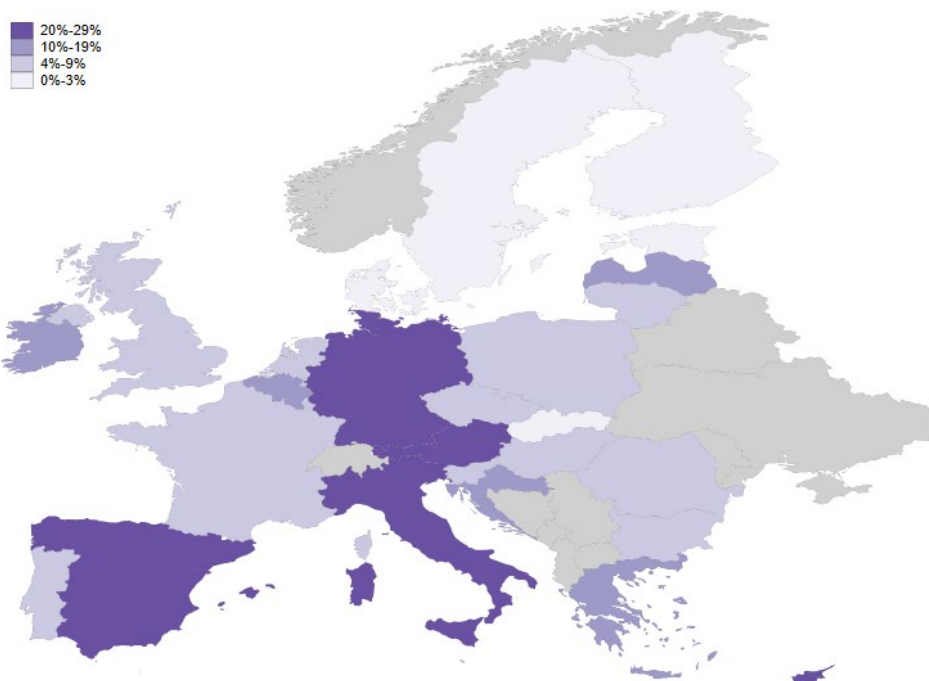


Source: European Commission's Digital Economy and Society Index (DESI) and EIBIS (2021).

Role of the environment: digital infrastructure and digital skills

Digital infrastructure plays a critical role in unlocking investment in the digital transformation. Among EU firms, 16% consider access to digital infrastructure to be a major obstacle to investment according to the latest EIBIS results. However, the assessment varies significantly across EU countries and regions within the same country.

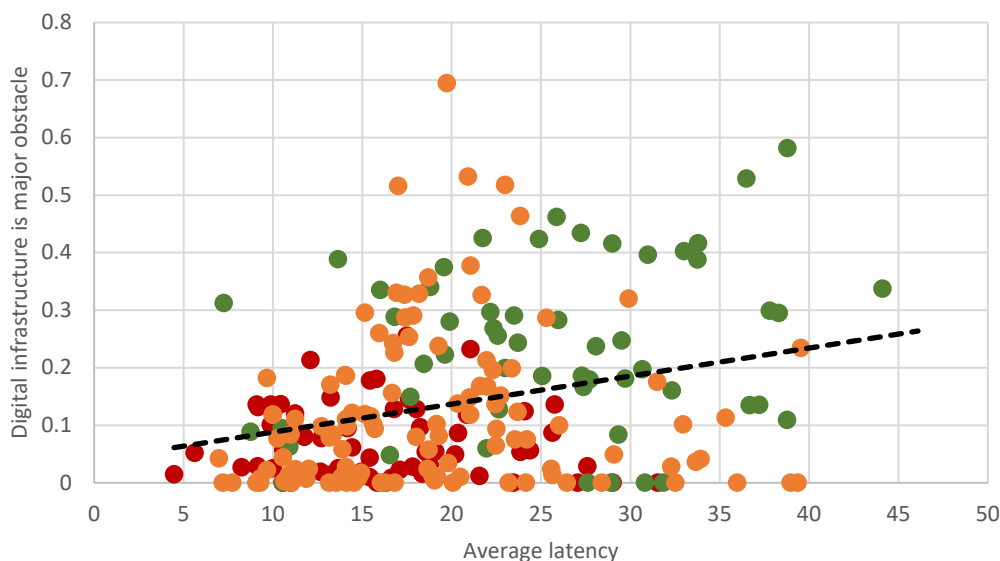
Digital infrastructure reported as a major obstacle to investment (in %), by country



Source: EIBIS (2021).

The level of access to digital infrastructure is converging across the European Union, with the vast majority of households having access to broadband, but more needs to be done to accelerate the spread of fast connections. There is a positive correlation across countries and regions between the share of firms reporting digital infrastructure as a major obstacle to investment and average latency (the higher the latency, the longer it takes to transfer data).

Digital infrastructure as major obstacle to investment (in %) and average latency (in milliseconds), by NUTS2 region



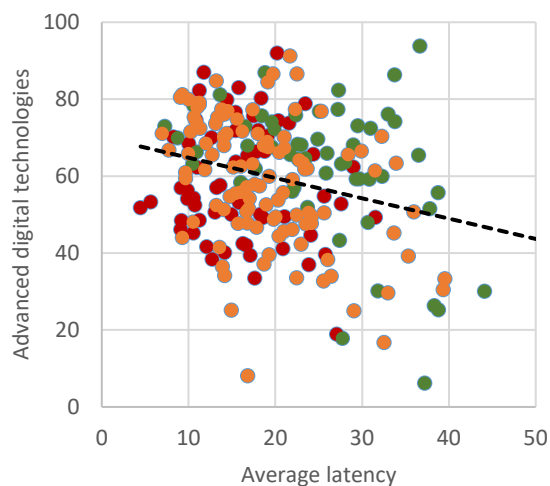
Source: EIBIS (2021), firms in EU27 and European Data Journalism Network (2021).

Note: Latency is the time it takes for data to be transferred between its original source and its destination, measured in milliseconds. Red dots: NUTS2 regions in Central and Eastern Europe, green dots: NUTS2 regions in Southern Europe, orange dots: NUTS2 regions in Western and Northern Europe. NUTS refers to the Nomenclature of Territorial Units for Statistics. NUTS2 regions are the main targets of EU regional policies.

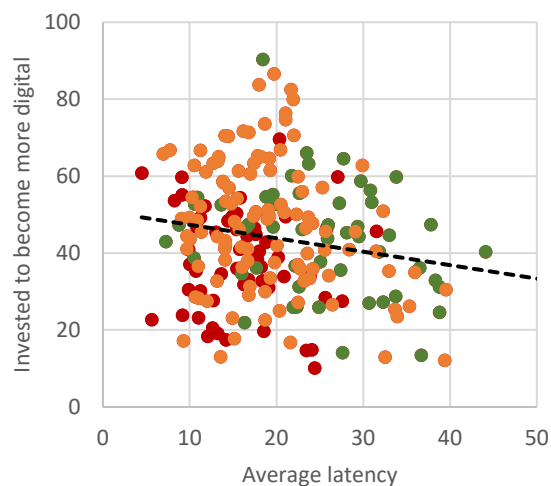
Firms operating in countries and regions with low average latency (a proxy for fast broadband) tend to have higher rates of digital adoption. The responses indicate that many EU regions have the potential to unlock investment in the digital transformation of businesses by making access to faster broadband more widespread. The operating environment has an impact on firms' decisions to become more digital.

Digital adoption and broadband speed, by NUTS2 region

Use of advanced digital technologies (in %) and average latency (in milliseconds)



Firms that invested to become more digital as a response to COVID-19 (in %) and average latency (in milliseconds)



Source: EIBIS (2021), firms in EU27 and European Data Journalism Network (2021).

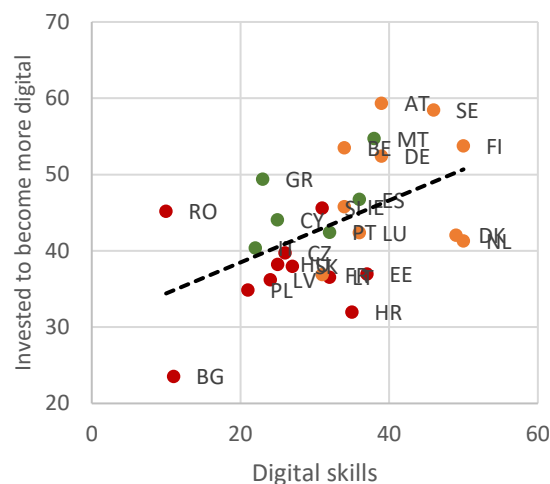
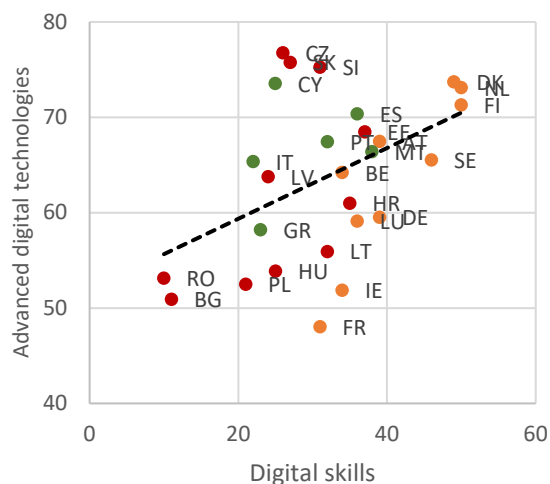
Note: Latency is the time it takes for data to be transferred between its original source and its destination, measured in milliseconds. Red dots: NUTS2 regions in Central and Eastern Europe, green dots: NUTS2 regions in Southern Europe, orange dots: NUTS2 regions in Western and Northern Europe. NUTS refers to the Nomenclature of Territorial Units for Statistics. NUTS2 regions are the main targets of EU regional policies.

The availability of people with digital skills supports the digital transformation. Firms operating in countries where a higher share of the population has above-average digital skills tend to have implemented advanced digital technologies more often. They are also more likely to report having taken action on increasing their digitalisation or made investments. Reaping the benefits of digitalisation will require improvements in education and training systems as well as online learning for groups that are currently excluded from the digital economy.

Digital adoption and share of population with high digital skills

Use of advanced digital technologies (in %) and people with digital skills (in %)

Firms that invested to become more digital as a response to COVID-19 (in %) and people with digital skills (in %)

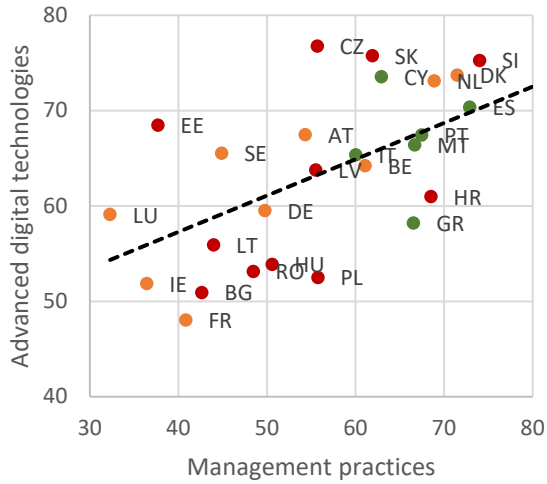


Source: EIBIS (2021), firms in EU27 and Eurostat.

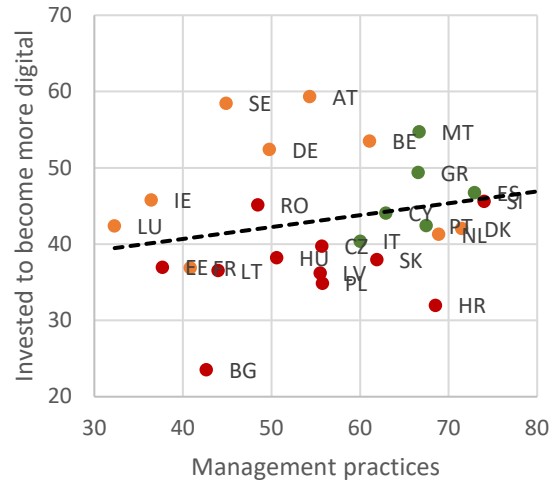
Firms that have invested in the digital transformation also tend to implement better management practices. Firms based in countries with a high share of firms saying that they use strategic business monitoring systems and key performance indicators (a proxy for management quality) are more likely to have implemented advanced digital technologies. Management practices are also linked to the uptake of digitalisation during the pandemic, even though the positive correlation is less pronounced. These findings are in line with results from previous studies highlighting the importance of management practices for technology adoption and firm performance (Bloom et al., 2019; EIB, 2020).

Digital adoption and management practices

Use of advanced digital technologies and management practices (in %)



Firms that invested to become more digital as a response to COVID-19 and management practices (in %)

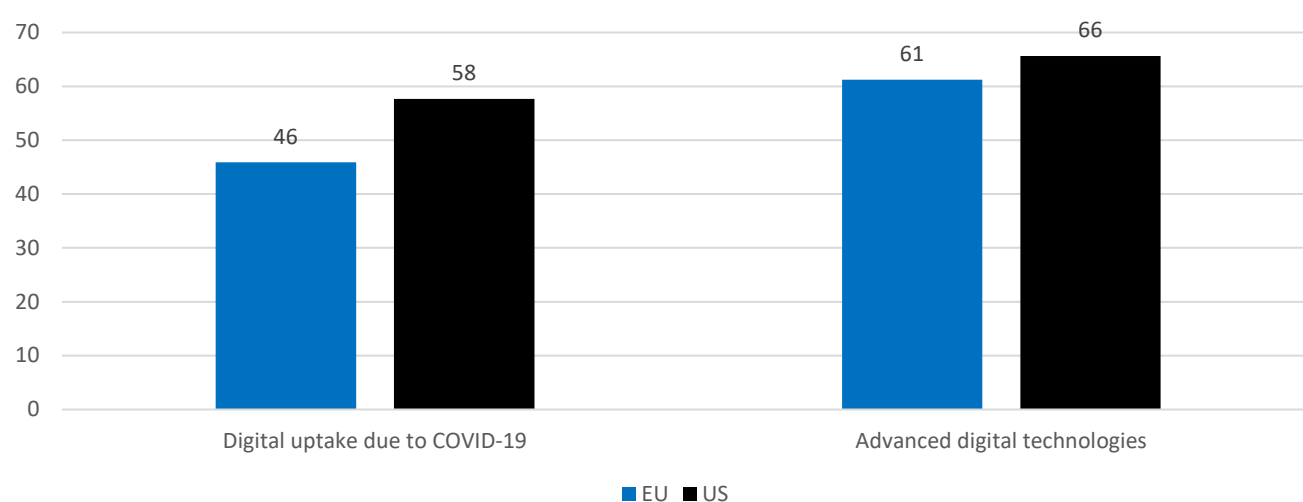


Source: EIBIS (2021), firms in the EU27.

Where does the European Union stand relative to the United States in digital adoption?

The European Union lags behind the United States in digitalisation. 46% of EU firms report having taken action to become more digital during the COVID-19 crisis, compared with 58% of US firms. Furthermore, the share of firms using advanced digital technologies is higher in the United States (66%) than in the European Union (61%).

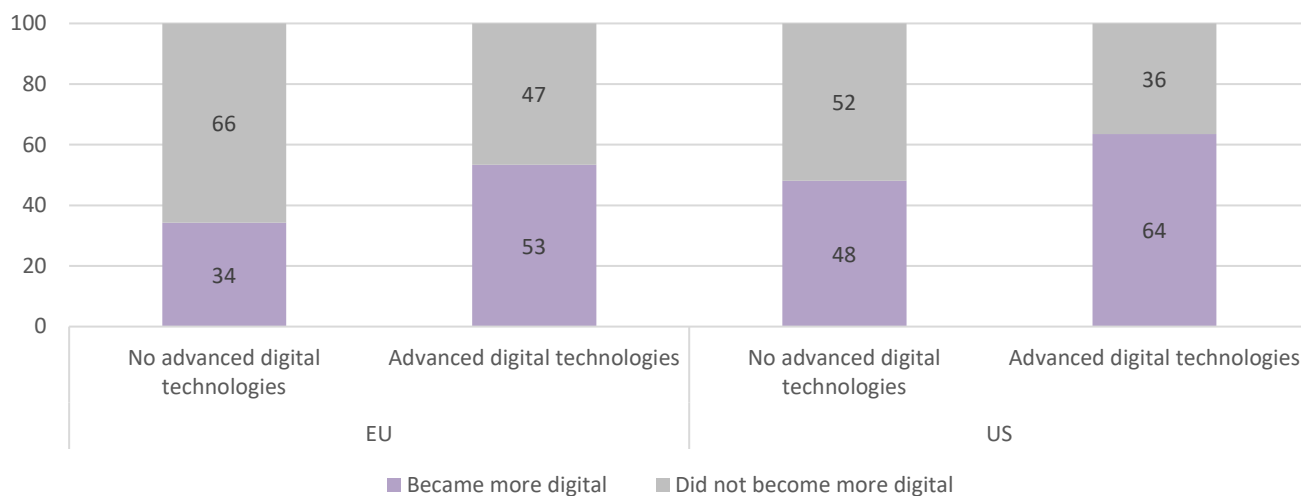
Digital uptake in the European Union and the United States (in %)



Source: EIBIS (2021).

Firms that already implemented advanced digital technologies are more likely to report that they invested in increasing digitalisation activities in response to COVID-19. The finding suggests that the coronavirus pandemic, while stimulating digitalisation across the board, has also led to some widening of the digital divide across firms. Leading firms accelerated digitalisation more often, while lagging firms were less likely to be able to transform during the crisis (Rückert et al., 2021). In the European Union, 53% of firms that had already adopted advanced digital technologies invested further to become more digital during the pandemic. This compares to 34% of EU firms that were non-digital and used the crisis as an opportunity to begin to invest in their digital transformation. A widening digital divide also emerges in the United States, but with more dynamism shown by non-digital firms than in the European Union. 48% of US firms that were non-digital before the pandemic used the crisis as an opportunity to start investing in digital technologies, compared with 64% of US firms that had already adopted advanced digital technologies.

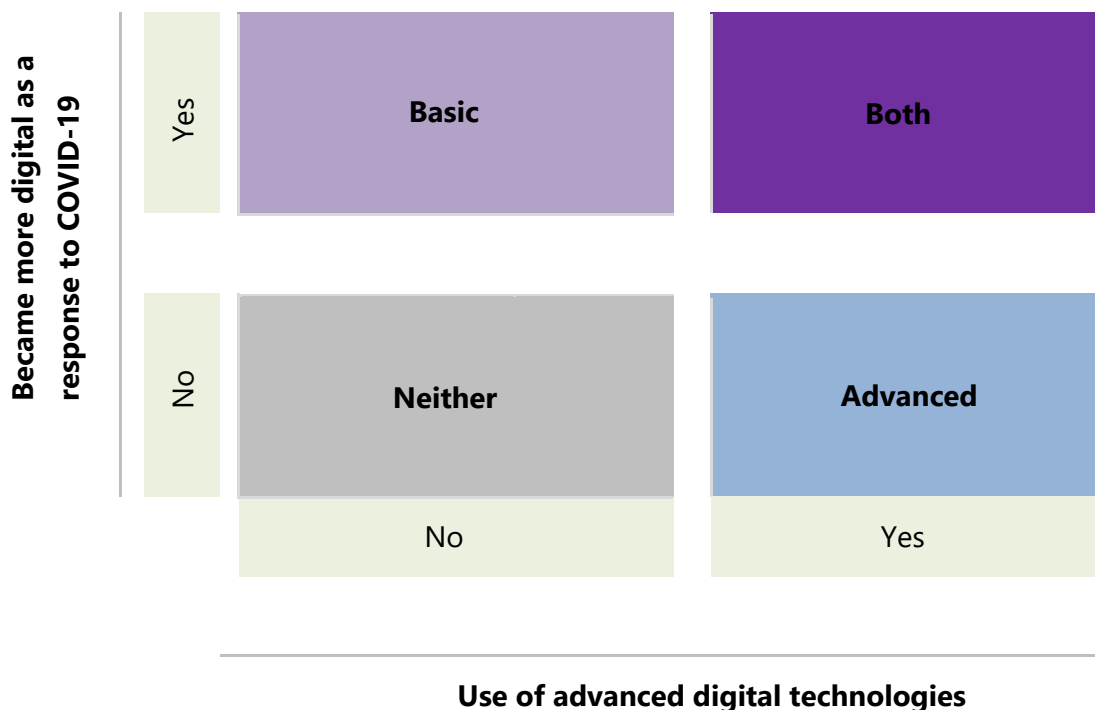
Firms that use advanced digital technologies and invested to become more digital as a response to COVID-19 (in %)



Source: EIBIS (2021).

Firms are grouped into four different profiles to identify where they fall in the digital divide. The four categories are based on the combination of firms' current implementation of advanced digital technologies, and the action they took to become more digital as a response to COVID-19: neither, basic, advanced and both. The following figure positions firms on the digital divide grid according to these categories.

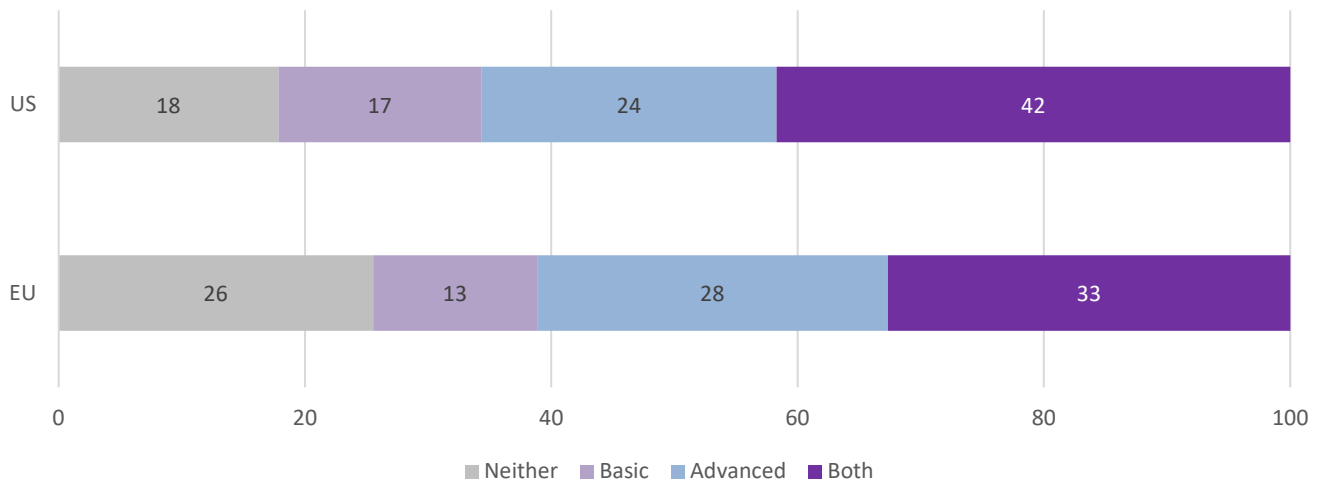
Corporate digital divide profiles



A substantial share of EU firms did not invest in digitalisation, despite the impact the pandemic had on the economy. Of EU firms, 26% have not invested in digital transformation:

they are in the “neither” category, at the bottom of the corporate digital divide. The large share of firms not investing in digitalisation is worrying and could have serious repercussions on firms’ competitiveness during the economic recovery. Firms that fall in the “neither” category may need stronger or specific policy support to prevent them from falling behind. In the United States, only 18% of firms have neither implemented advanced digital technologies nor invested in digitalisation as a response to the pandemic.

Corporate digital divide profiles (in %)



Source: EIBIS (2021).

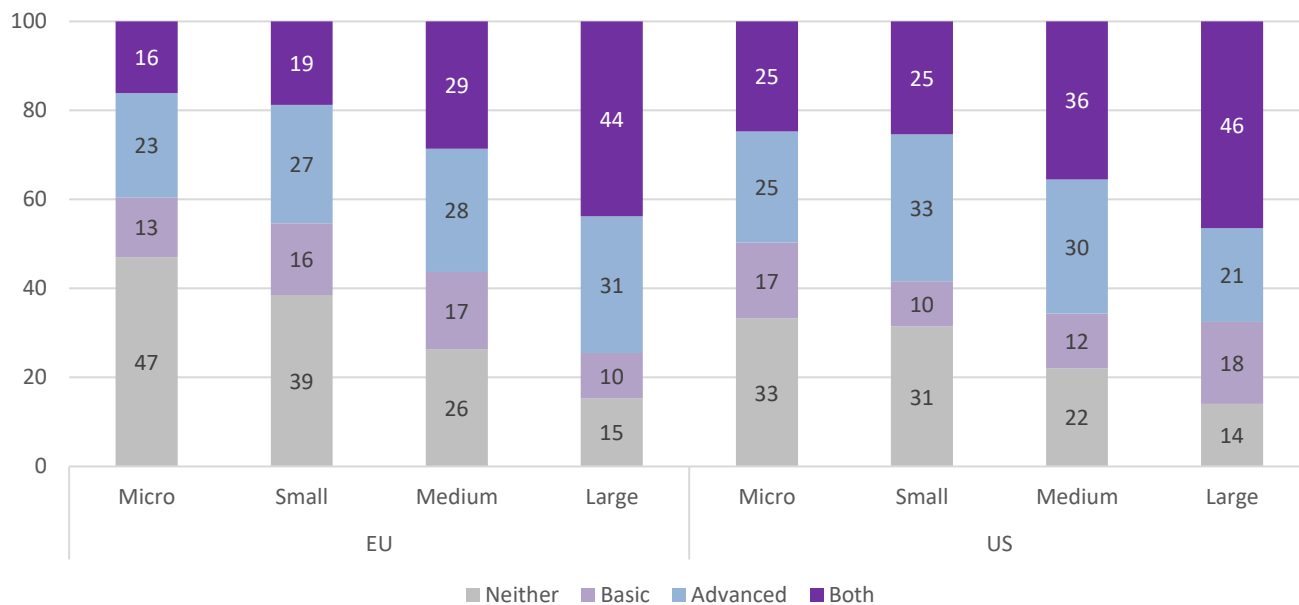
On the upside, a non-negligible share of firms has used the COVID-19 pandemic to embark on their digitalisation journey. These companies have not implemented any advanced digital technology in their business yet but have taken action to become more digital as a response to COVID-19 — for example, by providing services online — and are categorised as “basic” digital. 17% of US firms fall into the “basic” group, compared with 13% in the European Union.

At the other end of the spectrum, 61% of EU firms have already adopted advanced digital technologies. Among firms that have implemented advanced digital technologies in their business, some firms have not invested in increasing digitalisation activities during the pandemic. These firms are categorised as “advanced.” Finally, firms that use digital technologies and have also invested further in digitalisation as a response to the pandemic are categorised as “both” because they have fully embraced the digital transformation. 42% of US firms fall into the “both” group, compared with 33% in the European Union. To understand which companies are falling behind and which are leading, the remainder of this section will examine firms on each side of the divide, and explore the impact of the COVID-19 crisis on their business.

Firm size plays a key role in the corporate digital divide. Larger firms are much more likely to be on the right (or digital) side of the corporate digital divide. They are more likely to be in the “both” category and less likely to be “neither.” By contrast, smaller firms tend to be stuck on the wrong (or non-digital) side of the digital divide grid. This lack of investment in digital technologies by small EU firms is an area of concern because small firms are more prevalent in

the European Union than in the United States. Furthermore, small firms are on average more digital in the United States. This disparity is likely to be a major disadvantage for accelerating the digital transformation in Europe (Revoltella, Rückert and Weiss, 2020).

Adoption of digital technologies (in %), by firm size

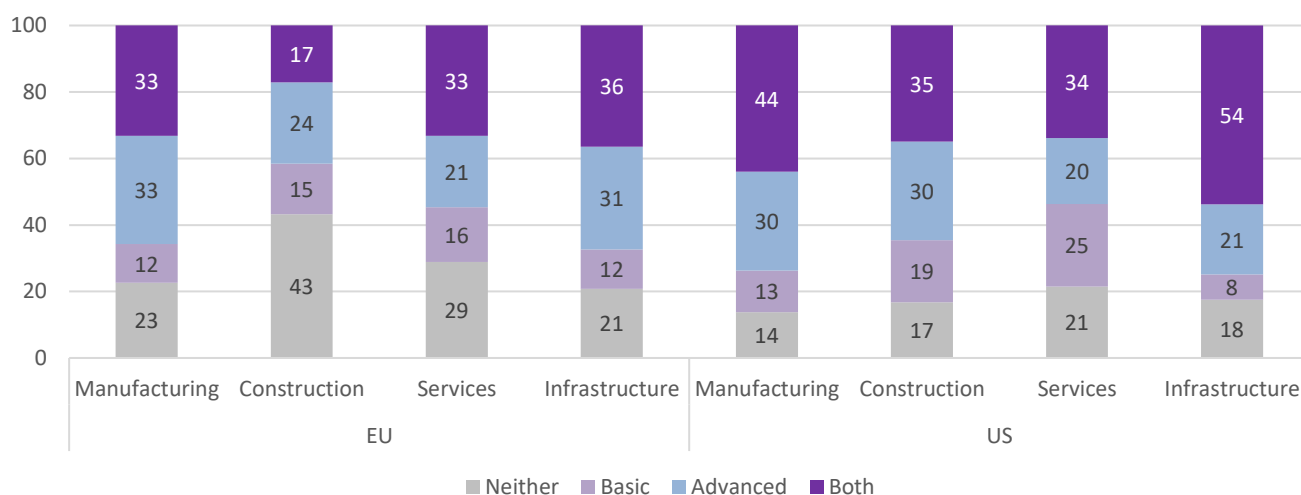


Source: EIBIS (2021).

If policymakers want to close the gap in adoption rates between EU and US firms, they need to help European firms grow to a sufficient size. It is clear that large firms tend to be more digital in the European Union and in the United States. The larger EU share of “neither” compared to the United States is observed in particular for micro and small firms, suggesting that the overall difference in the digital divide between the European Union and the United States is driven by the greater preponderance of small businesses in the European economy.

The difference in digital adoption rates between the European Union and the United States is particularly pronounced in the construction sector. The share of construction firms that fall in the “neither” group is 43% in the European Union, compared to only 17% in the United States. The difference in the share of firms in the “neither” group between EU and US firms is 9 percentage points in manufacturing, 8 percentage points in services, and 3 percentage points in the infrastructure sector.

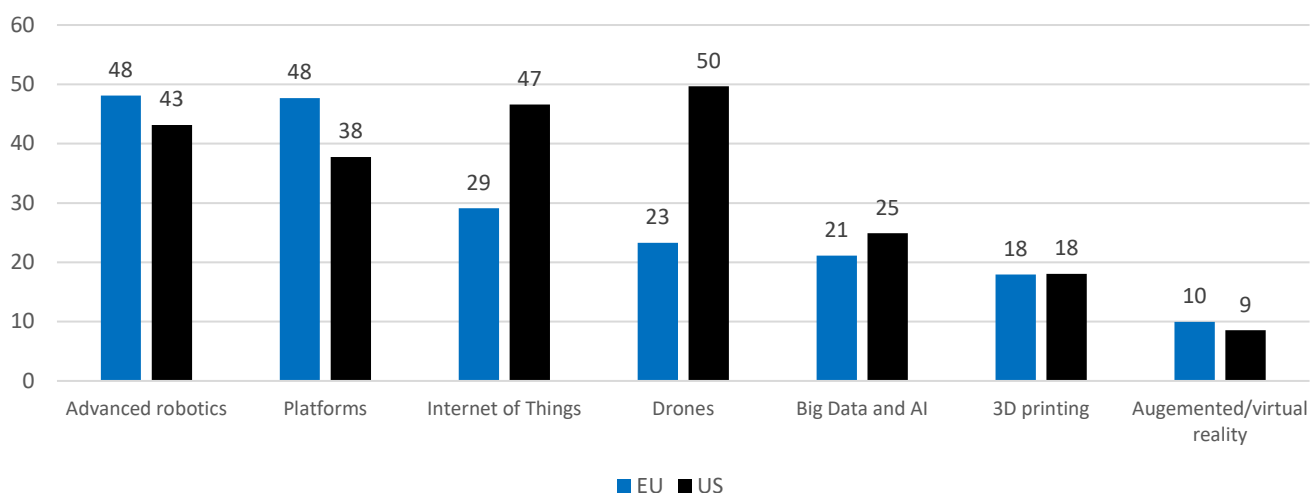
Adoption of digital technologies (in %), by sector



Source: EIBIS (2021).

EU firms have lower adoption rates for the internet of things than firms in the United States. The breakdown of the data on digital technologies suggests that the differences between the adoption rates in the European Union and the United States are driven by the lower use of technologies related to the internet of things — electronic devices that communicate with each other without assistance (see Box 1 for more information on the digital technologies covered in EIBIS). On average, 29% of EU firms have adopted this technology, compared to 47% of US firms. EU firms also fall short when it comes to the adoption of drones (which are used in the construction sector). For advanced robotics and platform use, EU firms are ahead of US firms. For the other digital technologies captured in the survey, the differences in adoption rates between EU and US firms are less pronounced.

Use of specific digital technologies (in %)



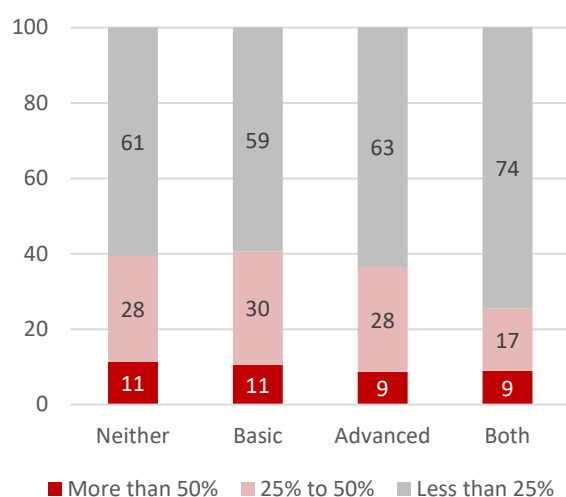
Source: EIBIS (2021).

The role of digitalisation during COVID-19

Firms that have embraced digital technologies were better able to cope with the disruptions created by the pandemic. Firms' adaptation strategies include remote working arrangements, smart factories, 3-D printing to produce in house product components or parts affected by supply chain disruptions, and the use of big data analytics and artificial intelligence to reschedule and plan activities to adapt to the COVID-19 crisis. The firms with the most advanced positions on the digital grid are less likely than non-digital firms to have experienced a decrease in sales since the beginning of 2020. This pattern is similar for firms on both sides of the Atlantic. They are also the least likely to consider that the crisis or its legacy pose an existential threat to their business. Furthermore, the crisis forced firms to find more efficient ways of working with digital technologies. Smaller businesses that improved their digitalisation as a response to the pandemic report more often that they used the crisis to accelerate changes they had already planned to make (38% of "basic" and 41% of "both," compared to 18% of "neither" and 22% of "advanced").

Impact of the COVID-19 crisis on the business

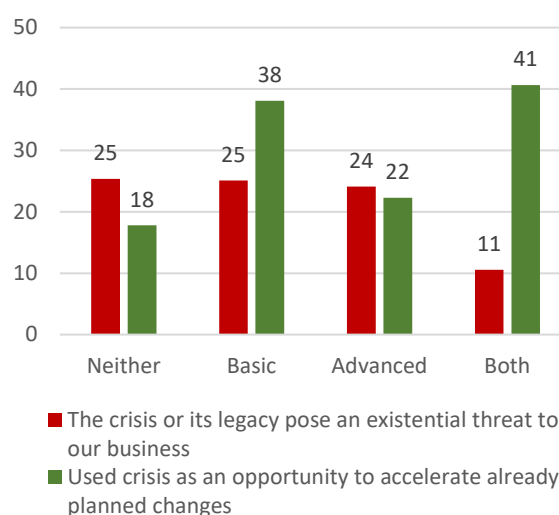
Firms that experienced a decrease in sales since the beginning of 2020 (in %)



Source: EIBIS (2021), firms in EU27.

Base: All firms that responded that sales decreased since the beginning of 2020.

The crisis or its legacy as an existential threat or an opportunity (% of SMEs)



Source: EIBIS 2021 add-on module — sample of EU SMEs in manufacturing and services (2021).

Larger firms are more likely to have invested to become more digital during the COVID-19 crisis. Comparing the probability of firms falling into the "neither" vs. "basic" categories can provide insight into which firms decided to start investing in digitalisation as a response to COVID-19. The estimates in Table 1 confirm once again that firm size matters. In particular, firms

with more than 50 employees are much more likely to start investing in the digital transformation. Similarly, the probability of falling into the “both” category vs. remaining “advanced” highlights the firms that are likely to forge ahead during the pandemic among those that have already implemented digital technologies. Again, small firms belong to the problematic category. Even when they are already digitally active, they are significantly less likely to have increased their digital investments.

Fluctuations in sales during the crisis are also linked to whether a firm decided to start investing in digitalisation. Among firms that had not adopted advanced digital technologies (“neither” and “basic”), those that experienced an increase or decrease in sales from 2019 to 2020 were more likely to have subsequently invested in increased digitalisation than firms that reported no change in sales. Firms that were negatively affected by the COVID-19 crisis and experienced a drop in sales were more likely to have then invested than those not reporting a change, but to a lesser extent than firms that saw a positive impact. However, the impact of COVID-19 on sales was not associated with the continued digitalisation efforts of firms that had already implemented advanced digital technologies.

Probability of investing in digitalisation as a response to COVID-19

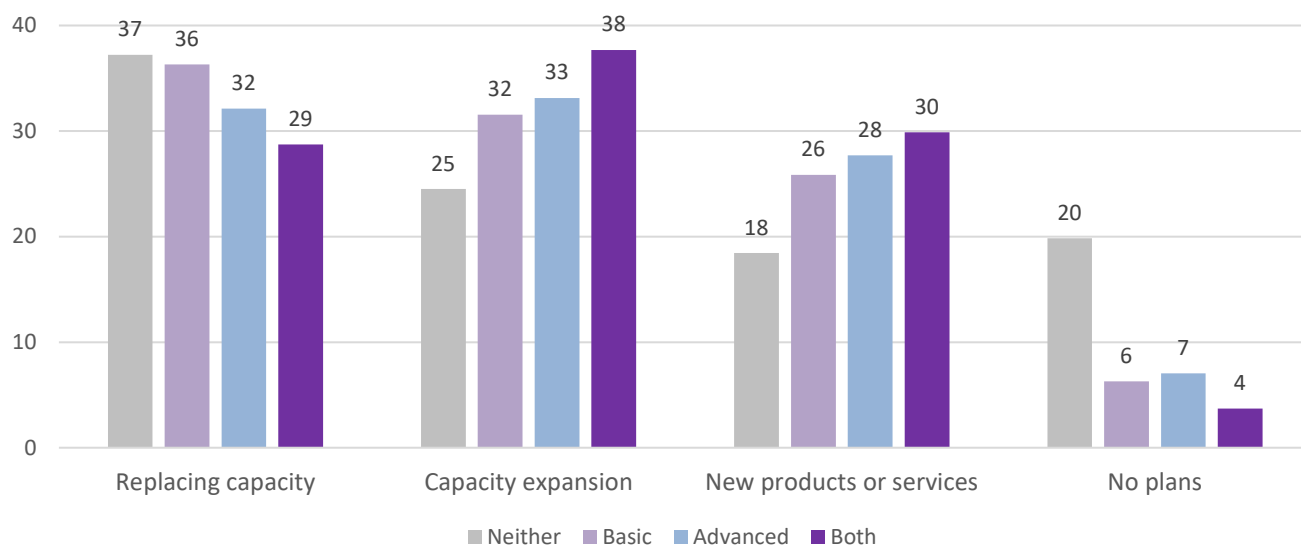
| | Basic vs. neither | Both vs. advanced |
|--|---------------------|---------------------|
| <i>Omitted category: micro</i> | | |
| Small | 0.069*** (0.025) | 0.020 (0.032) |
| Medium | 0.173*** (0.031) | 0.128*** (0.032) |
| Large | 0.179*** (0.044) | 0.219*** (0.034) |
| <i>Omitted category: COVID-19 had no impact on sales</i> | | |
| Increased sales or turnover | 0.108** (0.044) | 0.003 (0.041) |
| Decreased sales or turnover | 0.080** (0.034) | 0.044 (0.034) |
| Observations | 5 560 | 6 135 |

Source: EIBIS (2021), firms in the EU27.

Note: Marginal effects in a probit model. The coefficients can be interpreted as marginal effects on the probability of being “basic” or “both.” *** p<0.01, ** p<0.05, * p<0.1. The regression also controls for country groups and sector.

The digital divide between firms may continue to grow over time. Looking ahead to the next three years, the top investment priorities for more digitally advanced firms are expanding capacity and developing new products, processes or services. For non-digital firms, on the other hand, replacing capacity (including existing buildings, machinery, equipment and IT) is more often mentioned as the investment priority. About 20% of non-digital firms report that they do not have any investment plans.

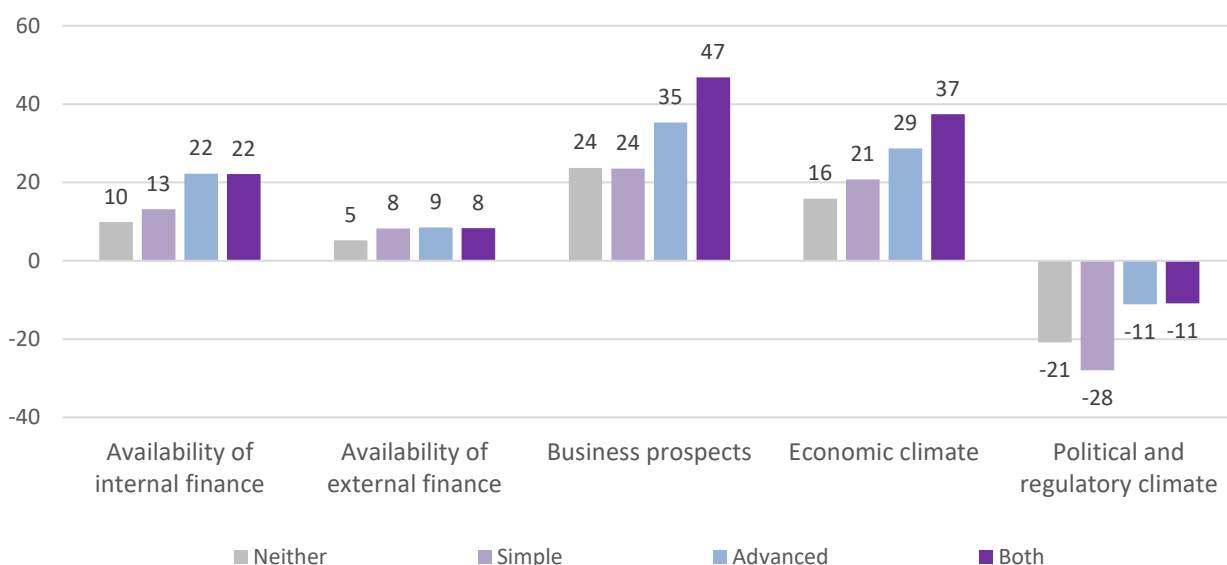
Investment priority over the next three years (in %)



Source: EIBIS (2021), firms in the EU27.

Furthermore, **firms that have adopted advanced digital technologies are more optimistic about business prospects specific to their industry and the overall economic climate** over the next 12 months. At the same time, they are less likely to expect the political and regulatory climate to deteriorate. This suggests that less digital firms consider that they are in a more difficult investment situation in the short term, which leaves them with a less positive long-term outlook. Ultimately, there is a risk that the digital divide will be exacerbated by the pandemic (Rückert et al., 2021).

Short-term outlook, net balance (in %)



Source: EIBIS (2021), firms in the EU27.

Firms that have invested in becoming more digital during the pandemic expect the business environment created by the pandemic to require enhanced digitalisation. In particular, the firms with “basic” and “both” digital divide profiles are much more likely to expect COVID-19 to increase the use of digital technologies in the long term. In addition, firms with the most advanced level of digitalisation are more likely to expect COVID-19 to affect their service and product portfolio as well as the supply chain. By contrast, the expected long-term impact of COVID-19 on employment is not associated with firms’ digitalisation status.

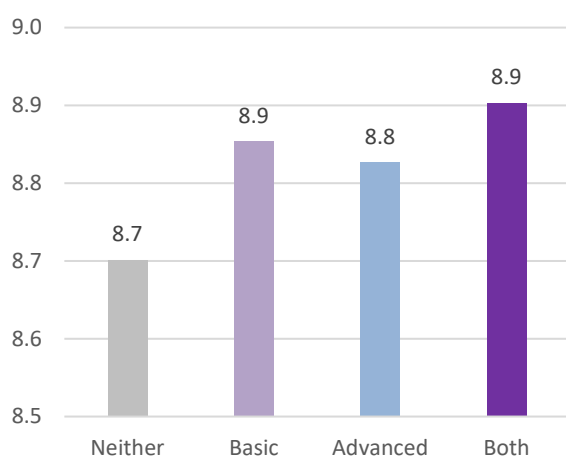
Digitalisation, intangible investment, innovation and firm productivity

Digital firms tend to be more productive. Non-digital firms that started investing in their digital transformation during the pandemic and do not use advanced digital technologies have lower total factor productivity.² These results support previous empirical evidence on the positive effect of digital adoption — including the use of platform technologies in the services sector — on productivity (Falk and Hagsten, 2015; Bailin Rivas et al., 2019; Gal et al., 2019). The pandemic has led to major changes in the nature and organisation of work, with implications for productivity, employment, wages and investment (Revoltella, Maurin and Pál, 2020).

Firms that have adopted advanced digital technologies are more likely to export goods and services to another country. This finding is in line with studies stressing that exporters tend to be more productive (Melitz and Redding, 2021). Investing in digital technologies therefore appears to be especially relevant to firms wanting to compete in international markets (DeStefano and Timmis, 2021). Exporting products or services has also improved firms' resilience during the COVID-19 crisis and recovery, as export-led sectors tend to bounce back faster than non-export-led ones (McKinsey, 2020).

Total factor productivity and export performance

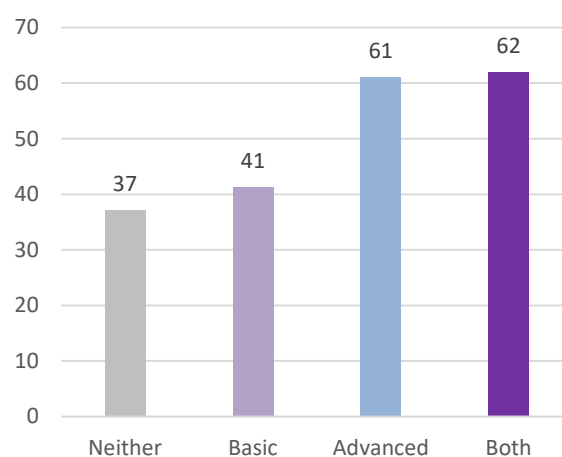
Total factor productivity (in logarithm)



Source: EIBIS (2021), firms in the EU27.

Note: Total factor productivity is based on sector-by-sector ordinary least squares (OLS) regressions of value added on number of hours worked, firms' total fixed assets and country fixed effects.

Exporting directly to another country (in %)

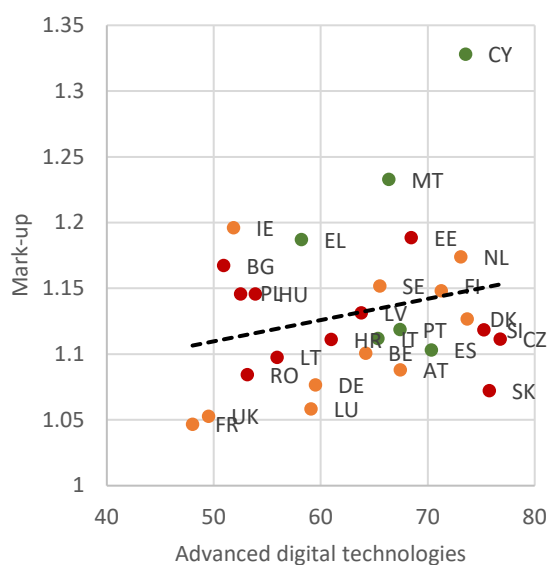


Source: EIBIS (2021), firms in the EU27.

² Total factor productivity (TFP) is the portion of output not explained by the amount of inputs used in production. It reflects the overall efficiency with which labour and capital inputs are used together in the production process.

Firms that have implemented advanced digital technologies tend to charge higher mark-ups. While digital technologies can lead to more competition (Crémer et al., 2019), firms that use advanced digital technologies are often in a relatively privileged market situation, with above-average mark-ups. This supports previous empirical evidence showing that digital technologies often come with (i) network effects; (ii) economies of scope in data collection and analysis; and thanks to this information, (iii) a high and increasing level of price and product differentiation leading to a concentration of market power (Brynjolfsson and McAfee, 2011; Calligaris, Criscuolo and Marcolin, 2018).

Average mark-ups and use of advanced digital technologies (in %)



Mark-ups and corporate digital profiles

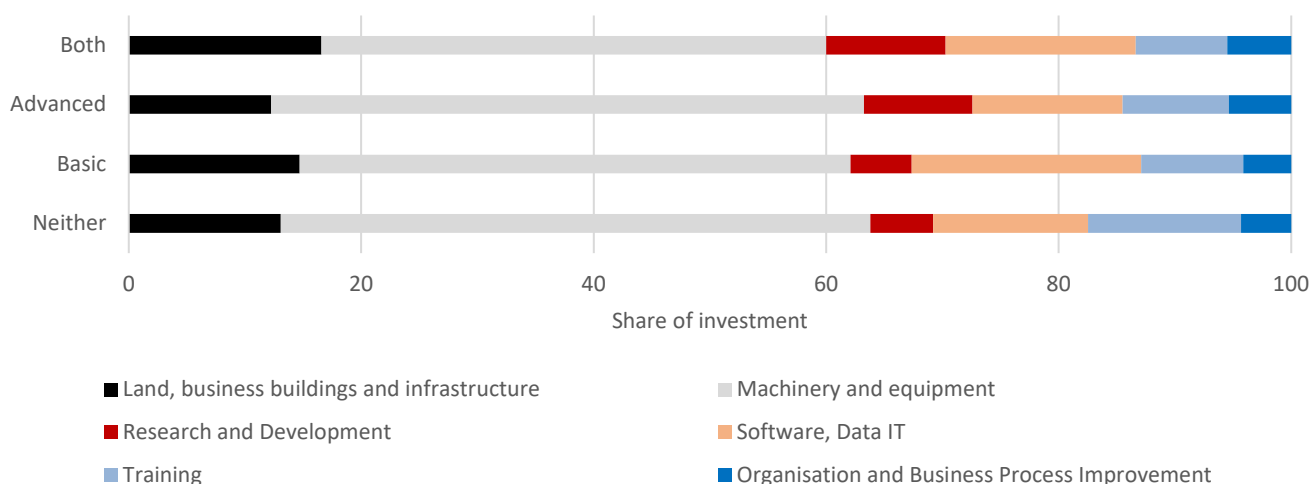
| Dependent variable: | Mark-up (in log) |
|---|--------------------------|
| Digital profiles (omitted category: neither) | |
| Basic | 0.013 (0.030) |
| Advanced | 0.049* (0.027) |
| Both | 0.047* (0.027) |
| Controlling for firm size, sector, country. | |
| Sample size | 9 220 |
| Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1 | |

Source: EIBIS (2021), firms in EU27.

Note: Mark-up calculations are based on the approach of De Loecker et al. (2020).

Digital firms tend to invest more, especially in R&D. More advanced digital firms have higher investment intensity (defined as investment spending over turnover). This higher investment intensity can be explained by the higher productivity of digital firms and the stronger demand for their goods and services. Firms that have adopted advanced digital technologies tend to allocate a larger share of their investment activities to R&D. Firms that have invested in digitalisation during the pandemic report having spent a large share of their investment on software, data, IT infrastructure and website activities in 2020.

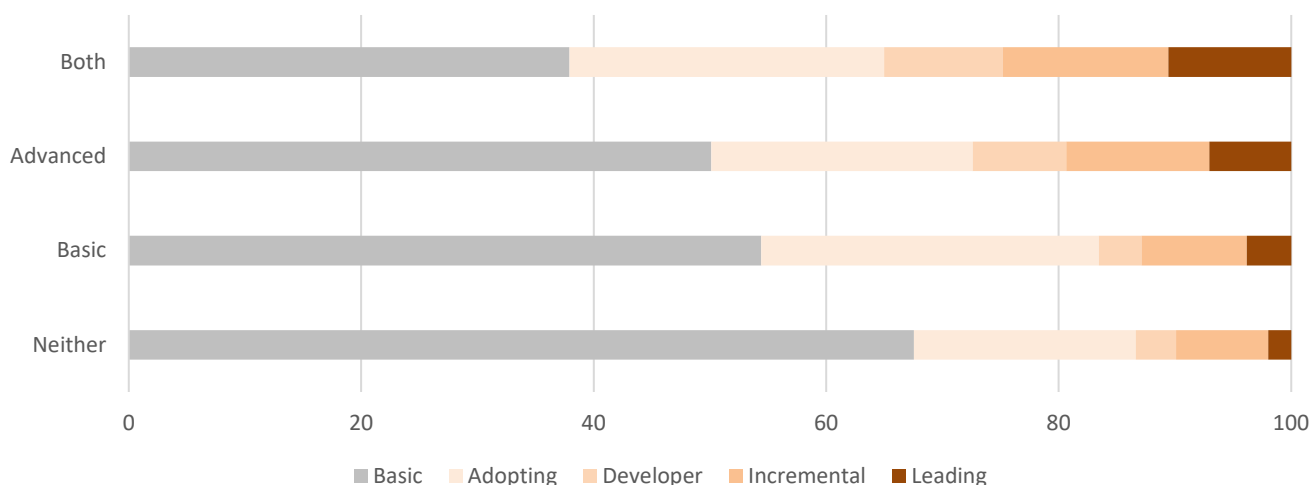
Composition of investment (in %)



Source: EIBIS (2021), firms in the EU27.

Digital firms tend to invest more in innovation. The share of active innovators — either incremental or leading innovators (such as firms that invest in R&D and introduce new products, processes and services new to the company or to their market) — is higher among digital firms. At the same time, non-digital firms are less likely to invest in innovation, meaning they do not conduct any R&D and do not develop new products, processes or services. However, the correlation between investment in digitalisation and the wide range of firm performance metrics considered in this report — such as productivity, employment growth, average wage per employee or innovation activities — does not necessarily imply causation.

Innovation profiles (in %)



Source: EIBIS (2021), firms in the EU27.

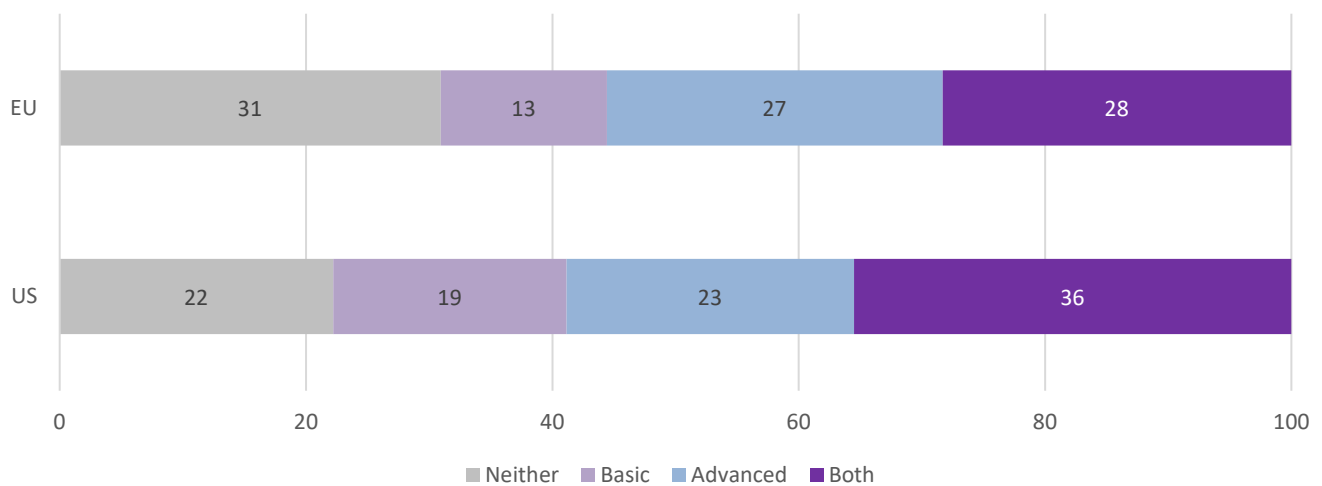
Note: See Veugelers et al. (2019) for the definition of innovation profiles and note to Figure 10 for the definition of corporate digital divide profiles.

Higher innovativeness is associated with the use of big data analytics, artificial intelligence and 3-D printing. To make the most of these technologies, firms have to collect and analyse large amounts of information. Big data analytics or artificial intelligence can enable the innovation process (Haskel and Westlake, 2017; Cockburn et al., 2018). 3-D printers also improve the innovation process.

Digitalisation, employment and management

The growing digital divide poses risks for the labour market. In Europe, 31% of employees are associated with firms that are doing nothing in the digital sphere, compared with some 22% in the United States. This is also because there are many more small firms in the European Union than in the United States. Smaller firms tend to be less digital, which has implications for the workers they employ. As shown below, non-digital firms tend to pay lower wages and are less likely to create new jobs. During the pandemic, they have also been less likely to train their workers.

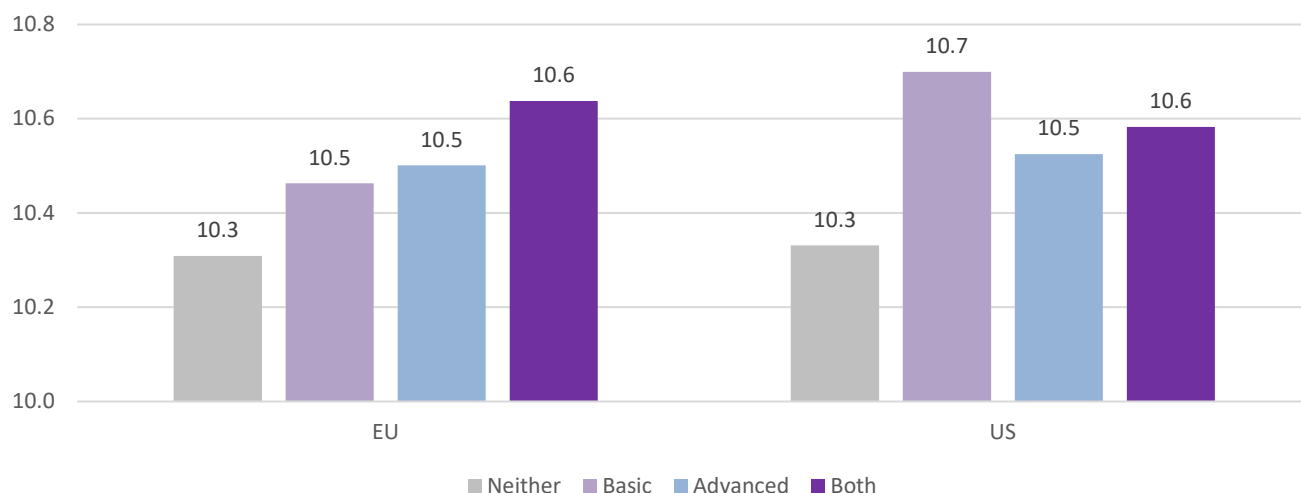
Share of employment (in %)



Source: EIBIS (2021), Eurostat and OECD Structural Business Statistics, and US Census Bureau.

Digital firms pay higher wages on average. Many economists argue that digital technologies — such as artificial intelligence, machine learning and industrial robots — have an impact on employment, wages, the demand for skills and job polarisation because of automation and skill-biased technological change (Acemoglu and Autor, 2011; Autor, 2015; EIB, 2018; Frank et al., 2019; Acemoglu and Restrepo, 2020). The higher demand for skilled workers is reflected in the higher average wages paid by digital firms. The digital transformation often goes hand in hand with the automation of routine jobs. This automation often comes at the expense of demand for low and medium-skilled jobs. On the other hand, to use digital technologies, firms need to have a pool of qualified personnel with the right skills. While digitalisation can disrupt employment and tasks, the jobs created by digital firms often appear to be relatively well paid.

Median wage per employee (in logarithm)

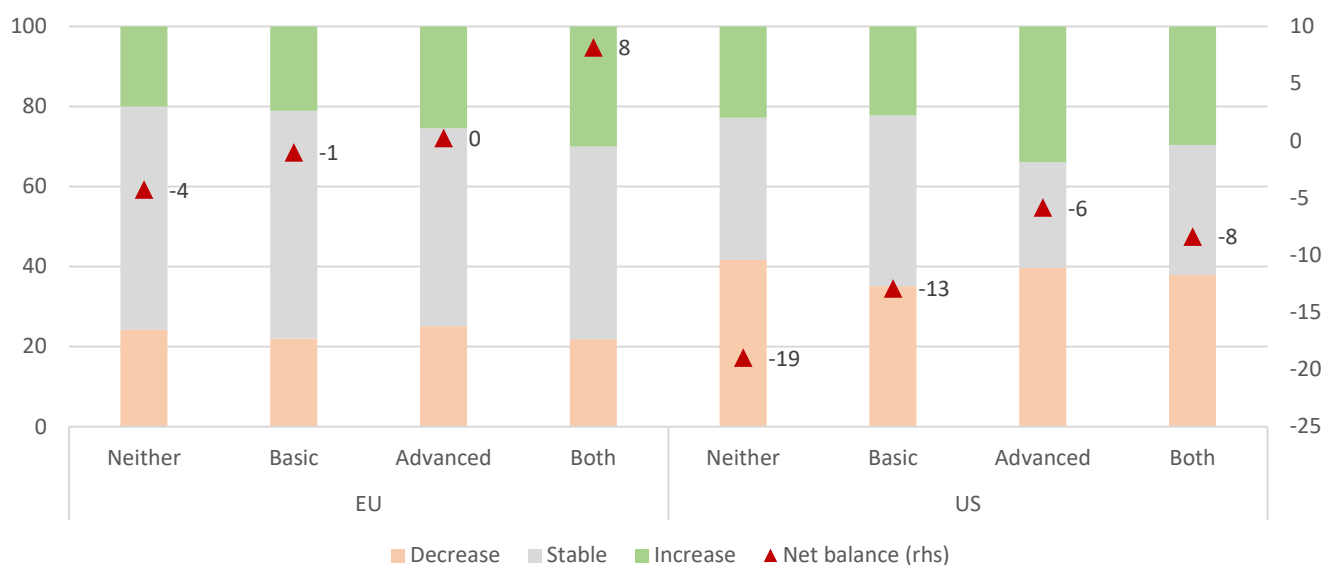


Source: EIBIS (2021).

Note: The figure shows the median wage per employee for each corporate digital divide profile. The wage per employee is computed as the wage bill divided by the number of employees.

The most advanced digital firms were able to increase staff numbers in the European Union compared to before the pandemic. On average, EU firms that adopted advanced digital technologies and invested in becoming more digital during the coronavirus pandemic have increased the number of workers they employ since the beginning of 2020. The share of non-digital firms that downsized after the COVID-19 outbreak was also higher than the share of non-digital firms with positive employment growth. The net balance of employment was negative for non-digital firms. In the European Union, furlough and short-time work schemes kept workers employed, while bankruptcy filing obligations for firms were relaxed, also allowing workers to remain in their jobs. By contrast, the United States relied on direct transfers and loans to support households and firms, independent of whether existing employment continued. Therefore, while the United States and European Union witnessed declines of about 15% in aggregate hours worked, the increase in unemployment was much larger in the United States. But also in the United States, most advanced digital firms were better able to prevent decreasing staff numbers than non-digital firms.

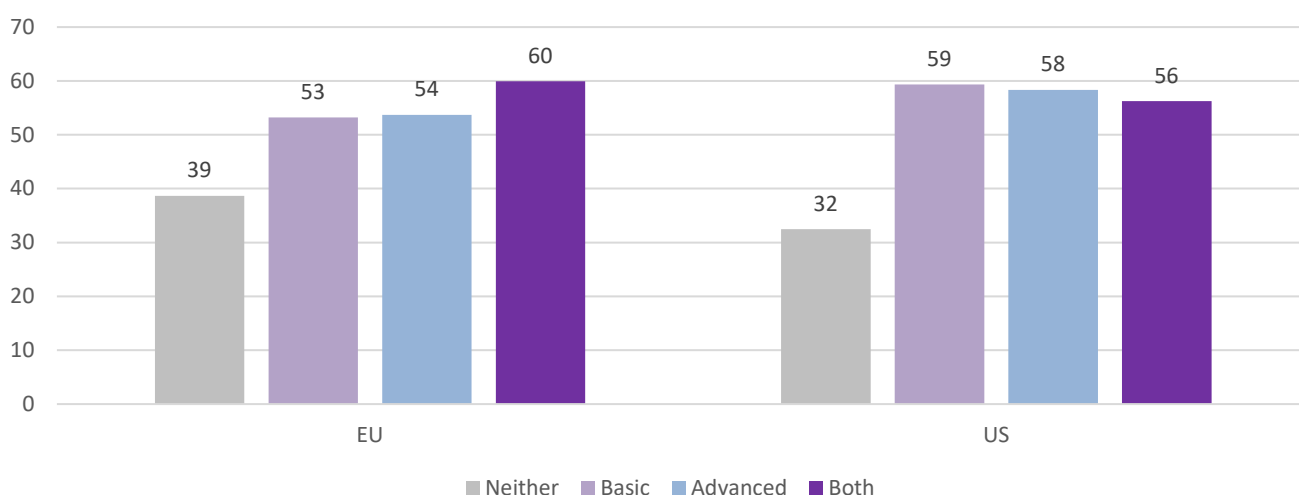
Employment growth since beginning of 2020 (in %)



Source: EIBIS (2021).

Firms driving structural change can support the adaptation of skills. Firms adopting new digital technologies tend to be more profitable and are in a better position to invest in the human capital of their employees. Similarly, investment in digital skills — and an environment that is conducive to learning about them — is more likely to come from digital companies than those not investing in digital transformation. Digital firms are indeed more likely to provide training than non-digital peers, in the European Union as well as in the United States. Fostering the spread of technologies could also help to increase and gradually broaden participation in training.

Firms investing in training of employees (in %)



Source: EIBIS (2021).

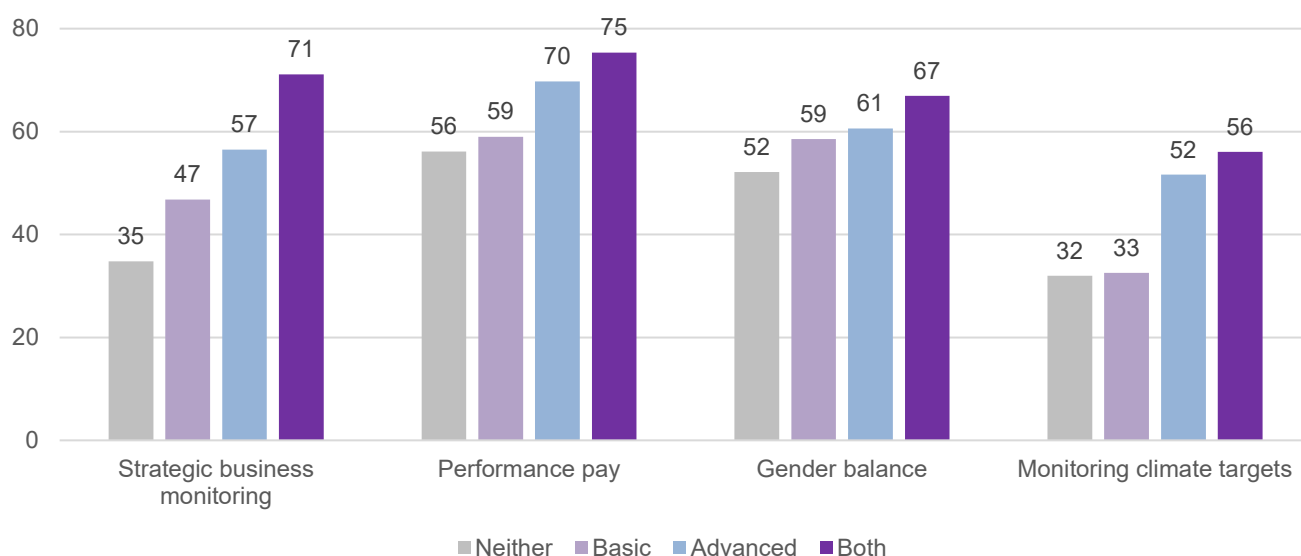
Note: The percentage of firms that invest more than EUR 50 per employee in training.

Digital transformation may also come with downsides for employment. Digital firms are more optimistic about how digitalisation will help create jobs in the future. However, certain

specific digital technologies must be examined because some are expected to induce job losses. For example, the introduction of advanced robotics in recent years has contributed to net job creation so far. But, looking ahead, many firms expect automation using robots to lead to a reduction in employment. This is particularly true of firms in Central and Eastern Europe (EIB, 2021). In contrast, the employment effects of other digital technologies such as platforms or big data/artificial data are expected to be more neutral.

Firms most advanced in digitalisation tend to implement better management practices than non-digital firms. Both use formal strategic business monitoring systems (with key performance indicators) more often than non-digital companies. Digital companies also tend to reward individual performance with higher pay. In addition, they are more likely to have appointed a designated person responsible for defining and monitoring climate change strategies. Those firms report more frequently that they have set and are monitoring targets on carbon emissions and energy consumption. This EIBIS-based evidence is in line with results from previous studies highlighting the importance of management practices for technology adoption and firm performance (Bloom et al., 2019). The European Union and its Member States need to create incentives for firms to improve their track record on environmental, social and corporate governance (ESG) metrics — an area where digital technologies may help firms monitor progress.

Management practices (in %)

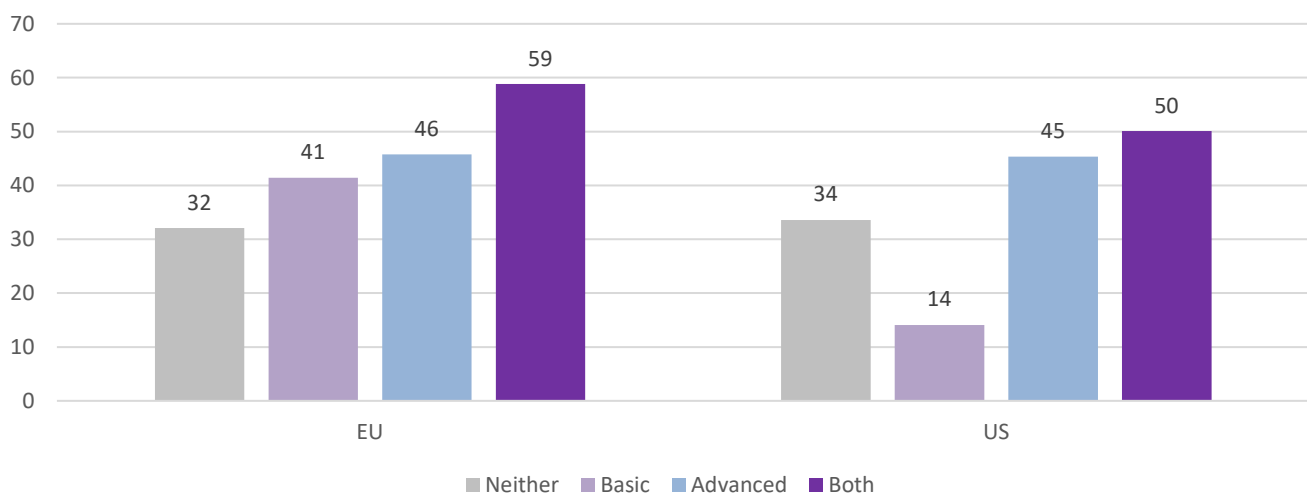


Source: EIBIS (2021), firms in EU27.

Digitalisation and climate change

Digitally advanced firms invest more in measures to improve energy efficiency. 59% of firms that fall into the “both” category in the European Union have invested in measures to improve energy efficiency, compared to only 50% of US firms in the same category. The gap between the digital profile of firms and investments dedicated to energy efficiency is very pronounced on both sides of the Atlantic.

Firms investing in measures to improve energy efficiency (in %)

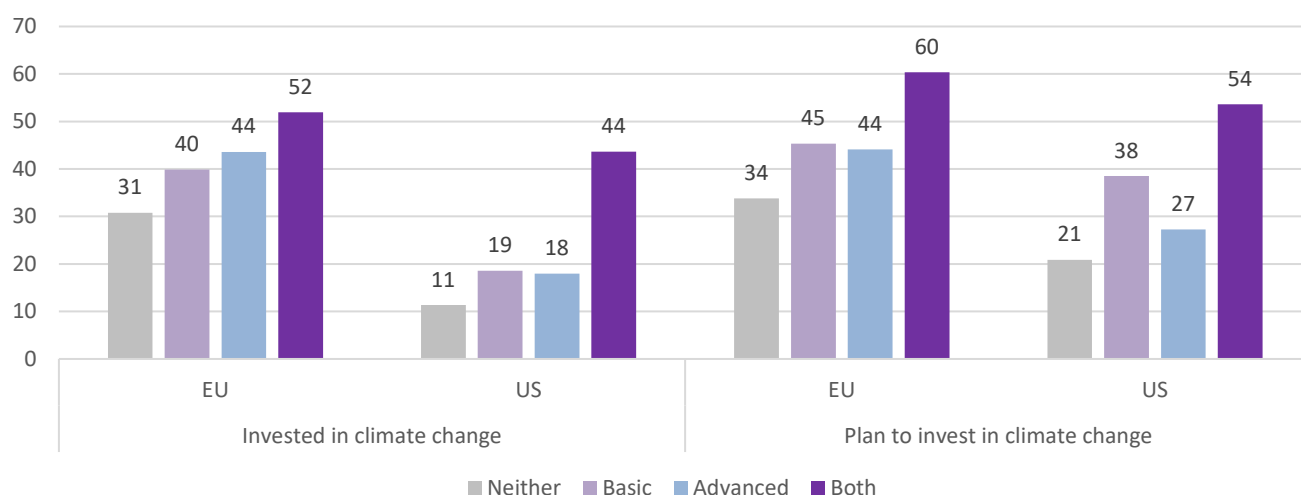


Source: EIBIS (2021).

The more advanced firms are with digitalisation, the more likely they are to invest to meet the challenges of climate change. Firms most advanced on the corporate digital divide grid tend to report that they have invested and plan to invest more in climate adaptation in the next three years, compared to digitally less advanced firms.³ These findings support the idea that digitalisation can serve as a critical enabler for attaining the ambitious goals of the European Green Deal. If used in the right way, emerging technologies could be critical to tackling today’s environmental challenges.

³ The positive association between digital profiles and investments in climate changes also holds in regression analysis that controls for firms size, region, sector as well as whether firms have been impacted by climate change and whether the transition poses a risk or a challenge for the firm. In other words, this association is neither driven by a location, nor by a firm size effect.

Investments to tackle climate change (in %)



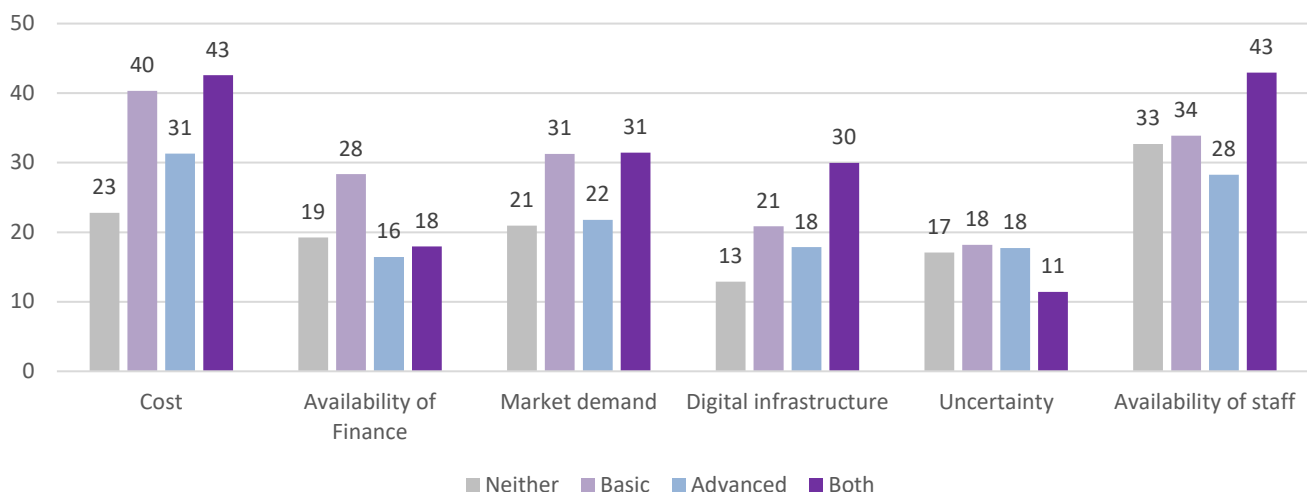
Source: EIBIS (2021).

Digital technologies are put forward as critical enablers of the green transition and meeting the sustainability goals defined in the European Green Deal. If emerging digital technologies are properly employed, they could play an essential role in tackling environmental challenges. Examples include smart urban mobility, precision agriculture, sustainable supply chains, environmental monitoring and disaster prediction. In addition, digital technologies can be instrumental in monitoring climate change and facilitating the much-needed shift towards a circular economy. Data analytics allow companies to match supply and demand for underused assets and products. The cloud, in combination with mobile and social media, can take products or even entire industries fully online. Moreover, 3-D printing creates opportunities for manufacturing biodegradable inputs (Lacy and Rutqvist, 2015).

Policy recommendations

Finding staff with the right skills and the cost of investments are the most significant obstacles to the digital transformation. The EIBIS 2021 add-on module (AOM) survey asked small and medium-sized enterprises (SMEs) in the services and manufacturing sectors about the obstacles to investing in digital technologies. More than one in three EU SMEs consider an absence of workers with the right skills to be a major barrier. Access to digital infrastructure is cited slightly less frequently, on average, but there are significant differences across digital divide profiles. For example, SMEs that took steps to become more digital as a response to the pandemic are more likely to report that a lack of access to digital infrastructure constrains their investment in digital technologies.

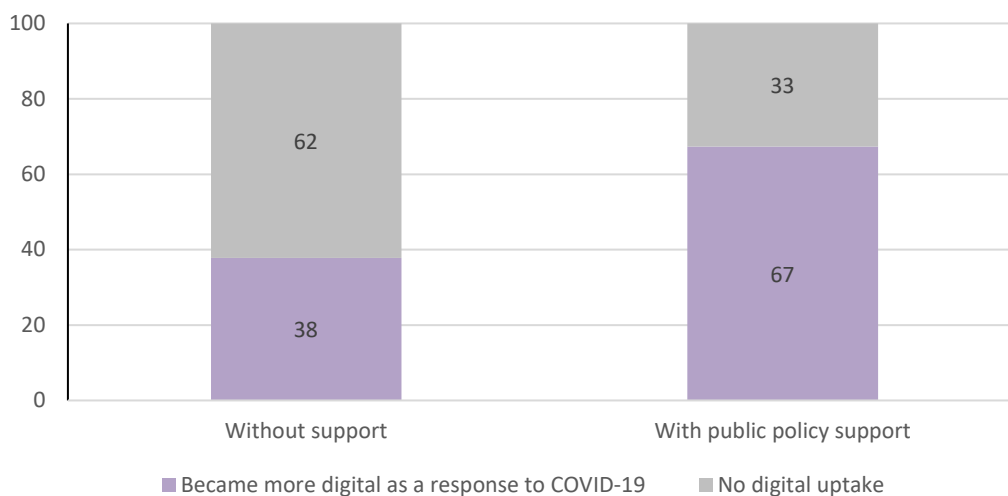
Major obstacles small and medium enterprises face when investing in digital technologies (in %)



Source: EIBIS 2021 AOM — sample of EU SMEs in manufacturing and services (2021).

Targeted financial support to SMEs has proved effective in increasing their readiness to undertake transformative investment, including in response to the pandemic. European SMEs that received incentives for digitalisation in the last three years were almost twice as likely to invest more in digitalisation as a response to the pandemic, suggesting that such incentives help to overcome the inertia of many firms. Some 15% of these businesses report having received public support — such as government grants, subsidies or subsidised finance from the public sector — over the past three years to accelerate digitalisation investments. Among the firms that benefited from this financial support, 67% report that they have also taken action to become more digital during the COVID-19 crisis, compared to only 38% of SMEs that did not receive previous support. This evidence shows that targeted incentives, when they are well designed, can make a difference in accelerating the digital transformation of the European Union.

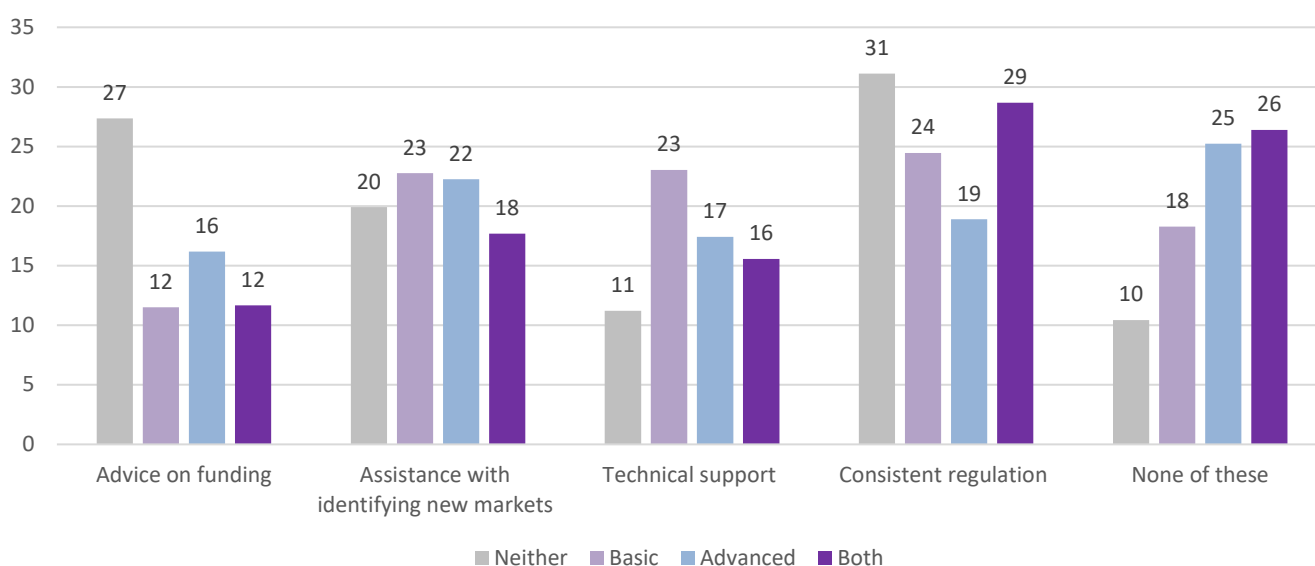
Small and medium enterprises that invested in becoming more digital as a response to COVID-19 and received public financial support over the past three years (in %)



Source: EIBIS 2021 AOM — sample of EU SMEs in manufacturing and services (2021).

Non-digital firms say that advice on funding and consistent regulation would be the best way to support their digital investments. The types of support that firms would like to receive differ among the corporate digital profiles. Firms clearly signalled that consistent regulation would be welcome, and firms that started digitalisation activities in response to the COVID-19 crisis said they would like technical support and help in identifying new markets. This suggests that policy support focusing on facilitating access to finance for SMEs will not necessarily accelerate the digital transformation in the European Union. Technical support, market expertise and predictable regulation are also required.

Policy support small and medium enterprises considered most useful (in %)



Source: EIBIS 2021 AOM — sample of EU SMEs in manufacturing and services (2021).

Improving skills and retraining need to be key policy targets to tackle the looming problem of reallocation in the labour market, avoiding a scenario where workers become trapped, on a large scale, in firms failing to adapt. The risk is that many workers will remain in firms that are failing to innovate and adapt to the new normal — and also fail to invest in training. At the same time, the availability of skilled workers could further constrain the investment activities of transformative firms with high growth potential. Improving skills and retraining are essential policy goals to ensure a just transition in which no one is left behind.

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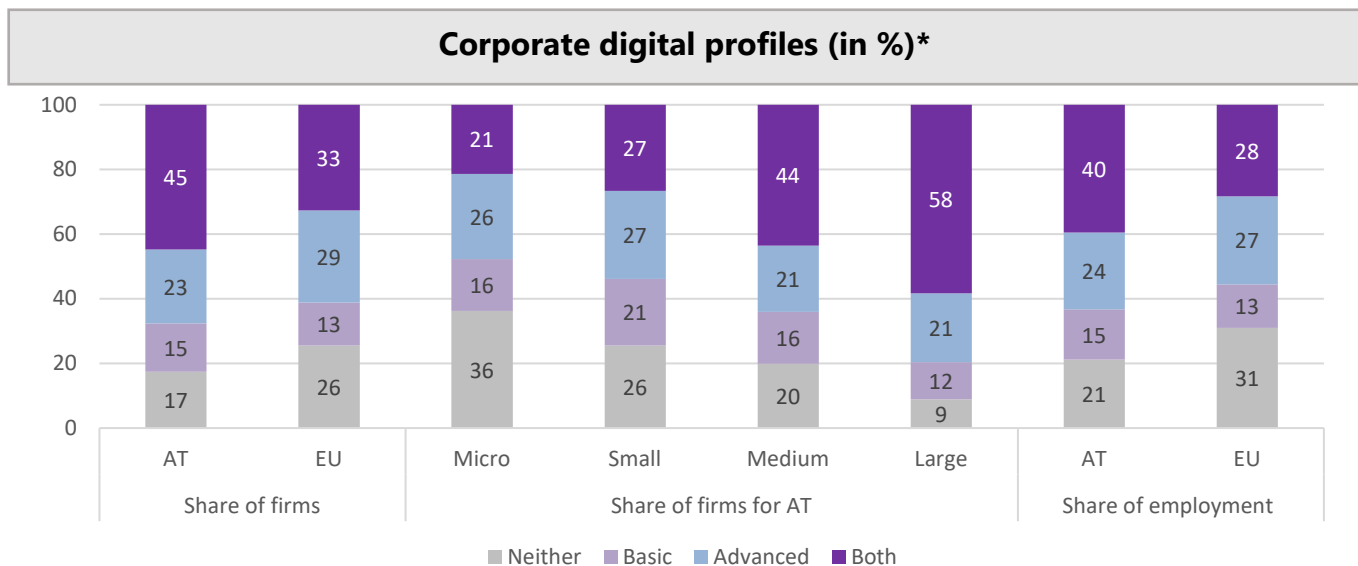
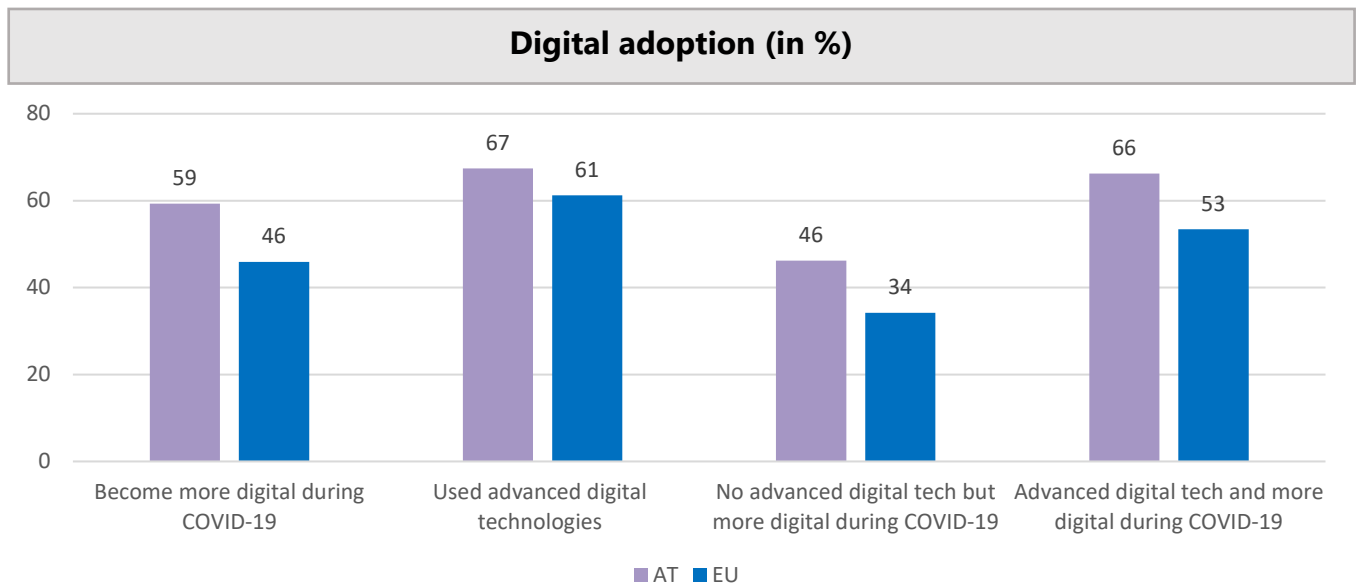
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Austria (AT)



* See p.15 for the definition of corporate digital profiles and p.27 for the definition of share of employment.

Firms' digital readiness

35% of neither firms* have **strategic business monitoring** practices in place, compared to 68% of both**



40% of neither firms* **invested in the training** of their employees, compared to 72% of both**



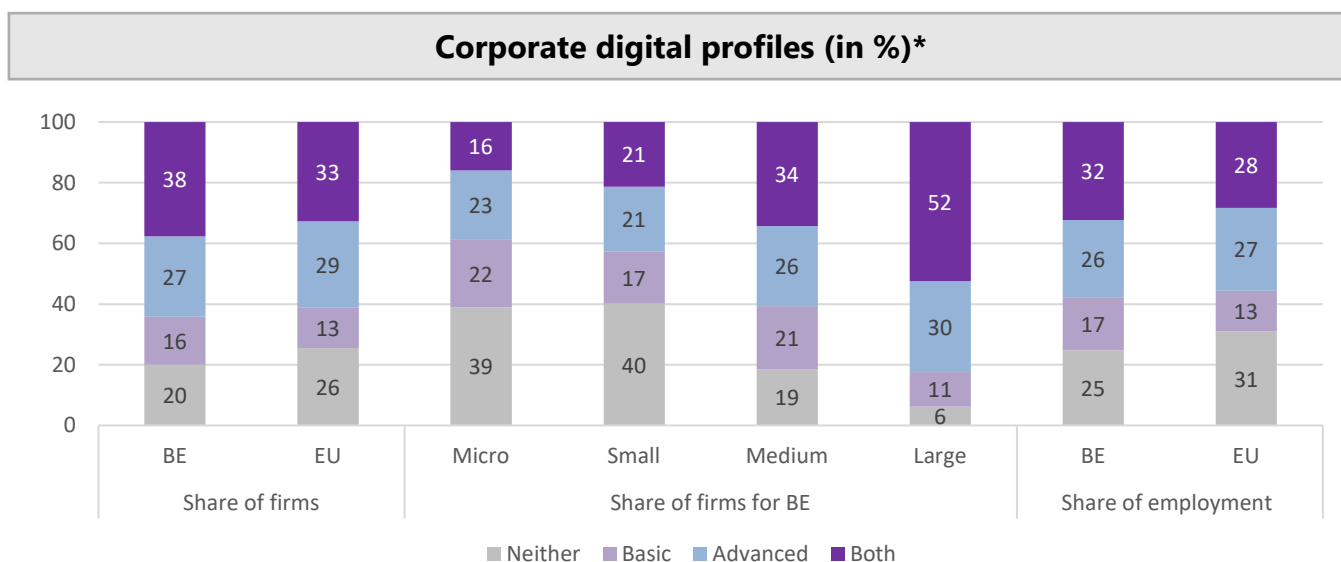
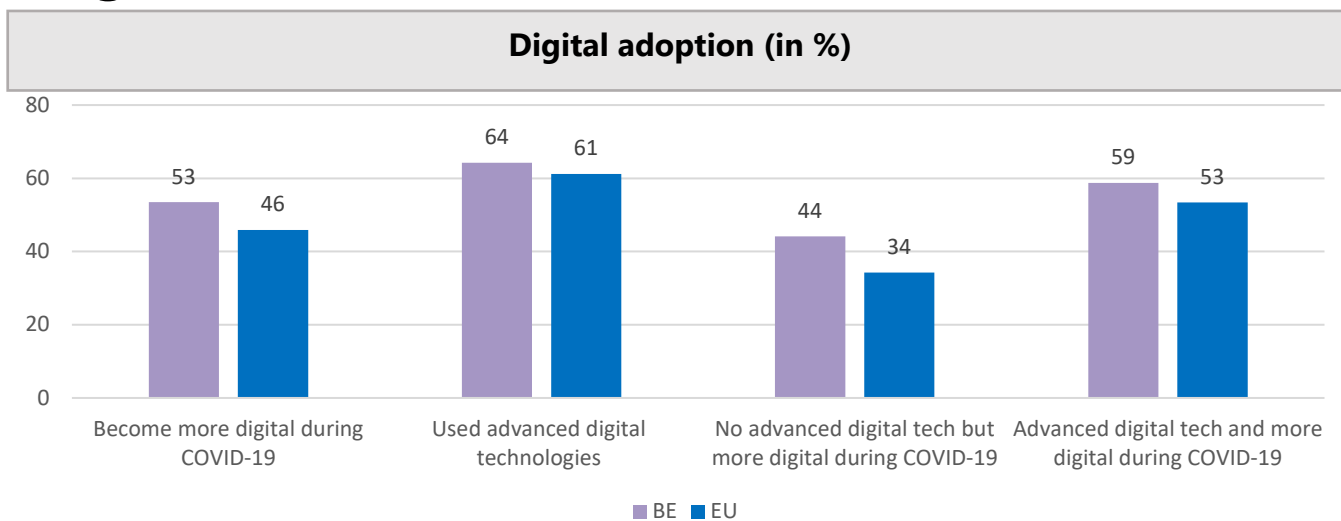
* comparable to the 35% EU average

** comparable to the 72% EU average

* comparable to the 39% EU average

** higher than the 60% EU average

Belgium (BE)



* See p.15 for the definition of corporate digital profiles and p.27 for the definition of share of employment.

Firms' digital readiness

30% of neither firms* have **strategic business monitoring** practices in place, compared to 77% of both**



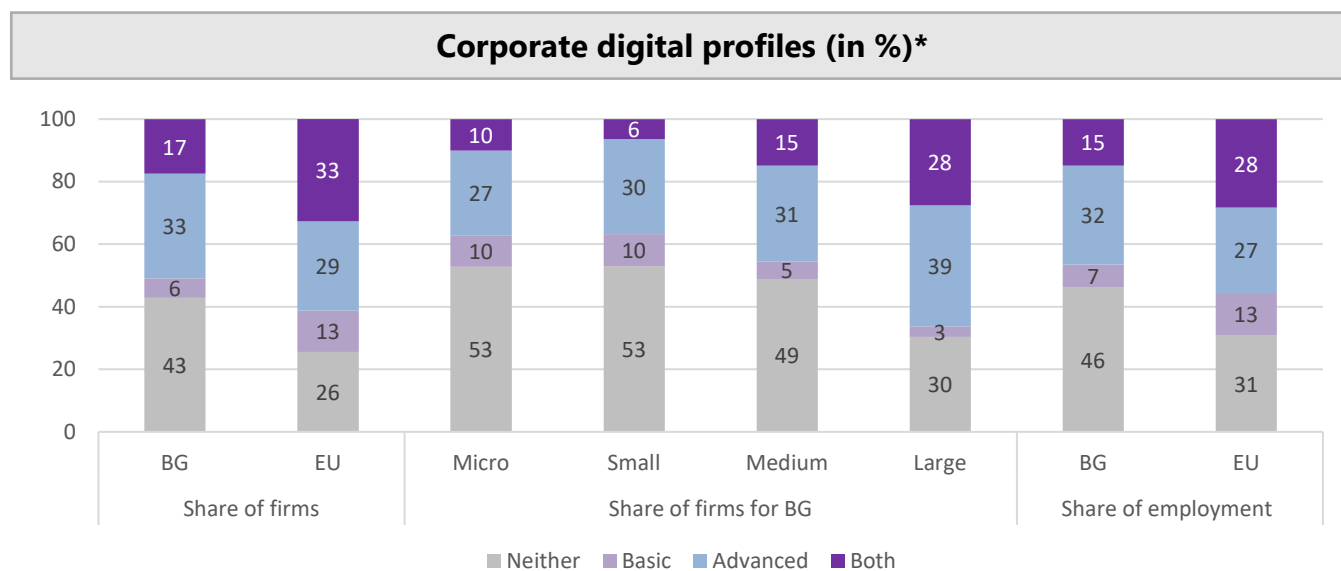
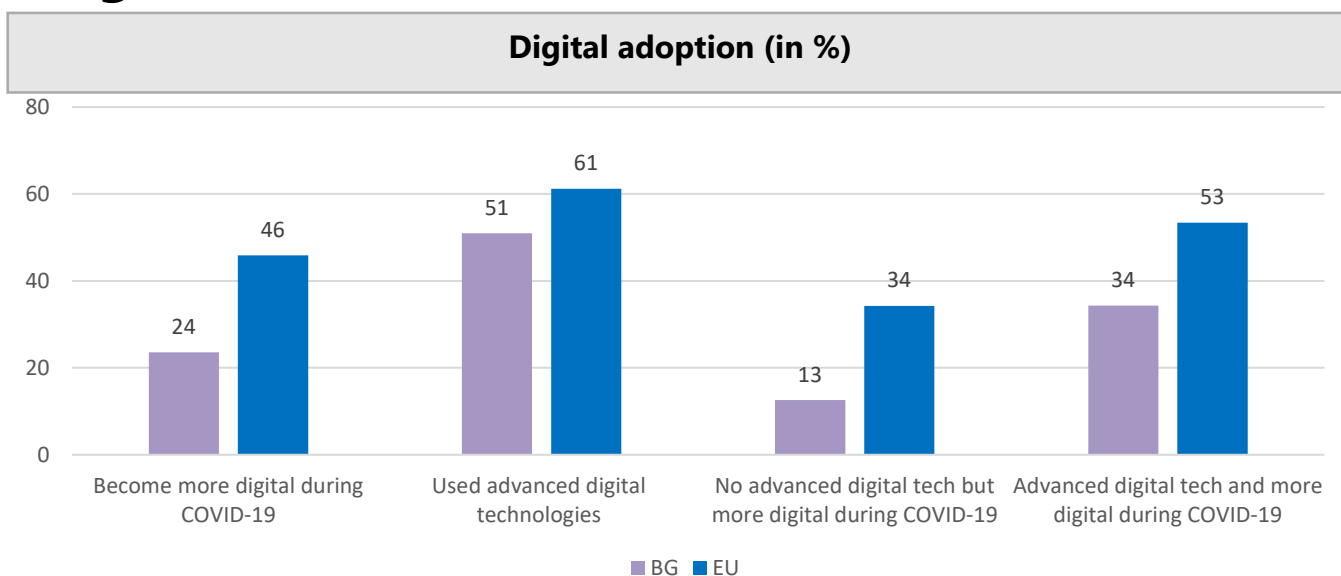
48% of neither firms* **invested in the training** of their employees, compared to 66% of both**



* lower than the 35% EU average
** higher than the 72% EU average

* higher than the 39% EU average
** higher than the 60% EU average

Bulgaria (BG)



* See p.15 for the definition of corporate digital profiles and p.27 for the definition of share of employment.

Firms' digital readiness

34% of neither firms* have **strategic business monitoring** practices in place, compared to **57%** of both**



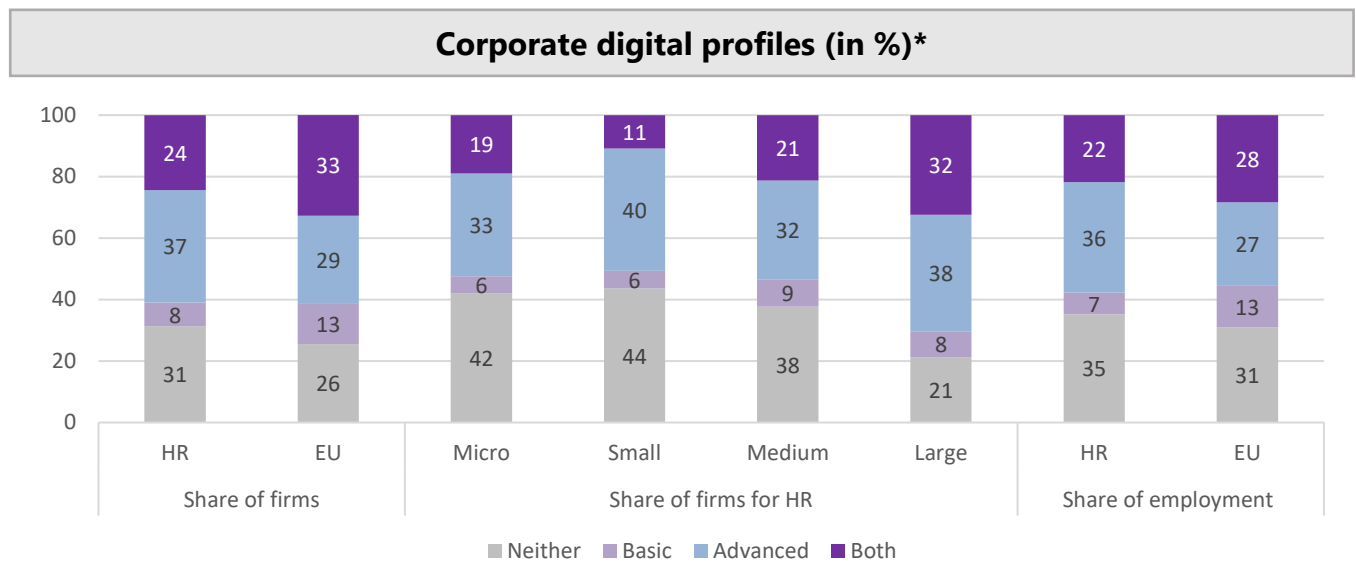
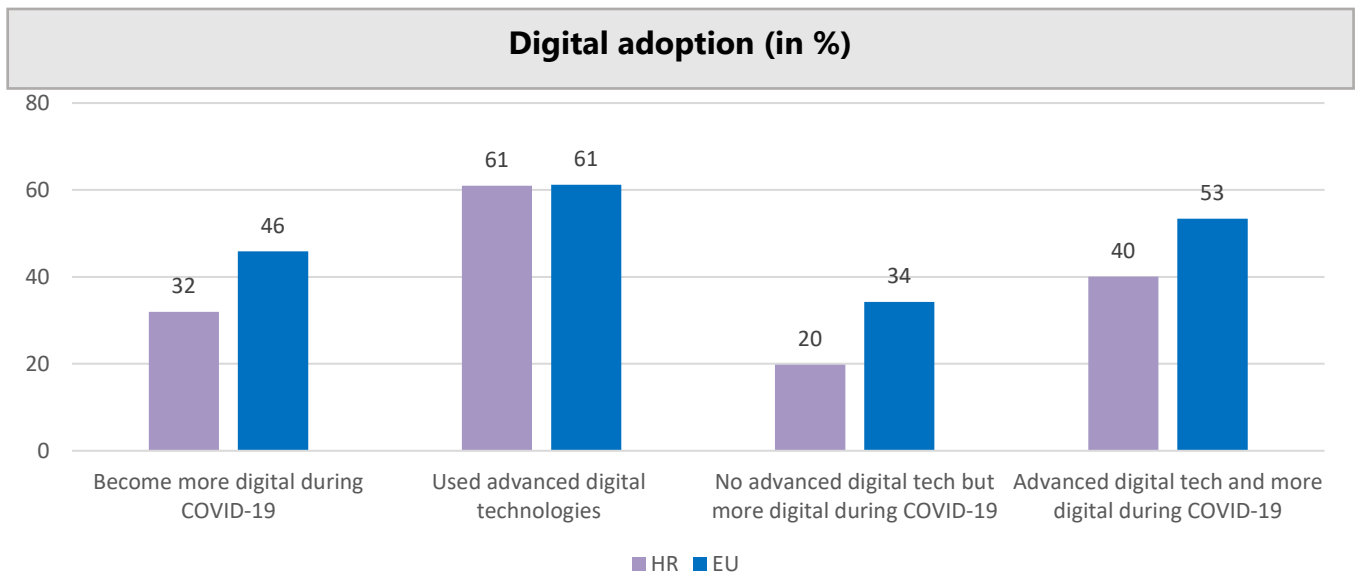
9% of neither firms* **invested in the training** of their employees, compared to **26%** of both**



* comparable to the 35% EU average
 ** lower than the 72% EU average

* lower than the 39% EU average
 ** lower than the 60% EU average

Croatia (HR)



* See p.15 for the definition of corporate digital profiles and p.27 for the definition of share of employment.

Firms' digital readiness

55% of neither firms* have **strategic business monitoring** practices in place, compared to 87% of both**



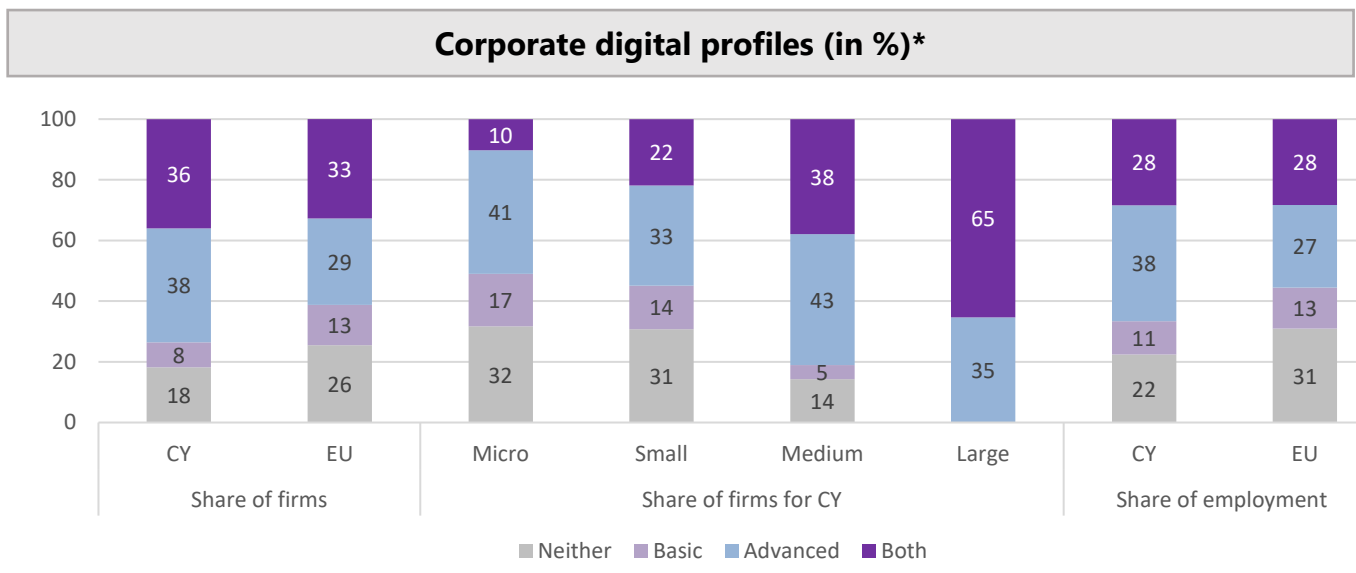
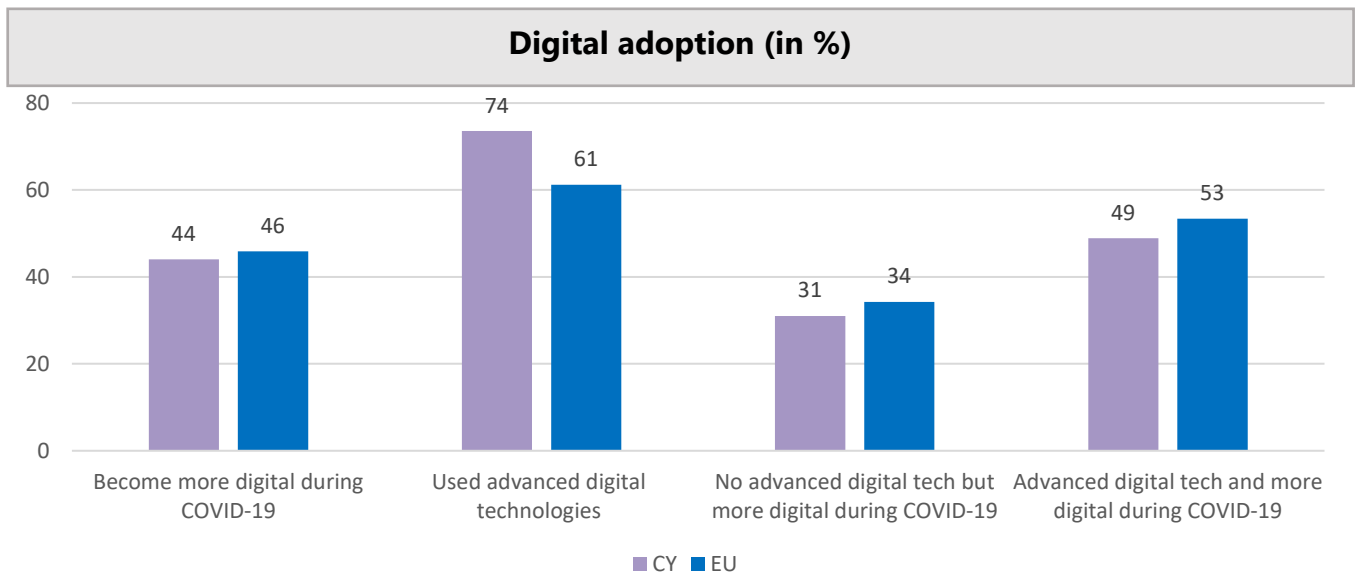
20% of neither firms* **invested in the training** of their employees, compared to 45% of both**



* higher than the 35% EU average
** higher than the 72% EU average

* lower than the 39% EU average
** lower than the 60% EU average


Cyprus (CY)



* See p.15 for the definition of corporate digital profiles and p.27 for the definition of share of employment.


Firms' digital readiness

35% of neither firms* have **strategic business monitoring** practices in place, compared to **90%** of both**



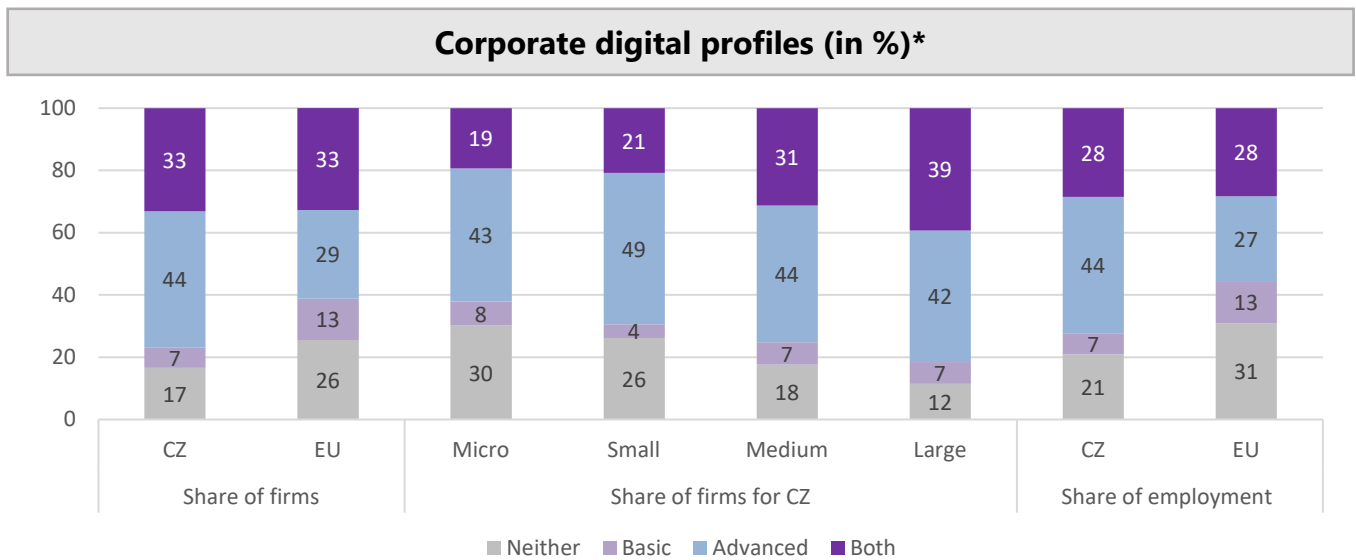
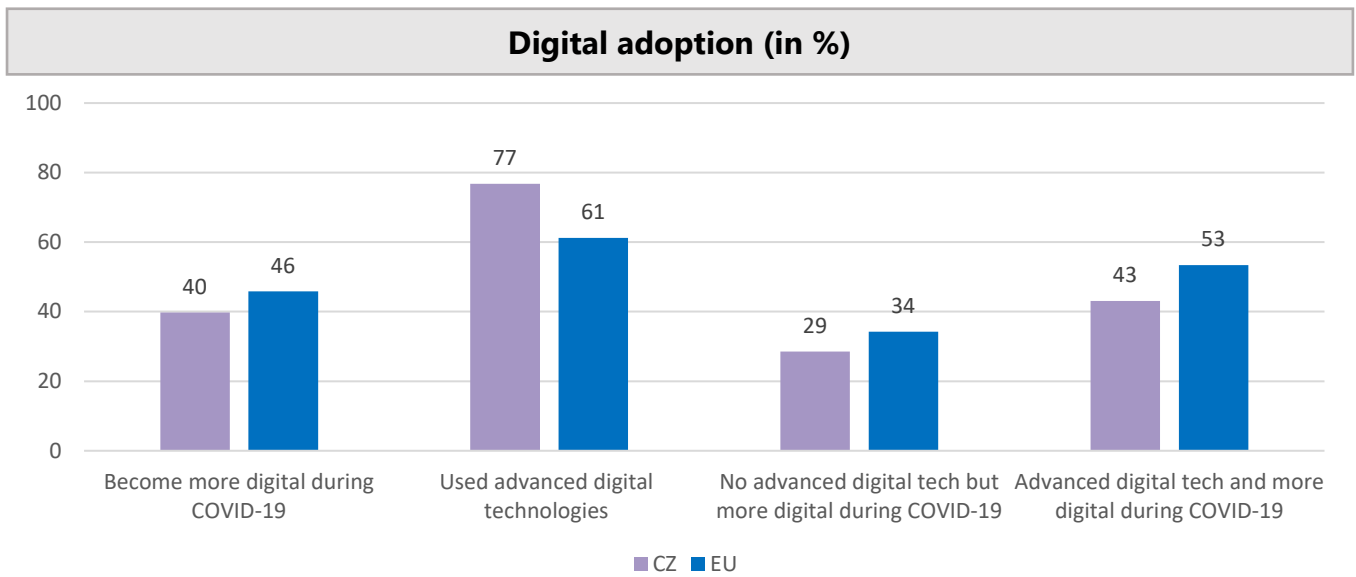
* comparable to the 35% EU average
** higher than the 72% EU average

38% of neither firms* **invested in the training** of their employees, compared to **20%** of both**



* comparable to the 39% EU average
** lower than the 60% EU average


Czech Republic (CZ)



* See p.15 for the definition of corporate digital profiles and p.27 for the definition of share of employment.


Firms' digital readiness

31% of neither firms* have **strategic business monitoring** practices in place, compared to **61%** of both**



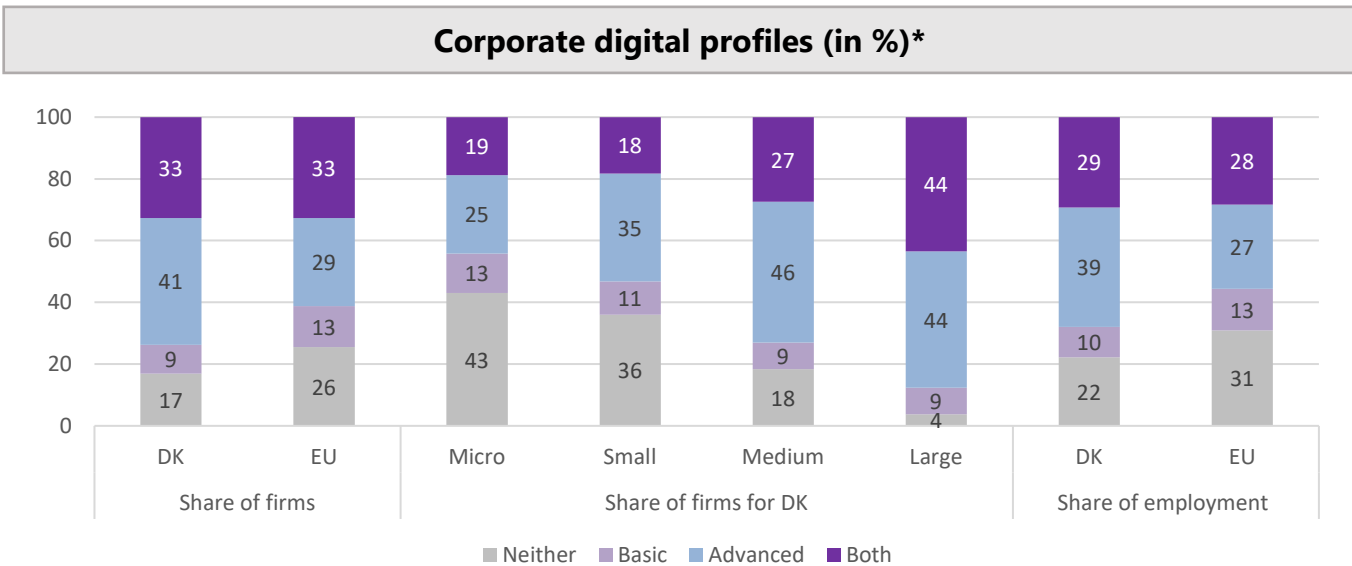
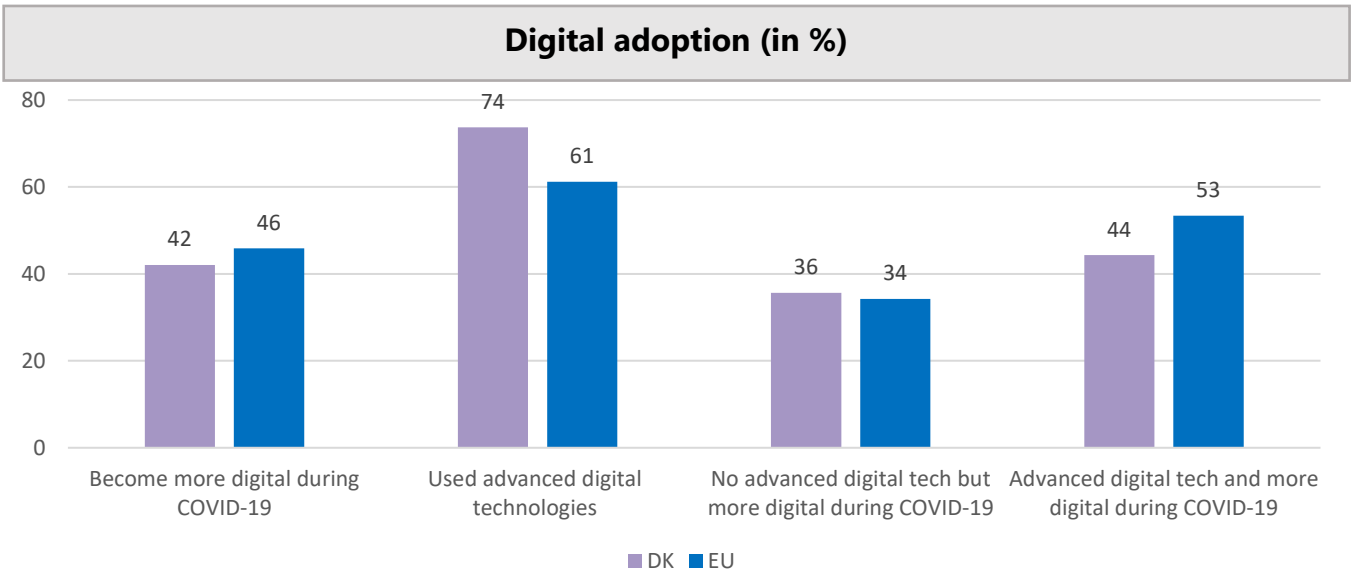
* comparable to the 35% EU average
** lower than the 72% EU average

47% of neither firms* **invested in the training** of their employees, compared to **36%** of both**



* higher than the 39% EU average
** lower than the 60% EU average


Denmark (DK)



* See p.15 for the definition of corporate digital profiles and p.27 for the definition of share of employment.


Firms' digital readiness

35% of neither firms* have **strategic business monitoring** practices in place, compared to **89%** of both**



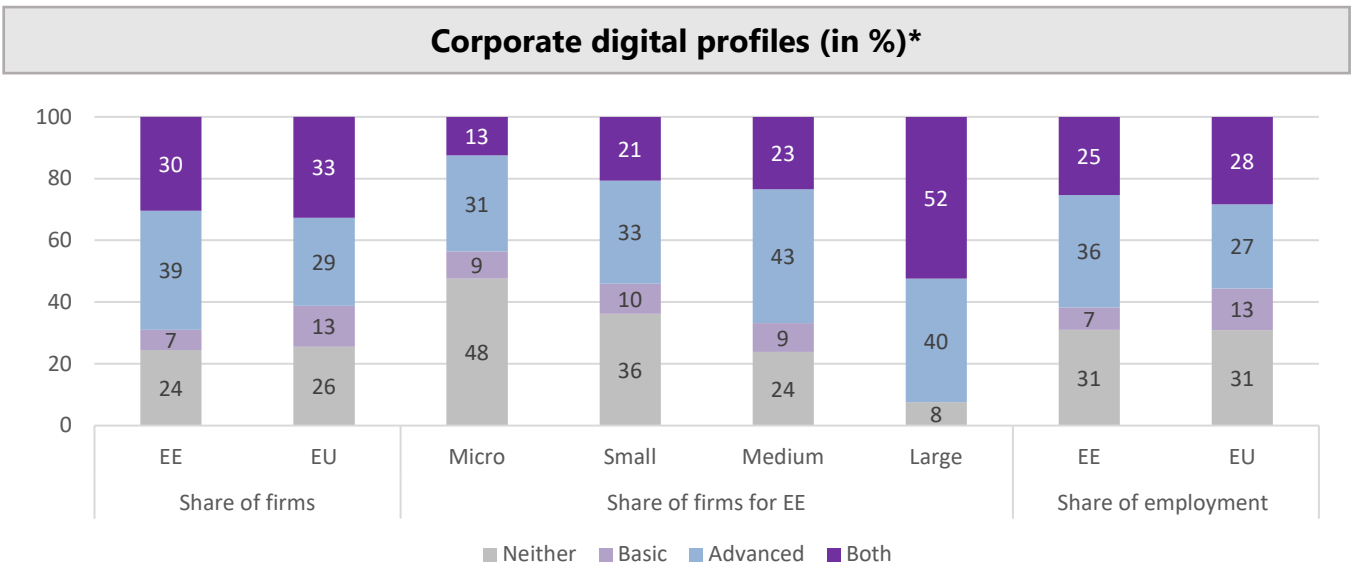
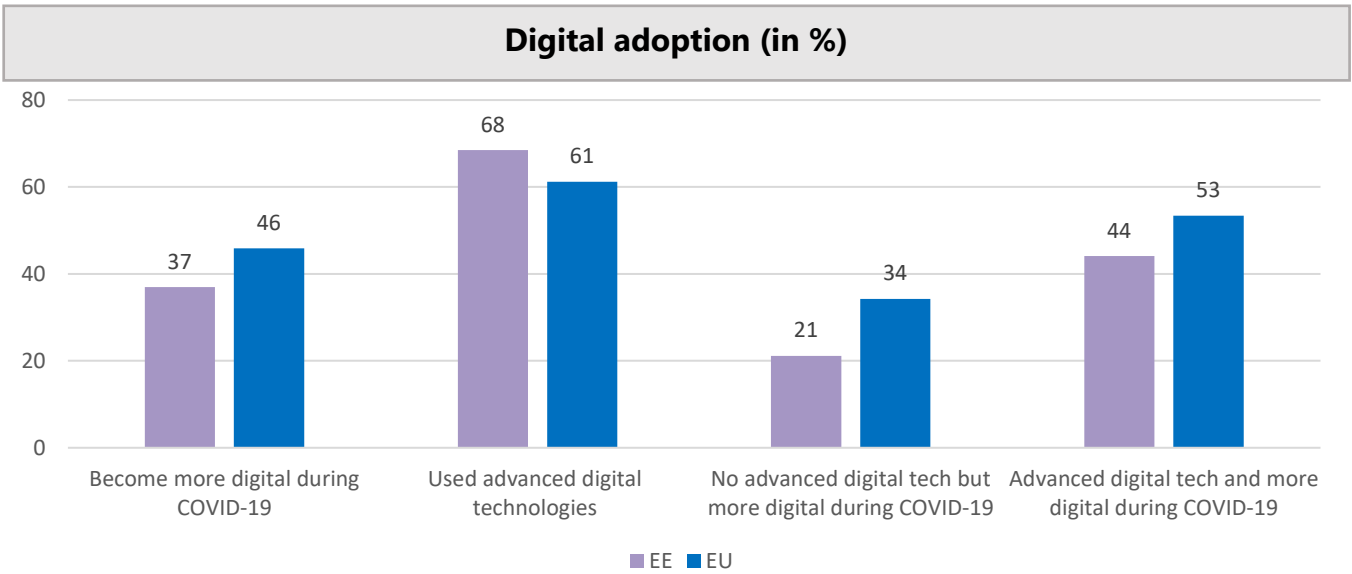
* comparable to the 35% EU average
** higher than the 72% EU average

49% of neither firms* **invested in the training** of their employees, compared to **60%** of both**



* higher than the 39% EU average
** comparable to the 60% EU average

Estonia (EE)



* See p.15 for the definition of corporate digital profiles and p.27 for the definition of share of employment.

Firms' digital readiness

26% of neither firms* have **strategic business monitoring** practices in place, compared to 42% of both**



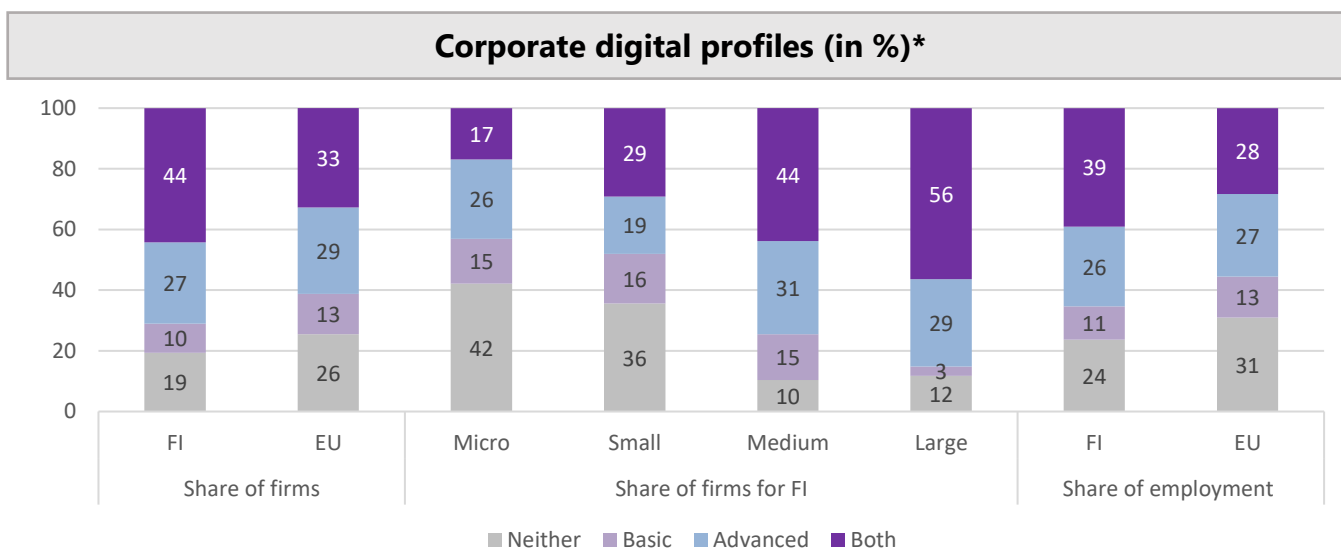
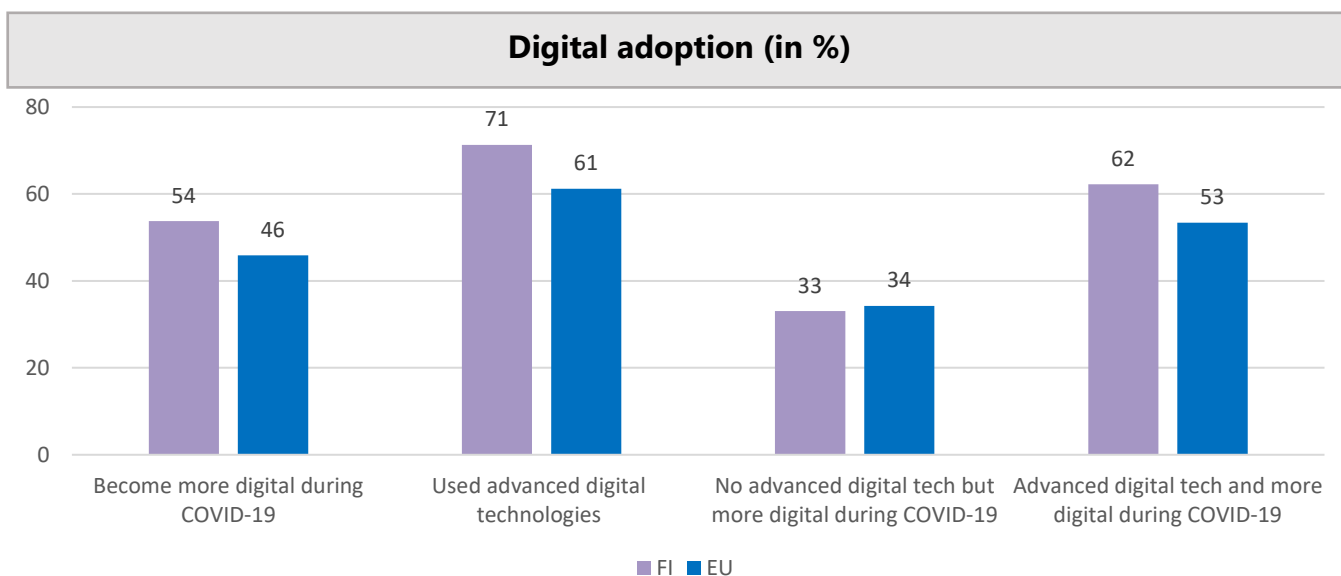
38% of neither firms* **invested in the training** of their employees, compared to 69% of both**



* lower than the 35% EU average
 ** lower than the 72% EU average

* comparable to the 39% EU average
 ** higher than the 60% EU average


Finland (FI)




* See p.15 for the definition of corporate digital profiles and p.27 for the definition of share of employment.

Firms' digital readiness

77% of neither firms* have **strategic business monitoring** practices in place, compared to **97%** of both**



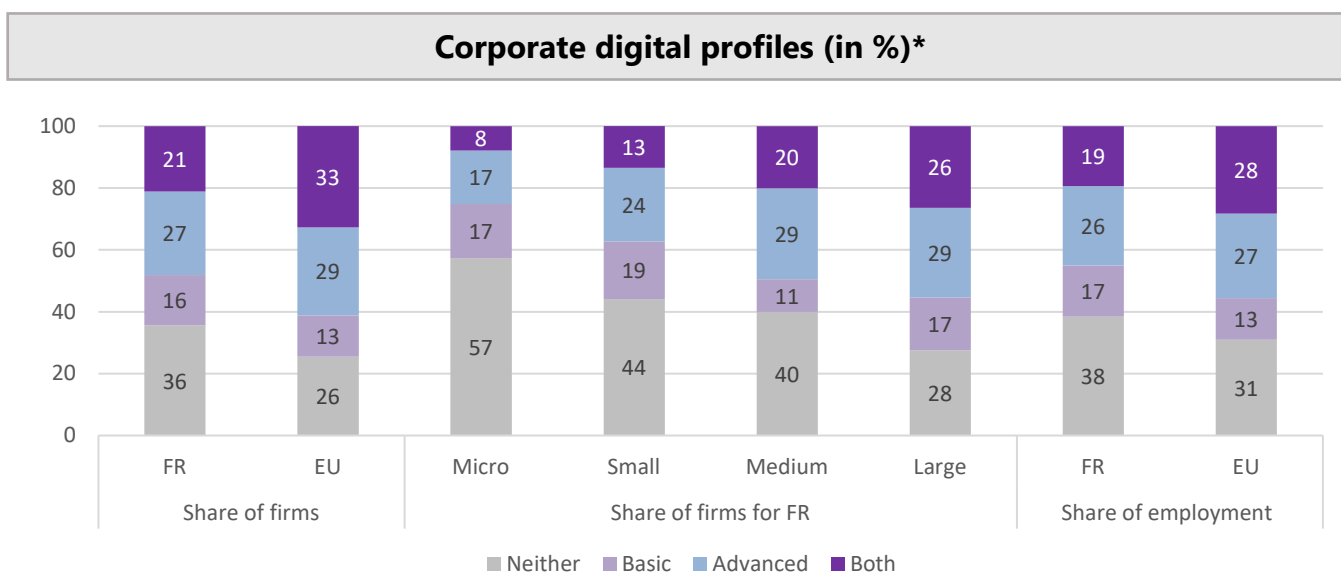
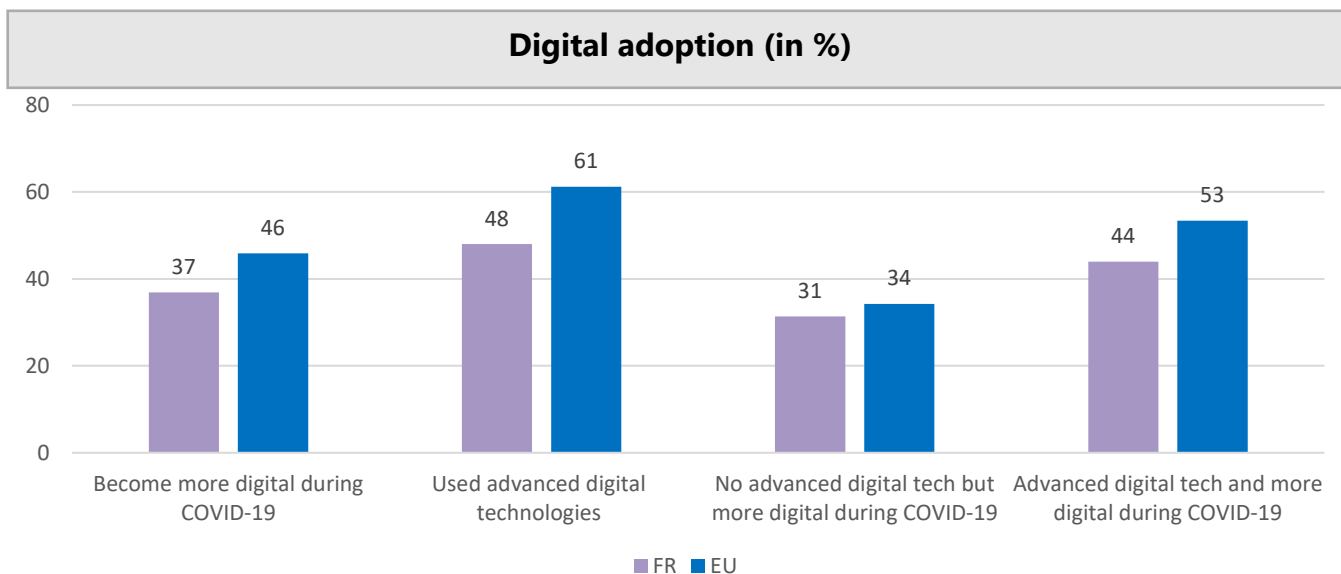
52% of neither firms* **invested in the training** of their employees, compared to **70%** of both**



* higher than the 35% EU average
 ** higher than the 72% EU average

* higher than the 39% EU average
 ** higher than the 60% EU average

France (FR)



* See p.15 for the definition of corporate digital profiles and p.27 for the definition of share of employment.

Firms' digital readiness

28% of neither firms* have **strategic business monitoring** practices in place, compared to **56%** of both**



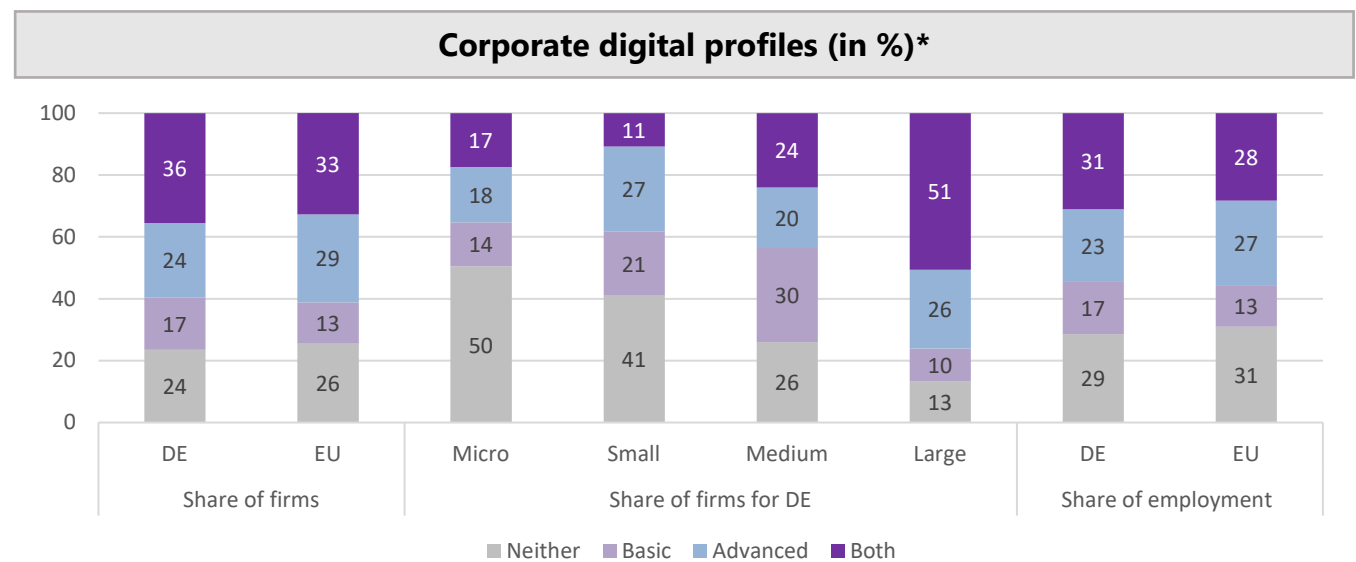
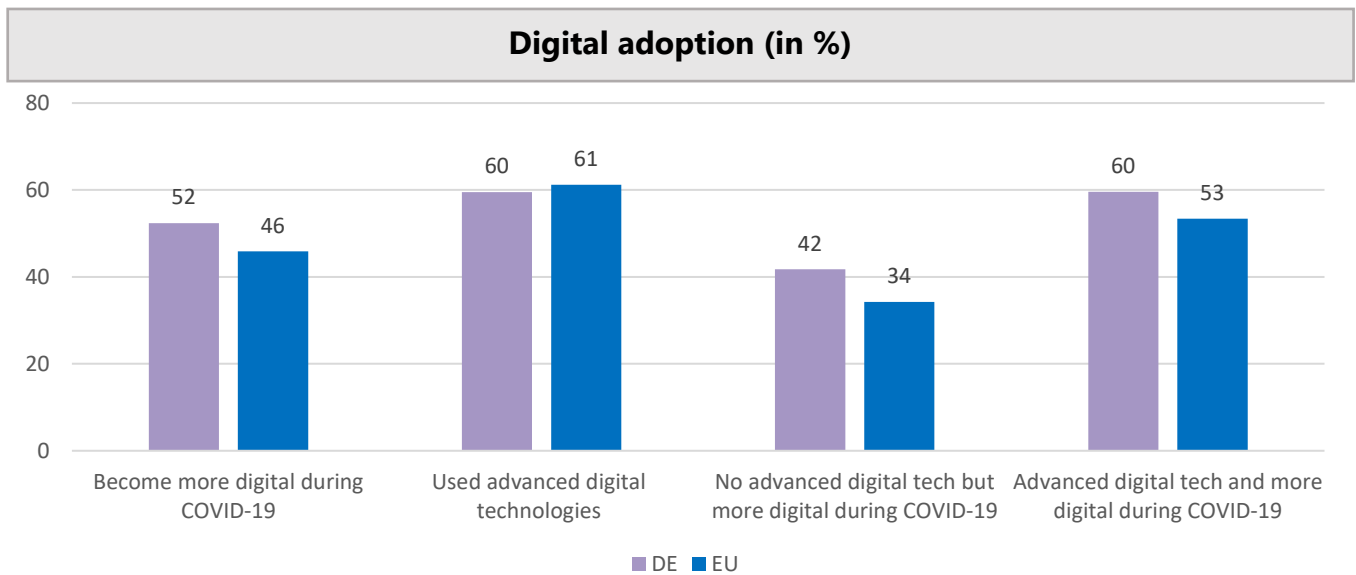
42% of neither firms* **invested in the training** of their employees, compared to **46%** of both**



* lower than the 35% EU average
** lower than the 72% EU average

* comparable to the 39% EU average
** lower than the 60% EU average


Germany (DE)



* See p.15 for the definition of corporate digital profiles and p.27 for the definition of share of employment.


Firms' digital readiness

29% of neither firms* have **strategic business monitoring** practices in place, compared to **69%** of both**



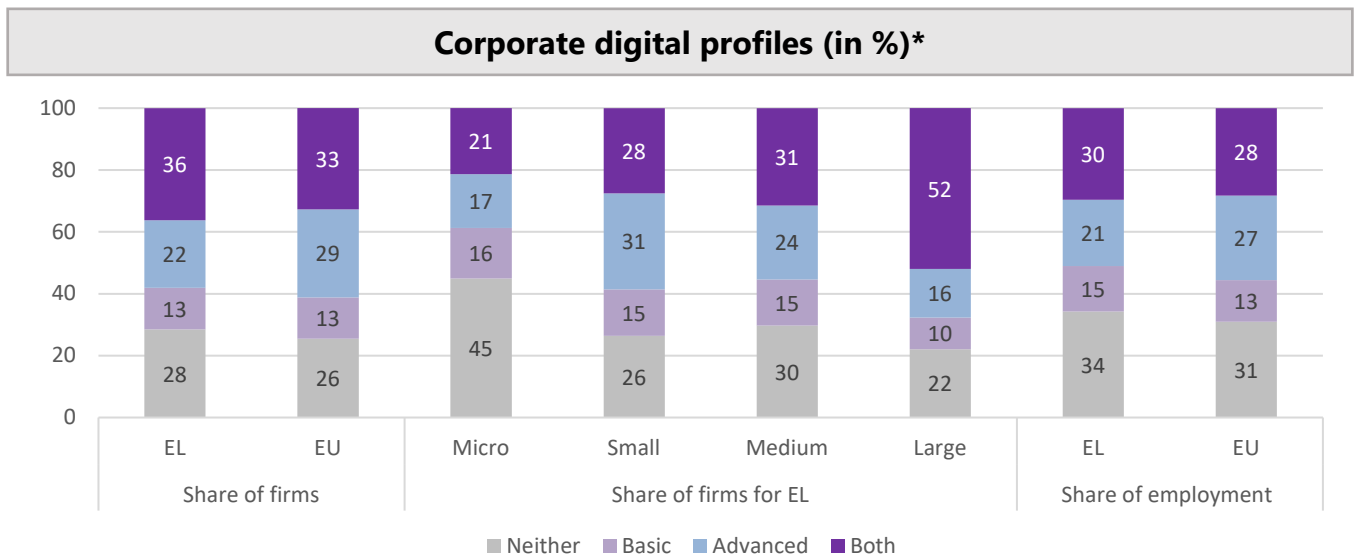
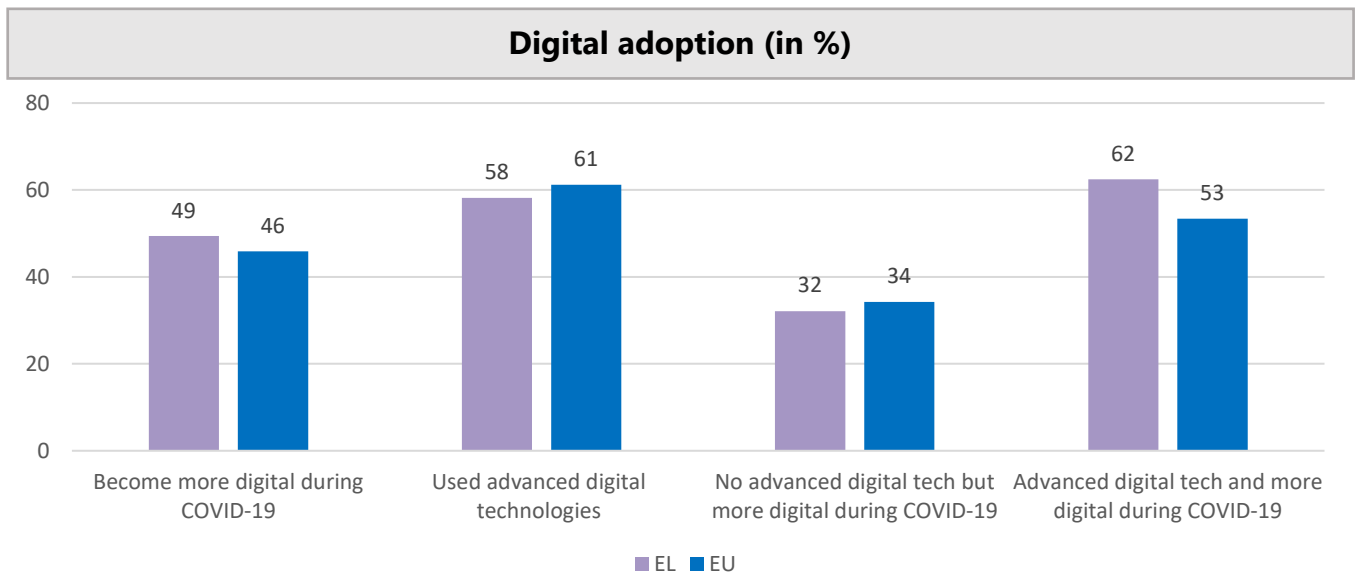
* lower than the 35% EU average
** comparable to the 72% EU average

41% of neither firms* **invested in the training** of their employees, compared to **62%** of both**



* comparable to the 39% EU average
** comparable to the 60% EU average


Greece (EL)



* See p.15 for the definition of corporate digital profiles and p.27 for the definition of share of employment.


Firms' digital readiness

61% of neither firms* have **strategic business monitoring** practices in place, compared to **78%** of both**



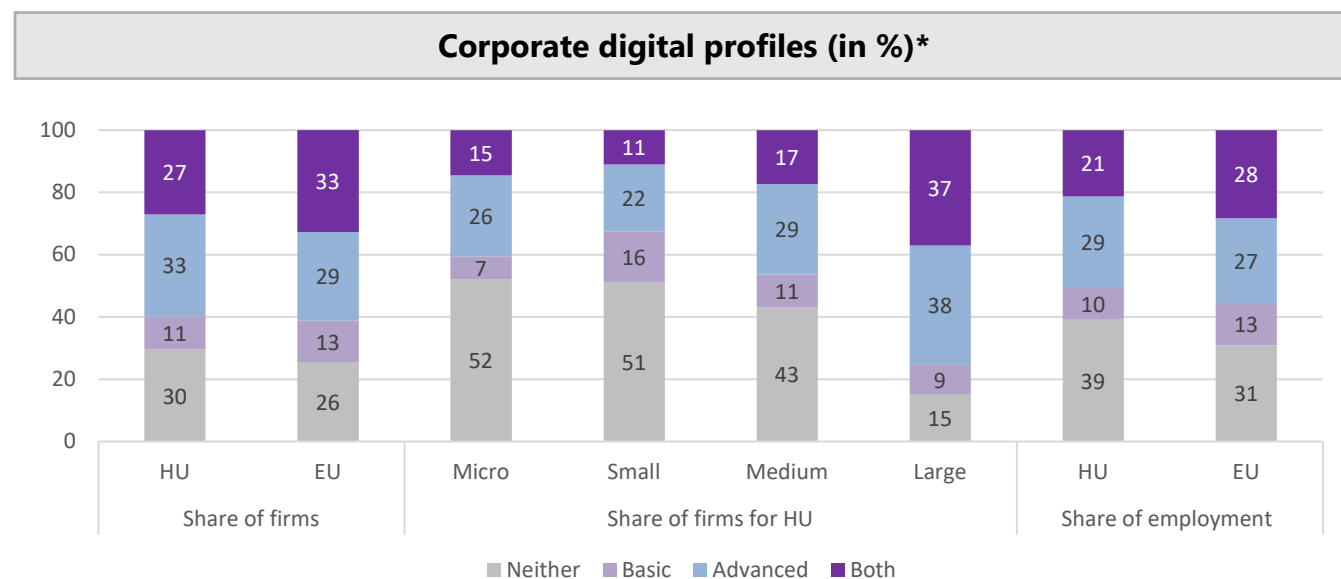
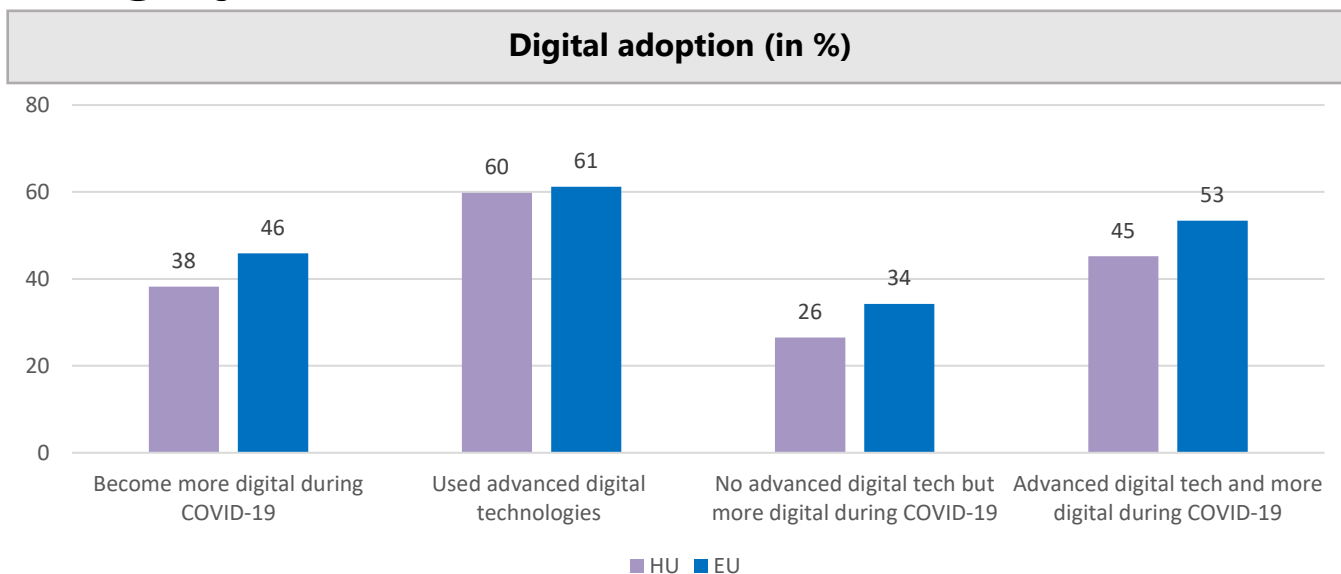
* higher than the 35% EU average
** higher than the 72% EU average

19% of neither firms* **invested in the training** of their employees, compared to **41%** of both**



* lower than the 39% EU average
** lower than the 60% EU average

Hungary (HU)



* See p.15 for the definition of corporate digital profiles and p.27 for the definition of share of employment.

Firms' digital readiness

35% of neither firms* have **strategic business monitoring** practices in place, compared to **68%** of both**



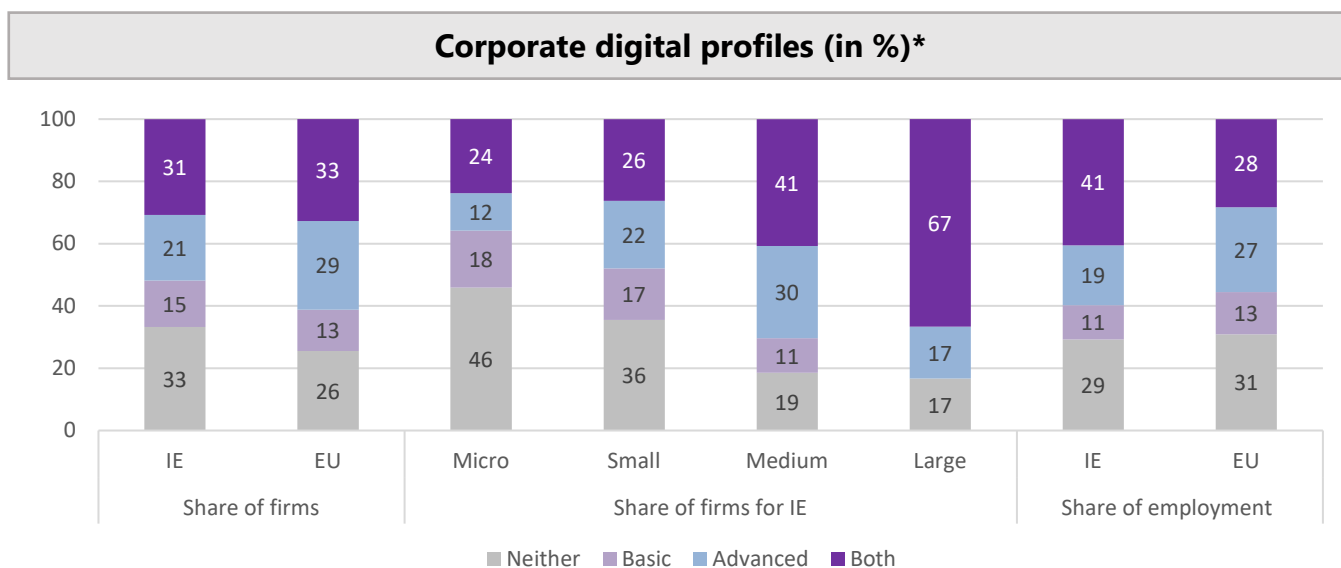
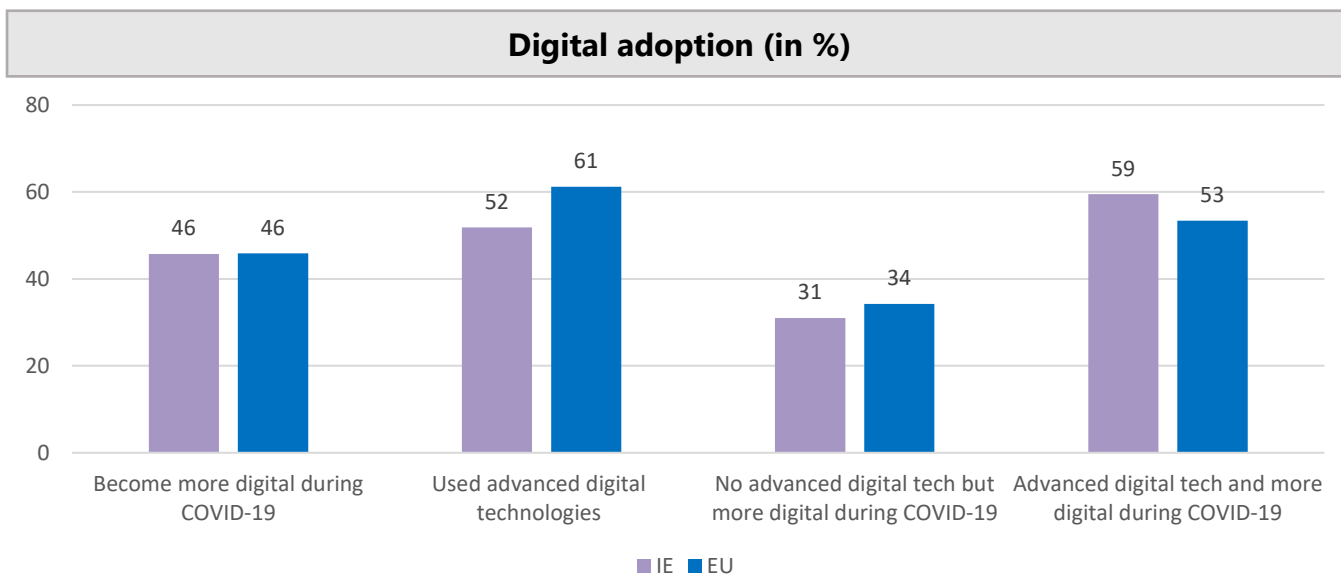
24% of neither firms* **invested in the training** of their employees, compared to **22%** of both**



* comparable to the 35% EU average
 ** comparable to the 72% EU average

* lower than the 39% EU average
 ** lower than the 60% EU average


Ireland (IE)



* See p.15 for the definition of corporate digital profiles and p.27 for the definition of share of employment.


Firms' digital readiness

27% of neither firms* have **strategic business monitoring** practices in place, compared to **46%** of both**



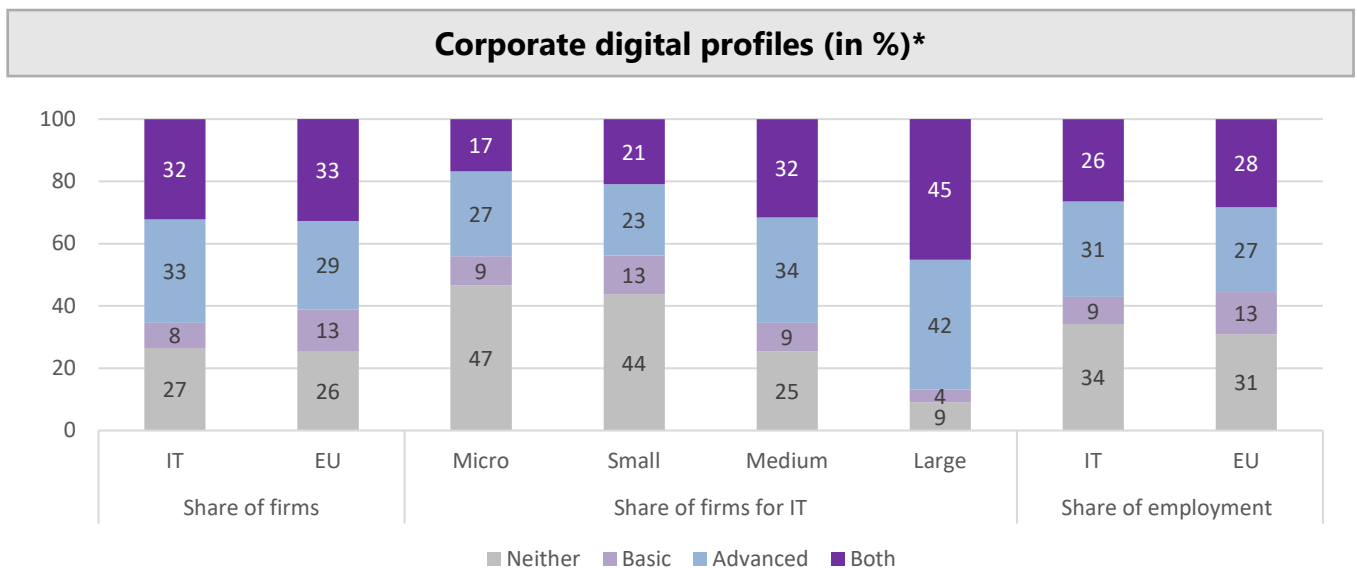
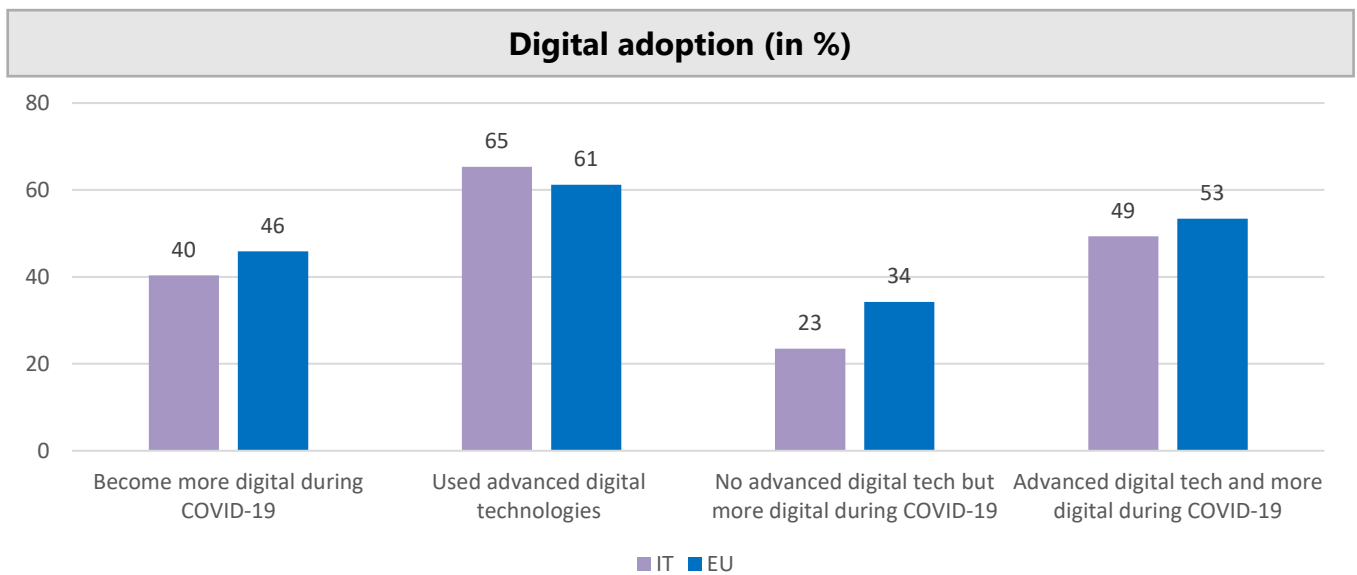
* lower than the 35% EU average
** lower than the 72% EU average

44% of neither firms* **invested in the training** of their employees, compared to **77%** of both**



* higher than the 39% EU average
** higher than the 60% EU average


Italy (IT)



* See p.15 for the definition of corporate digital profiles and p.27 for the definition of share of employment.


Firms' digital readiness

36% of neither firms* have **strategic business monitoring** practices in place, compared to **80%** of both**



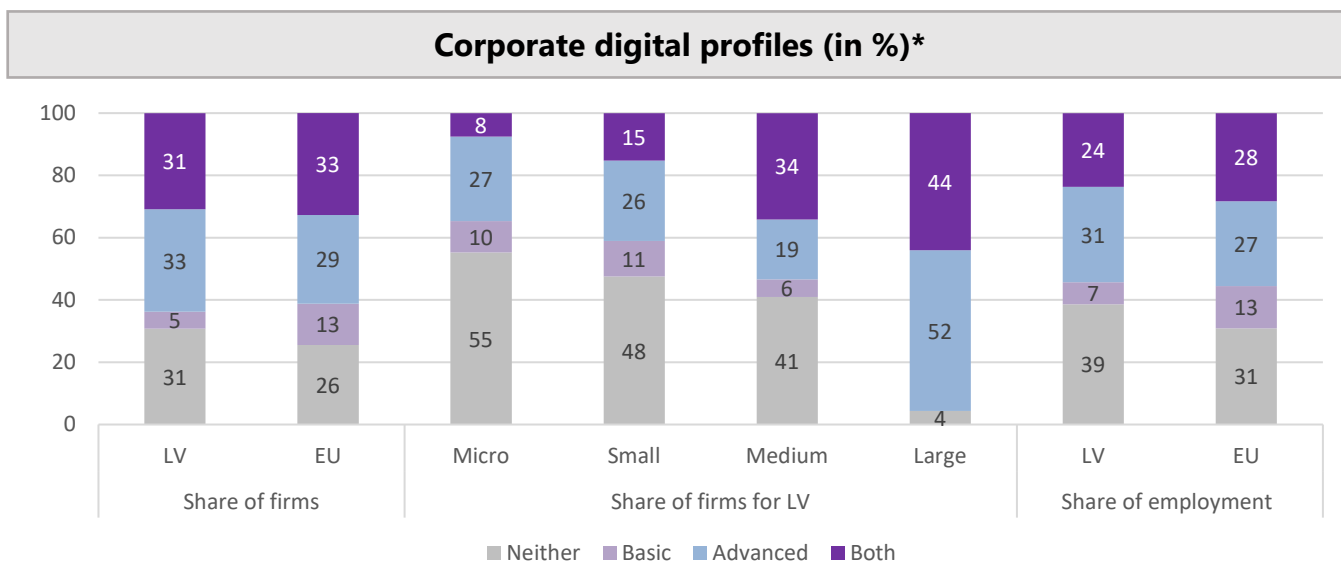
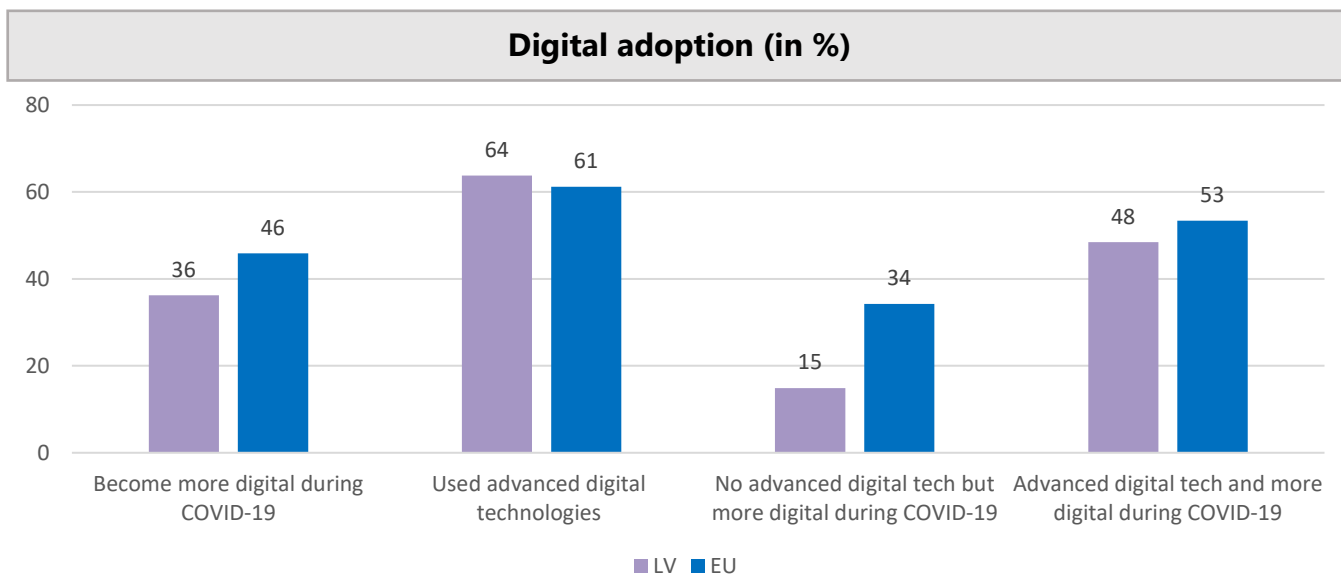
* comparable to the 35% EU average
** higher than the 72% EU average

35% of neither firms* **invested in the training** of their employees, compared to **64%** of both**



* lower than the 39% EU average
** higher than the 60% EU average

Latvia (LV)



* See p.15 for the definition of corporate digital profiles and p.27 for the definition of share of employment.

Firms' digital readiness

47% of neither firms* have **strategic business monitoring** practices in place, compared to **66%** of both**



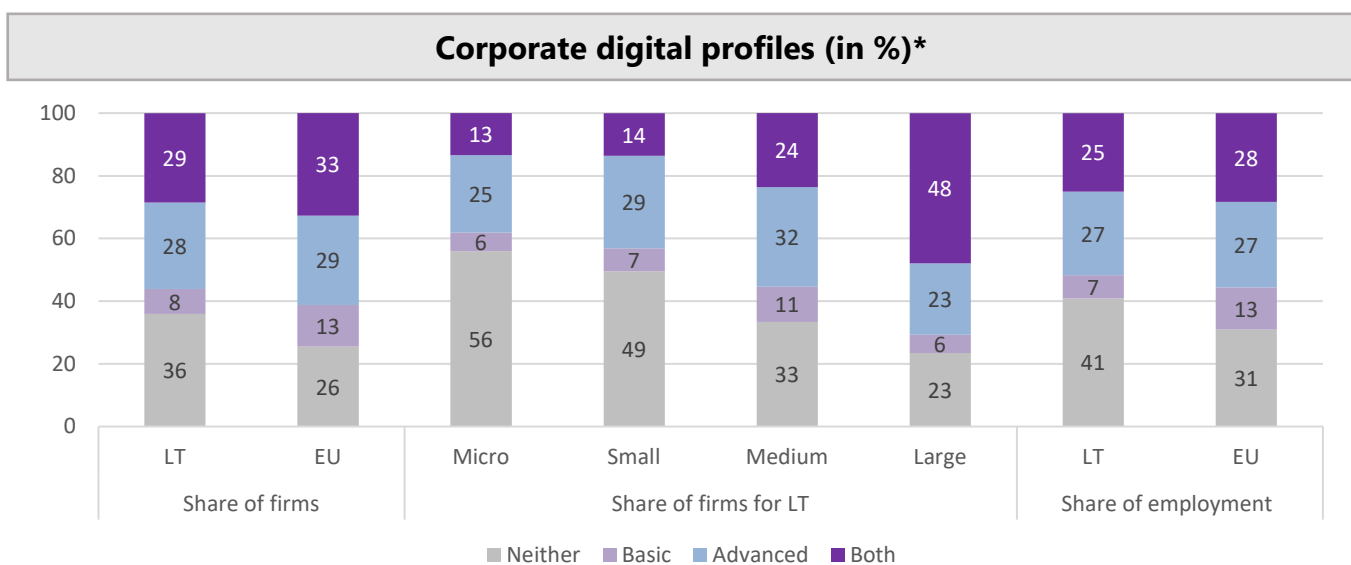
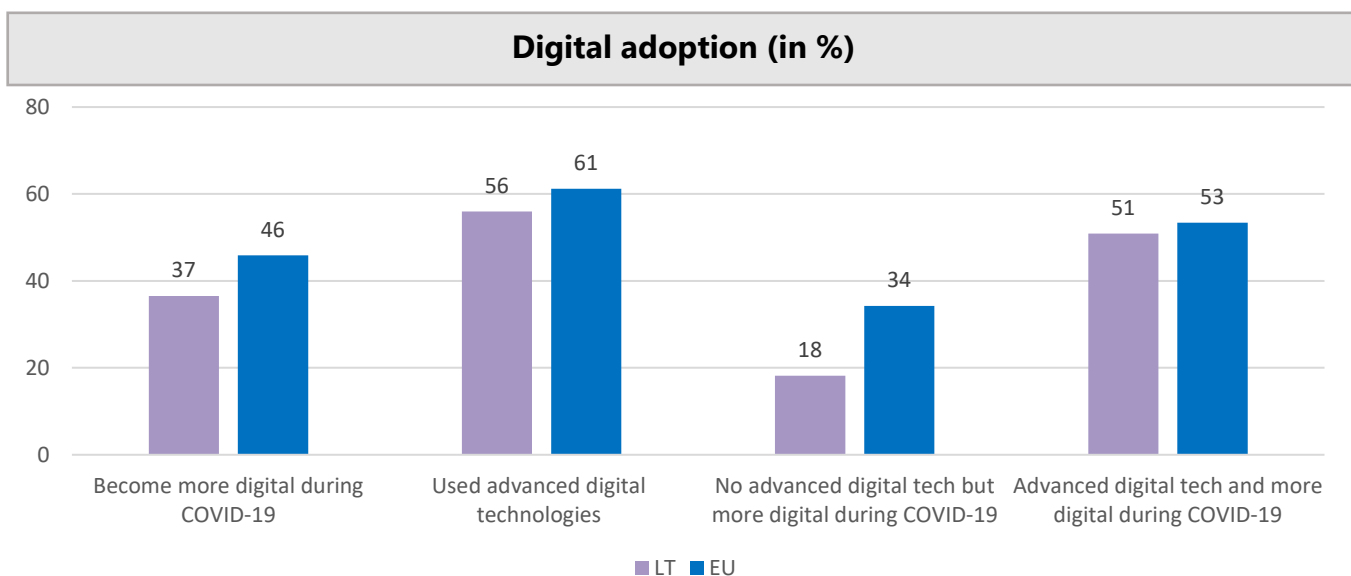
19% of neither firms* **invested in the training** of their employees, compared to **41%** of both**



* higher than the 35% EU average
** lower than the 72% EU average

* lower than the 39% EU average
** lower than the 60% EU average

Lithuania (LT)



* See p.15 for the definition of corporate digital profiles and p.27 for the definition of share of employment.

Firms' digital readiness

25% of neither firms* have **strategic business monitoring** practices in place, compared to 68% of both**



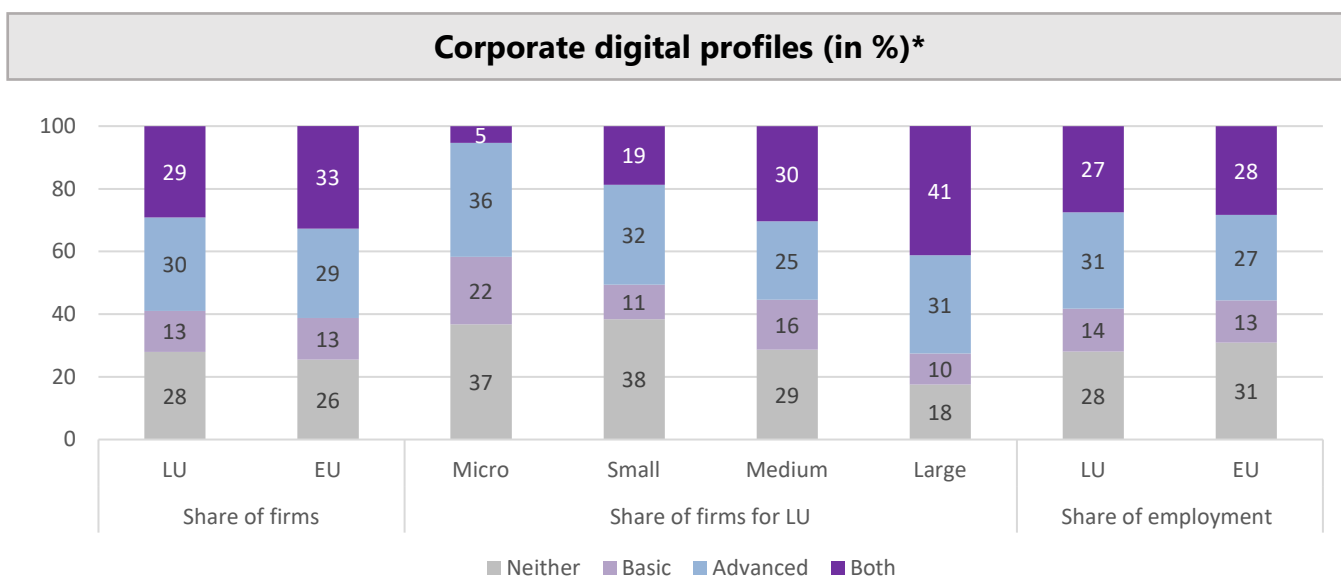
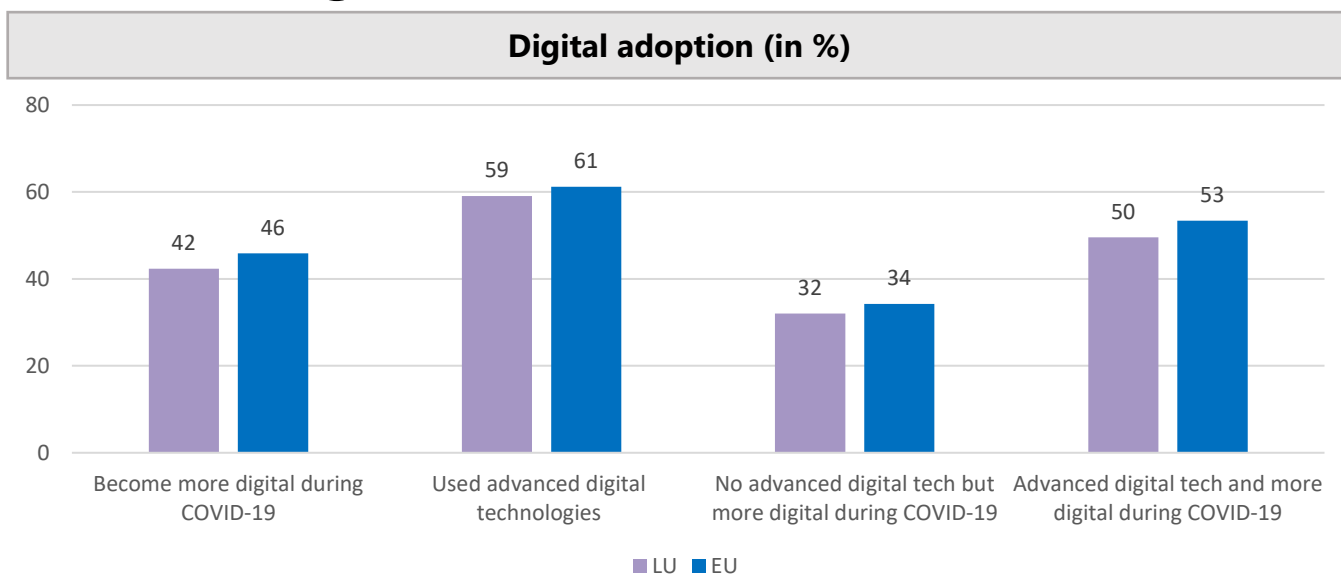
25% of neither firms* **invested in the training** of their employees, compared to 43% of both**



* lower than the 35% EU average
** comparable to the 72% EU average

* lower than the 39% EU average
** lower than the 60% EU average

Luxembourg (LU)



* See p.15 for the definition of corporate digital profiles and p.27 for the definition of share of employment.

Firms' digital readiness

24% of neither firms* have **strategic business monitoring** practices in place, compared to 41% of both**



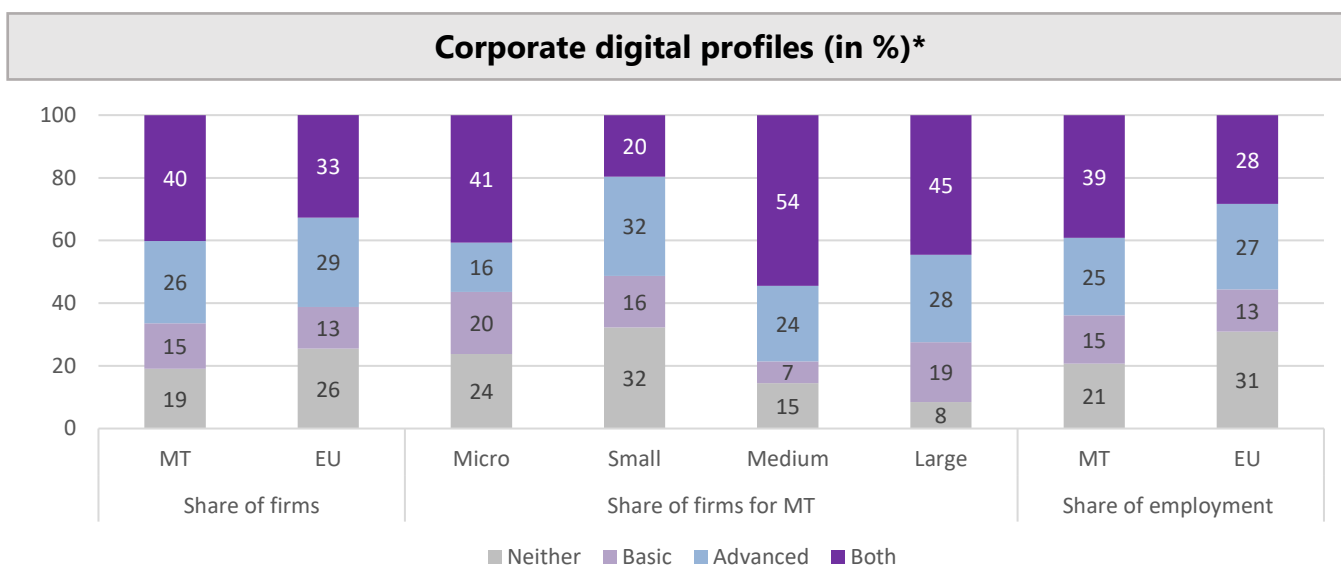
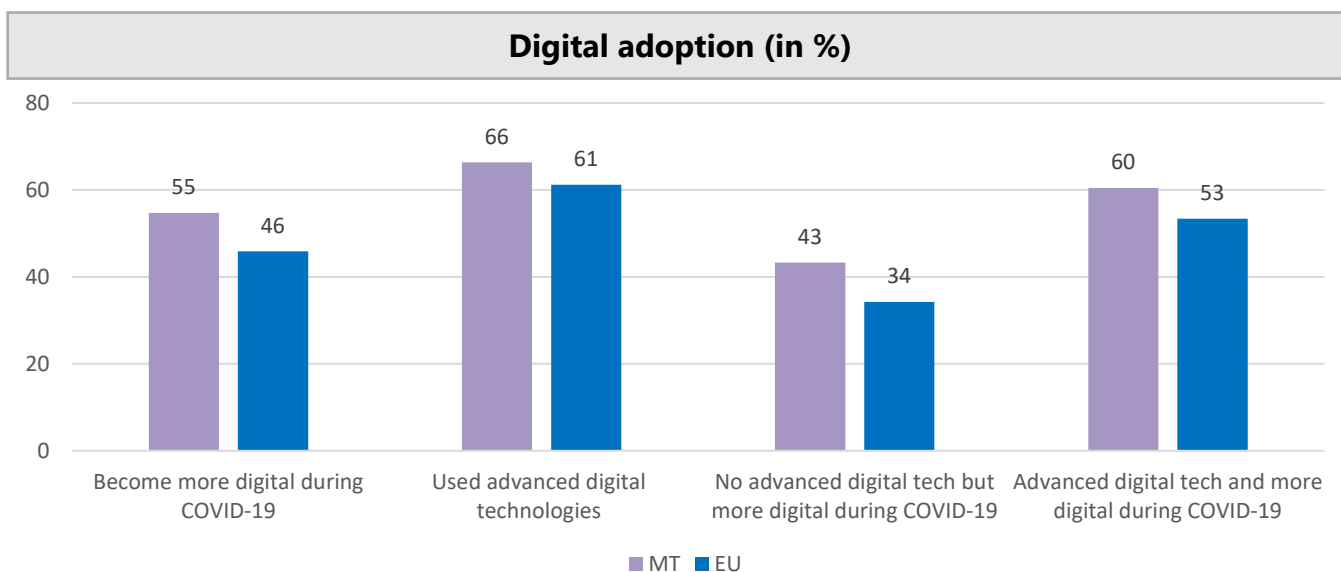
22% of neither firms* **invested in the training** of their employees, compared to 24% of both**



* lower than the 35% EU average
 ** lower than the 72% EU average

* lower than the 39% EU average
 ** lower than the 60% EU average


Malta (MT)



* See p.15 for the definition of corporate digital profiles and p.27 for the definition of share of employment.


Firms' digital readiness

32% of neither firms* have **strategic business monitoring** practices in place, compared to **80%** of both**



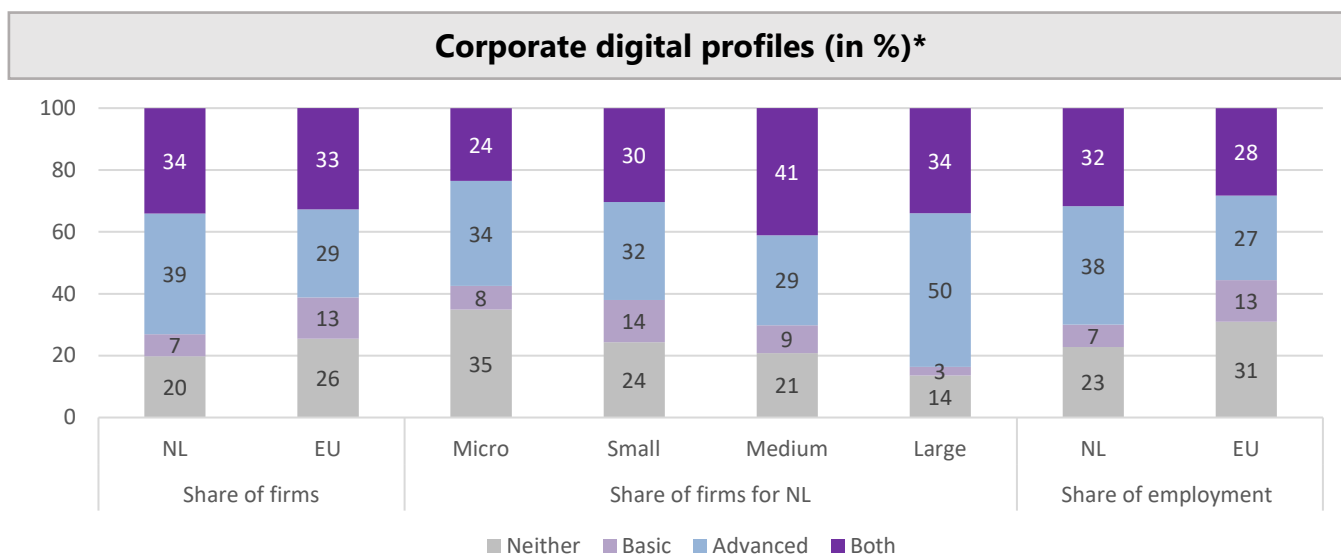
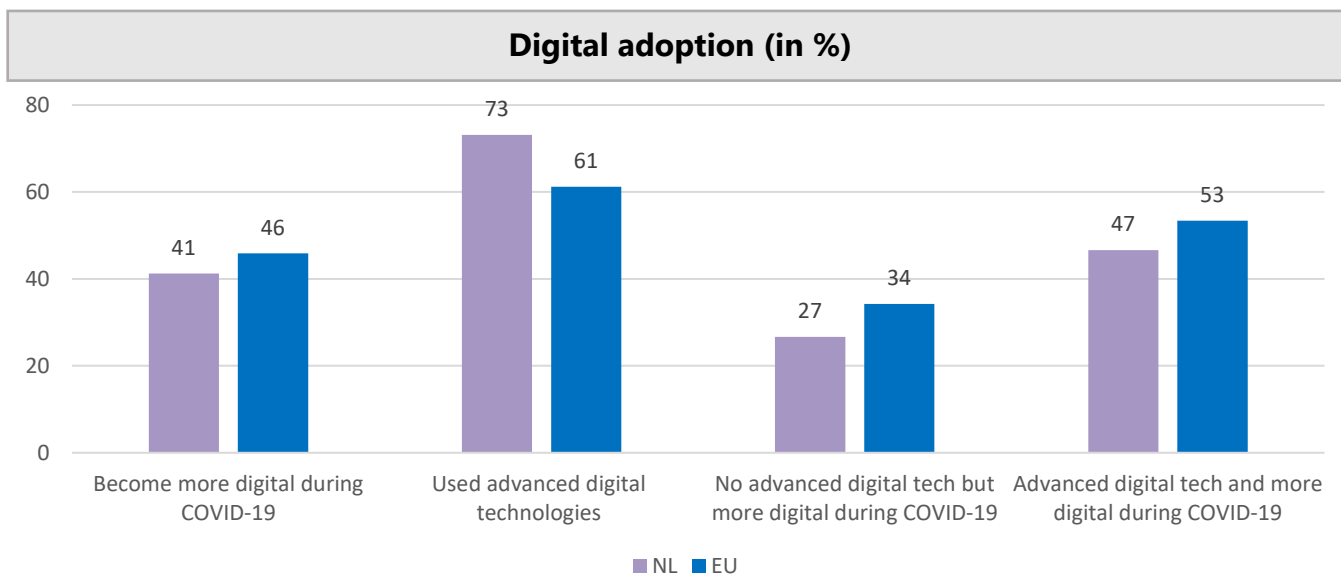
* comparable to the 35% EU average
** higher than the 72% EU average

33% of neither firms* **invested in the training** of their employees, compared to **53%** of both**



* lower than the 39% EU average
** lower than the 60% EU average


Netherlands (NL)



* See p.15 for the definition of corporate digital profiles and p.27 for the definition of share of employment.


Firms' digital readiness

51% of neither firms* have **strategic business monitoring** practices in place, compared to **77%** of both**



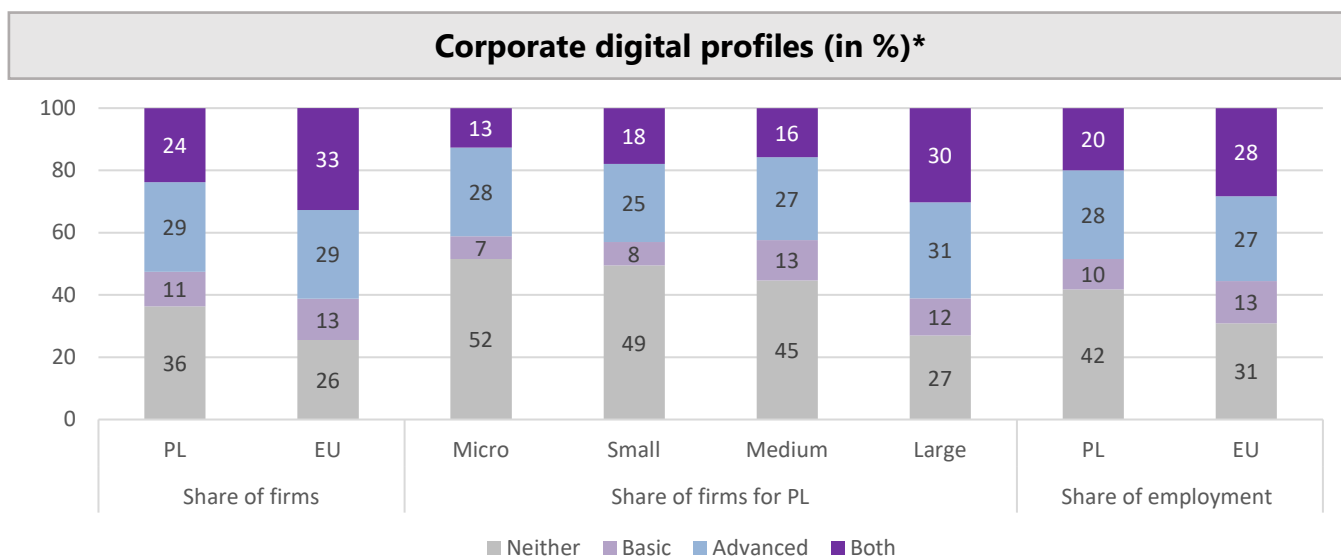
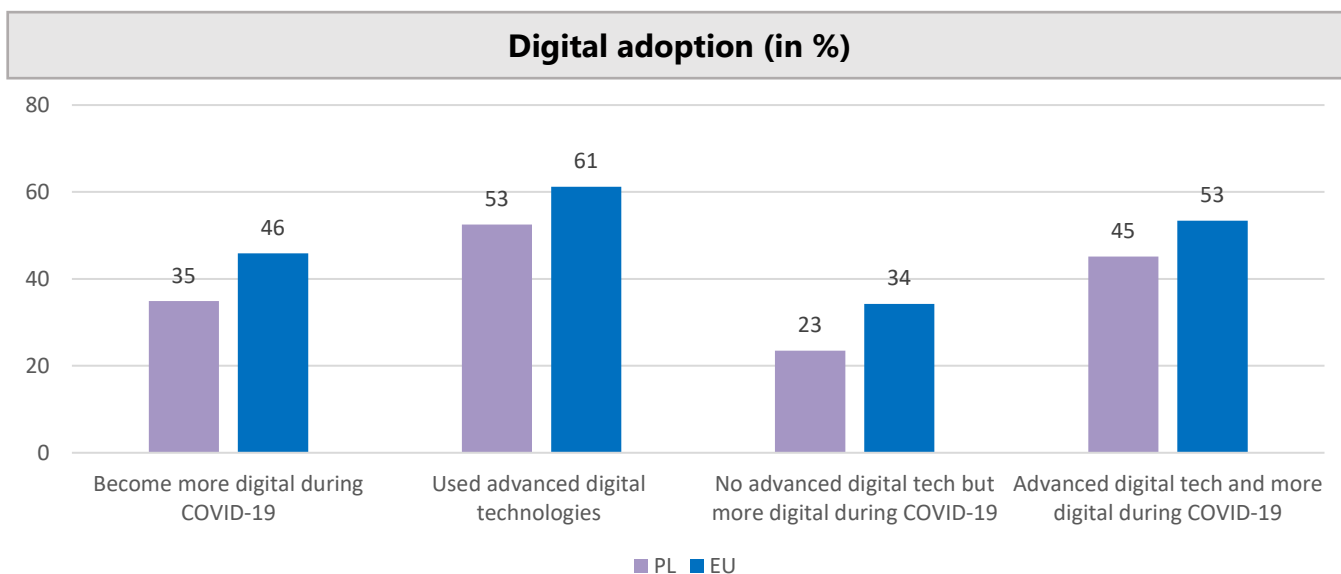
* higher than the 35% EU average
** higher than the 72% EU average

52% of neither firms* **invested in the training** of their employees, compared to **71%** of both**



* higher than the 39% EU average
** higher than the 60% EU average


Poland (PL)



* See p.15 for the definition of corporate digital profiles and p.27 for the definition of share of employment.


Firms' digital readiness

50% of neither firms* have **strategic business monitoring** practices in place, compared to **63%** of both**



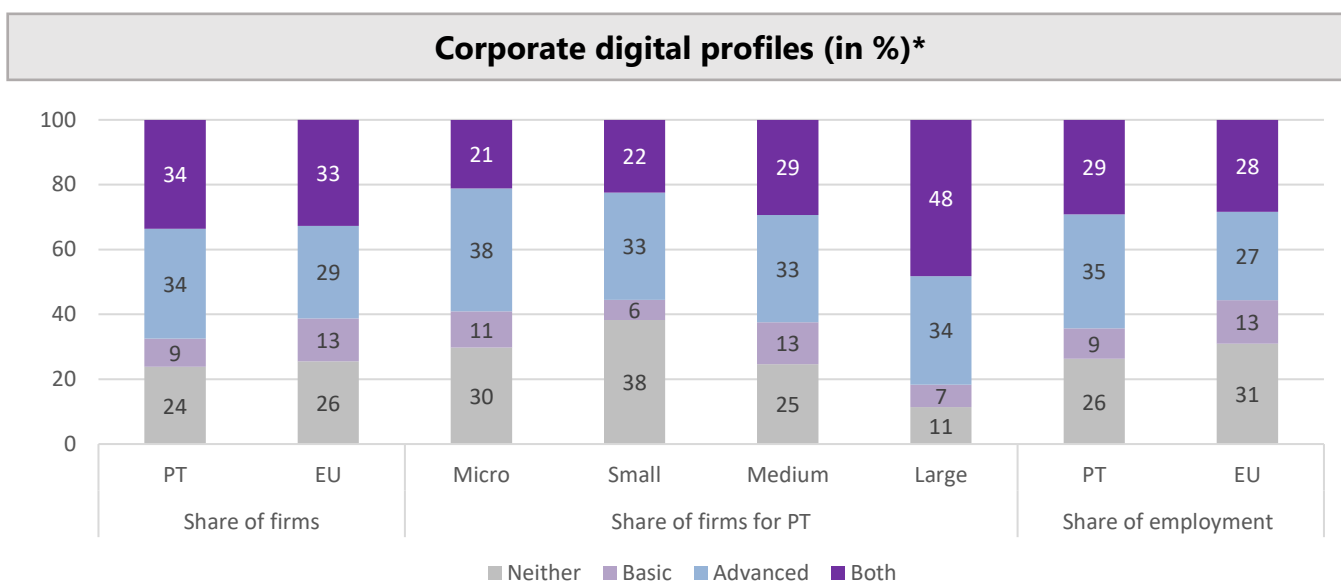
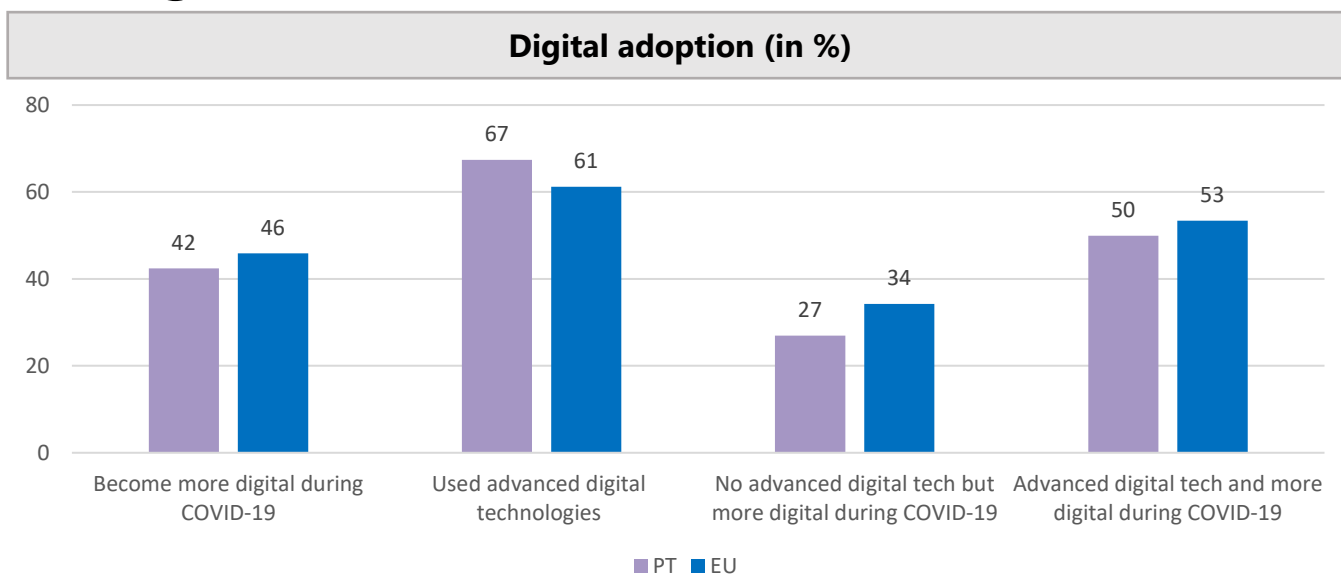
* higher than the 35% EU average
** lower than the 72% EU average

19% of neither firms* **invested in the training** of their employees, compared to **58%** of both**



* lower than the 39% EU average
** comparable to the 60% EU average

Portugal (PT)



* See p.15 for the definition of corporate digital profiles and p.27 for the definition of share of employment.

Firms' digital readiness

47% of neither firms* have **strategic business monitoring** practices in place, compared to 86% of both**



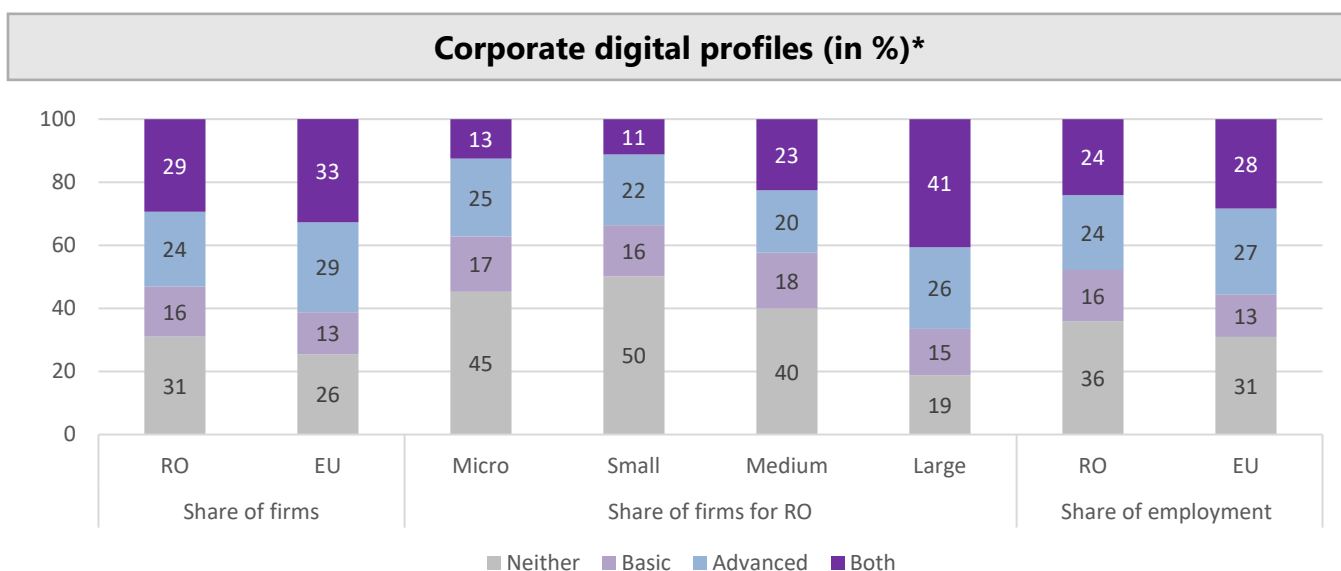
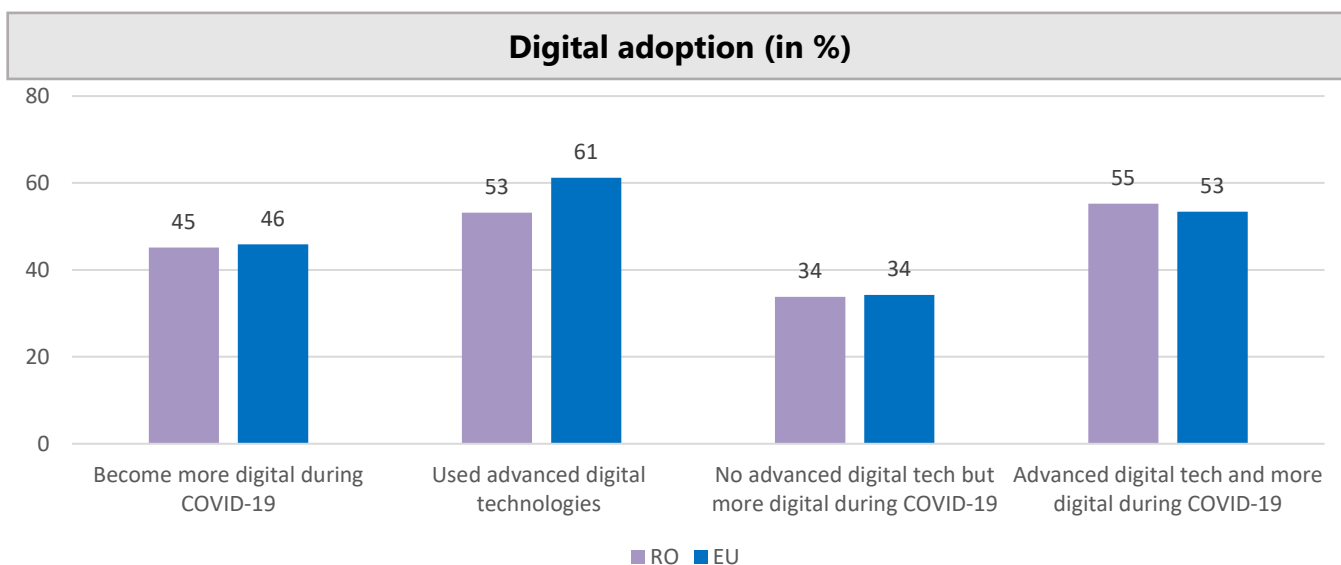
40% of neither firms* **invested in the training** of their employees, compared to 65% of both**



* higher than the 35% EU average
** higher than the 72% EU average

* comparable to the 39% EU average
** higher than the 60% EU average


Romania (RO)




* See p.15 for the definition of corporate digital profiles and p.27 for the definition of share of employment.

Firms' digital readiness

27% of neither firms* have **strategic business monitoring** practices in place, compared to **71%** of both**



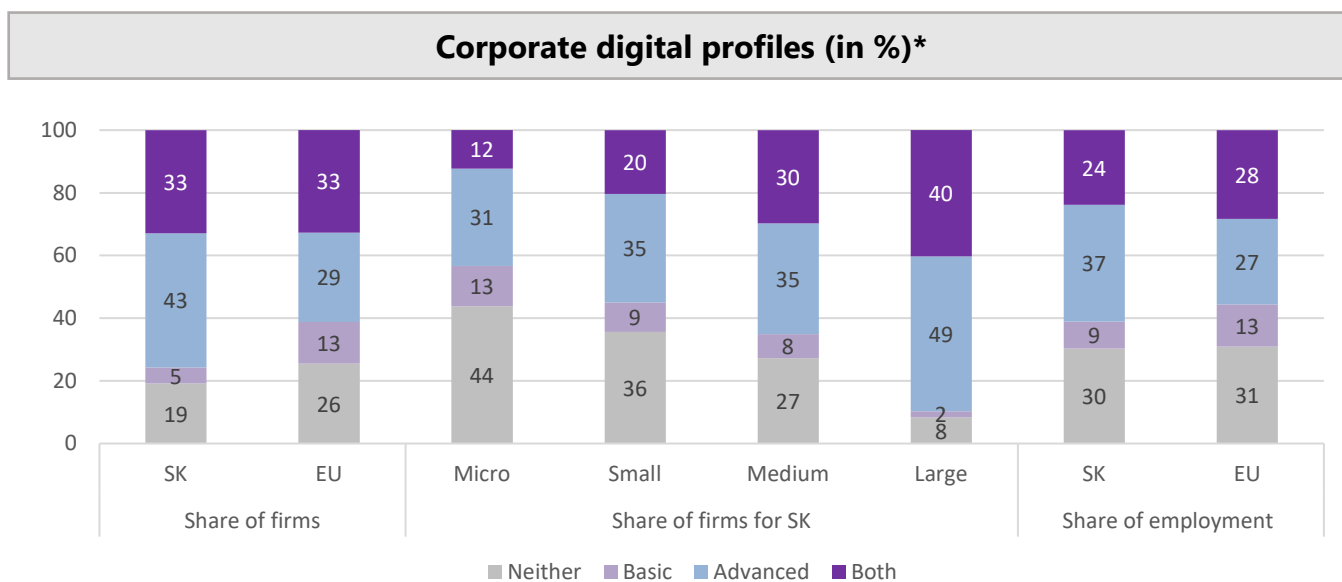
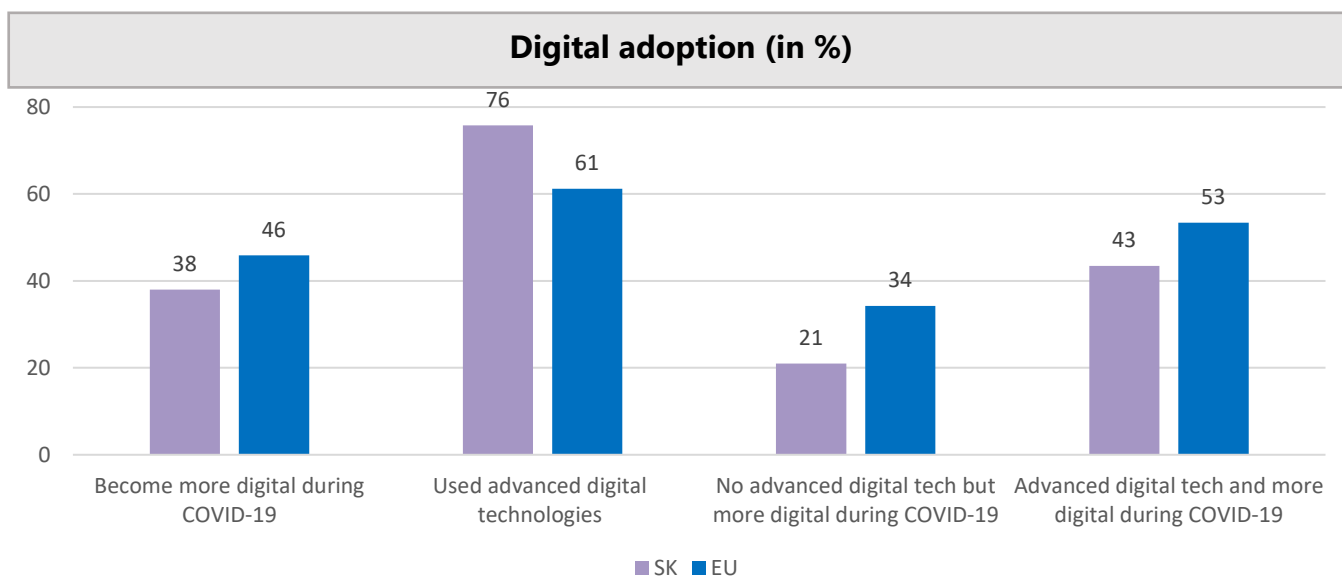
12% of neither firms* **invested in the training** of their employees, compared to **15%** of both**



* lower than the 35% EU average
 ** comparable to the 72% EU average

* lower than the 39% EU average
 ** lower than the 60% EU average

Slovakia (SK)



* See p.15 for the definition of corporate digital profiles and p.27 for the definition of share of employment.

Firms' digital readiness

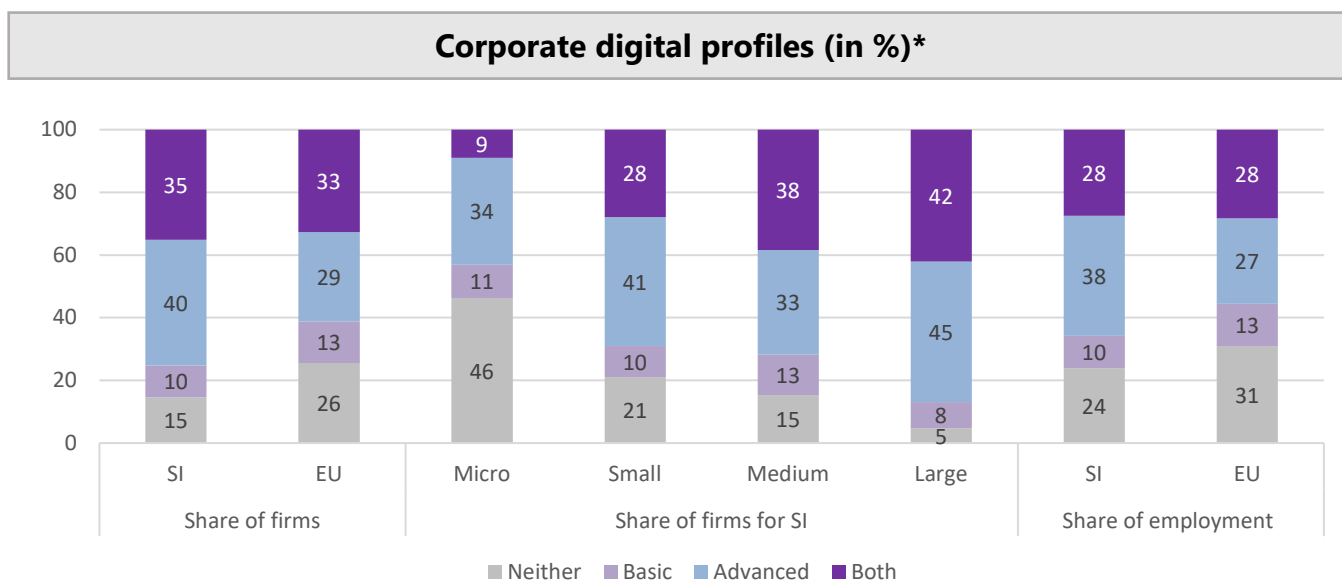
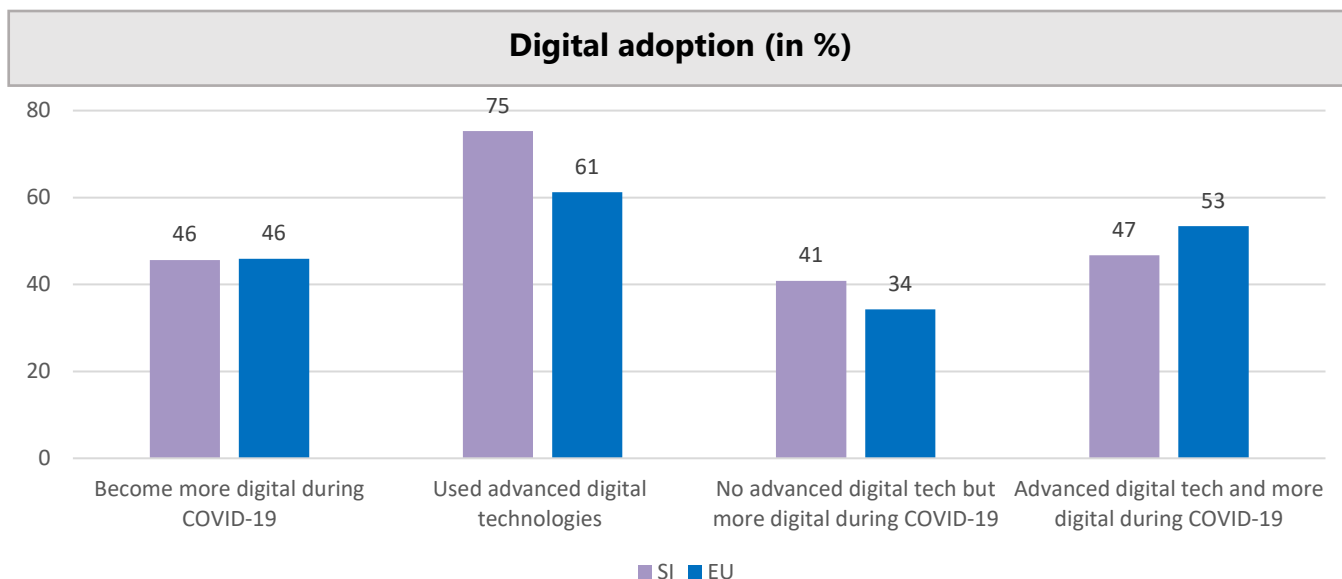
39% of neither firms* have **strategic business monitoring** practices in place, compared to **83%** of both**

18% of neither firms* **invested in the training** of their employees, compared to **43%** of both**

* comparable to the 35% EU average
 ** higher than the 72% EU average

* lower than the 39% EU average
 ** lower than the 60% EU average

Slovenia (SI)



* See p.15 for the definition of corporate digital profiles and p.27 for the definition of share of employment.

Firms' digital readiness

39% of neither firms* have **strategic business monitoring** practices in place, compared to 86% of both**



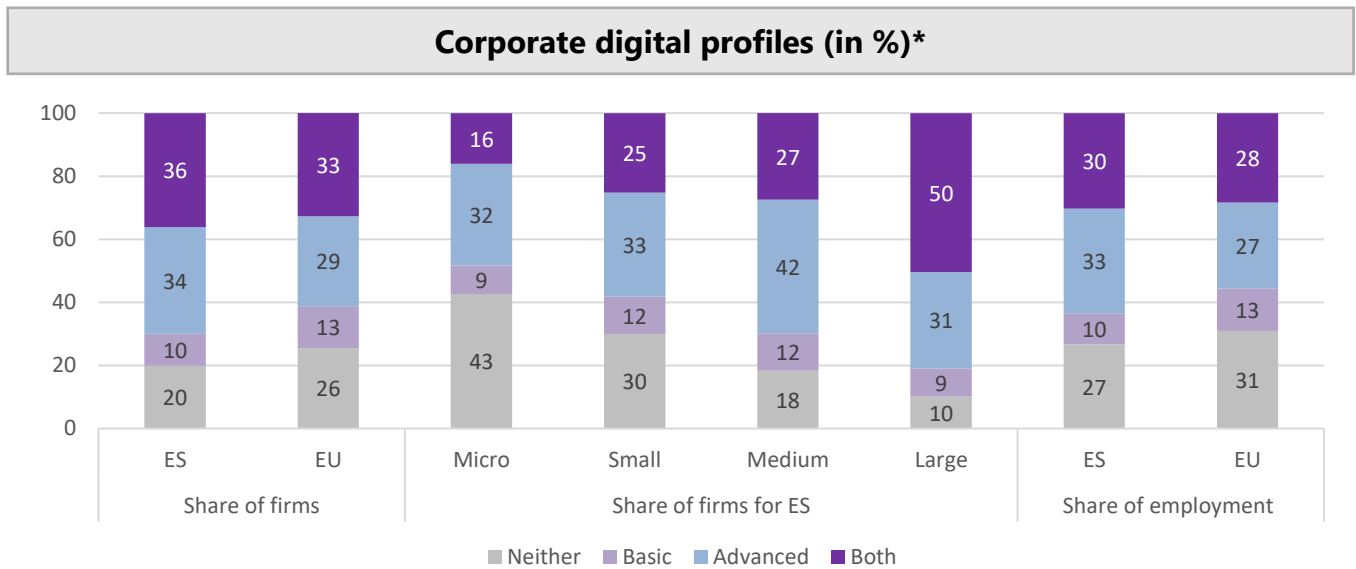
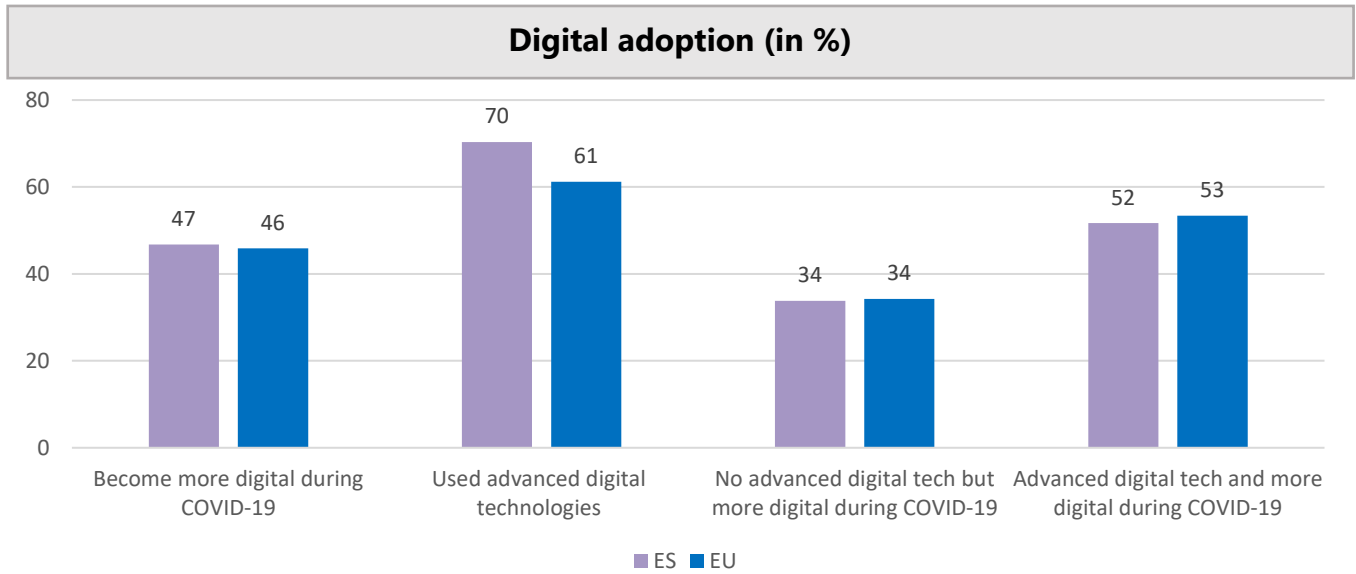
45% of neither firms* **invested in the training** of their employees, compared to 51% of both**



* comparable to the 35% EU average
 ** higher than the 72% EU average

* higher than the 39% EU average
 ** lower than the 60% EU average

Spain (ES)



* See p.15 for the definition of corporate digital profiles and p.27 for the definition of share of employment.

Firms' digital readiness

49% of neither firms* have **strategic business monitoring** practices in place, compared to 84% of both**



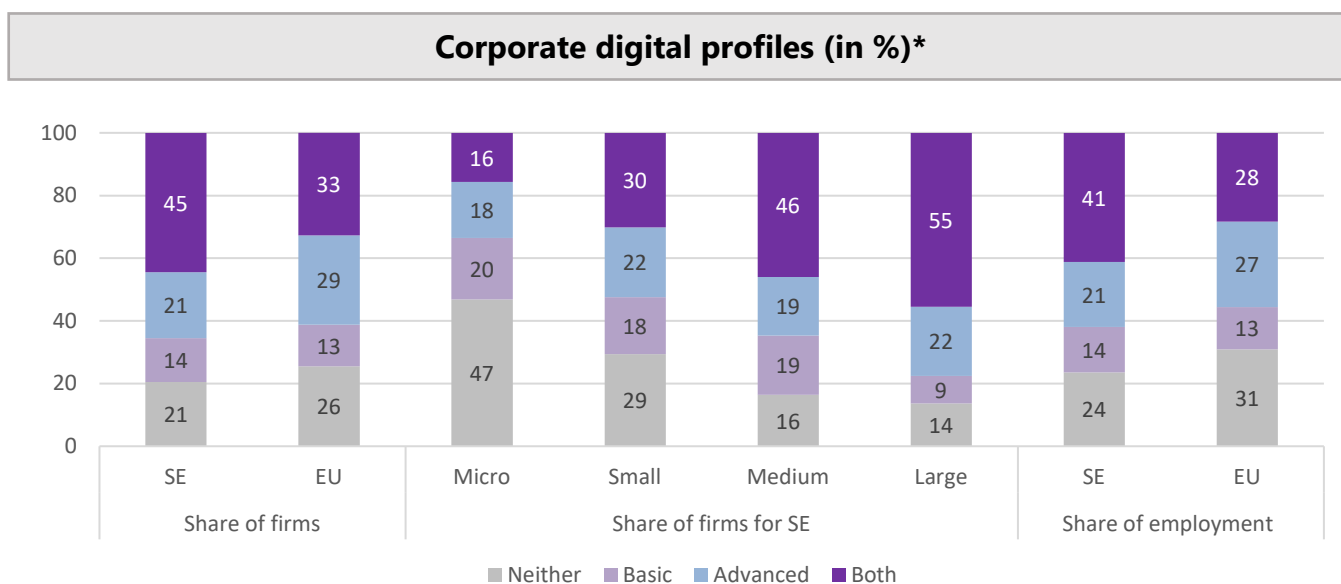
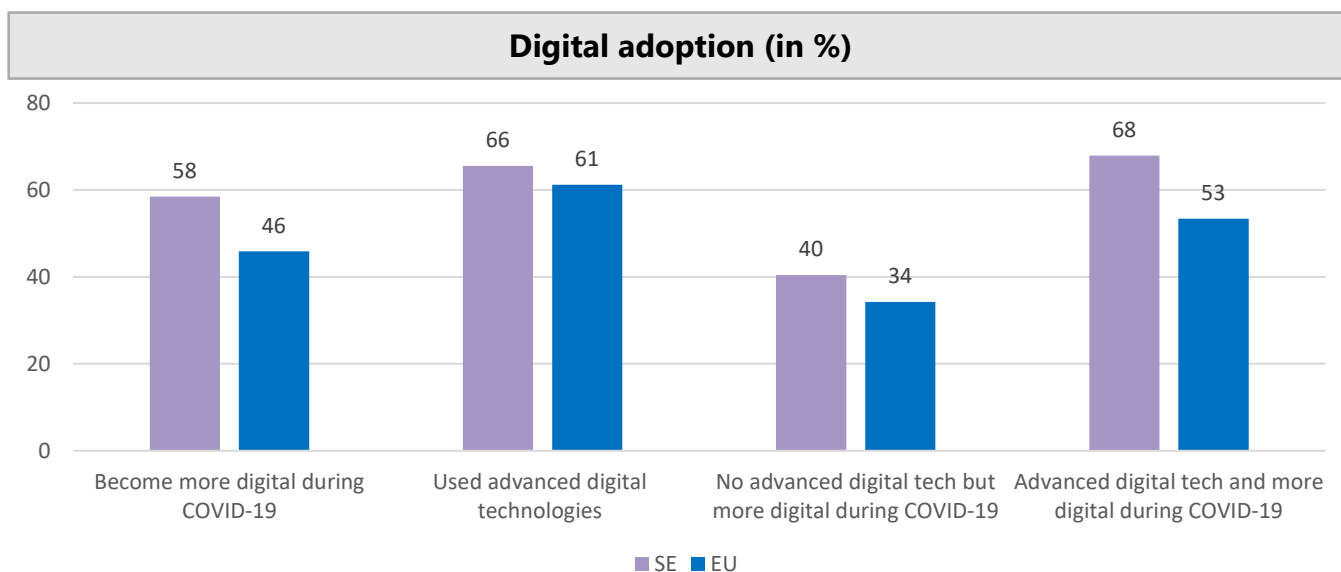
33% of neither firms* **invested in the training** of their employees, compared to 48% of both**



* higher than the 35% EU average
** higher than the 72% EU average

* lower than the 39% EU average
** lower than the 60% EU average

Sweden (SE)



* See p.15 for the definition of corporate digital profiles and p.27 for the definition of share of employment.

Firms' digital readiness

37% of neither firms* have **strategic business monitoring** practices in place, compared to **58%** of both**



46% of neither firms* **invested in the training** of their employees, compared to **70%** of both**



* comparable to the 35% EU average
** lower than the 72% EU average

* higher than the 39% EU average
** higher than the 60% EU average

Appendix: The EIB Corporate Digitalisation Index

The EIBIS Corporate Digitalisation Index is based on firm-level data of the EIB Investment Survey (EIBIS) in 2021. It consists of six components: adoption of advanced digital technologies, digital infrastructure, investment in software and data, investment in training, use of a strategic monitoring system, and the uptake of digitalisation during COVID-19.

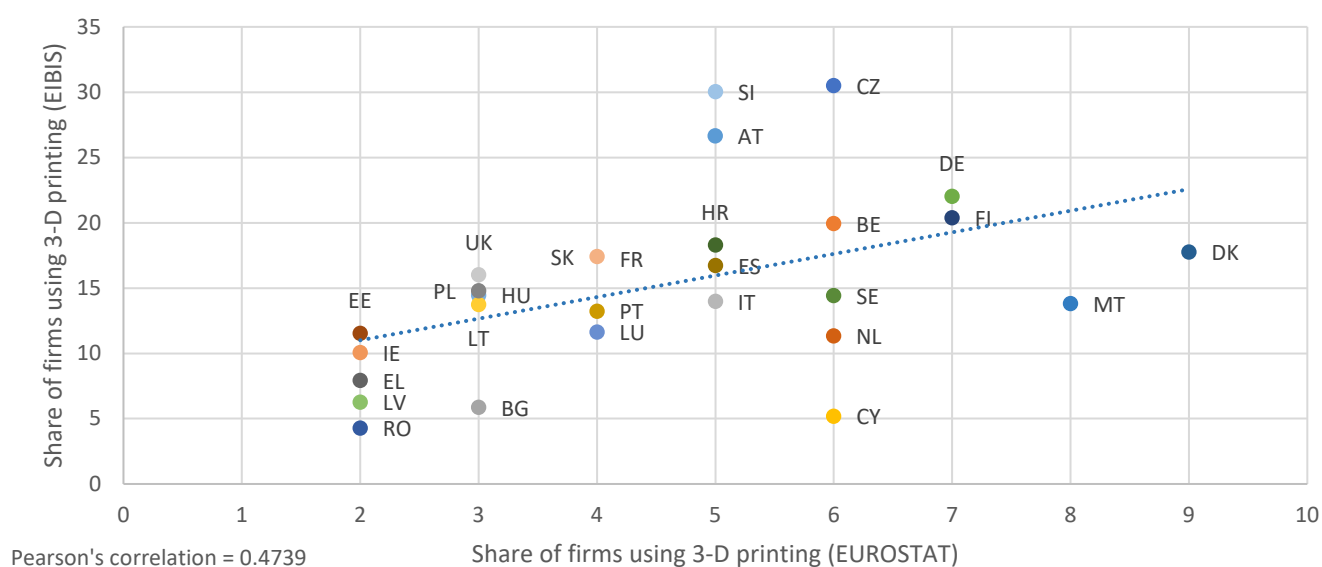
Advanced digital technology adoption is based on the question highlighted in Box 1. Digital infrastructure is based on a question asking firms whether access to digital infrastructure is an obstacle to investment or not. Investments in software and data is measured as a percentage of total investment in the previous fiscal year. Investment in training is based on the firms' investment in employee training. The strategic monitoring system component is based on a question asking whether the firm uses a formal strategic business monitoring system or not. More digital during COVID-19 is based on a question asking whether firms invested in becoming more digital during COVID-19.

The six components of the EIBIS Corporate Digitalisation Index are aggregated at the country level and give the following weights: 0.3 to advanced digital technology adoption, 0.2 to digital infrastructure and digital uptake during COVID-19 and 0.1 to the other three components. The final scores for each country are divided by the score of Finland, the top-performing country (which has a value of 100 in the index).

Appendix: Comparing EIBIS to other data sources

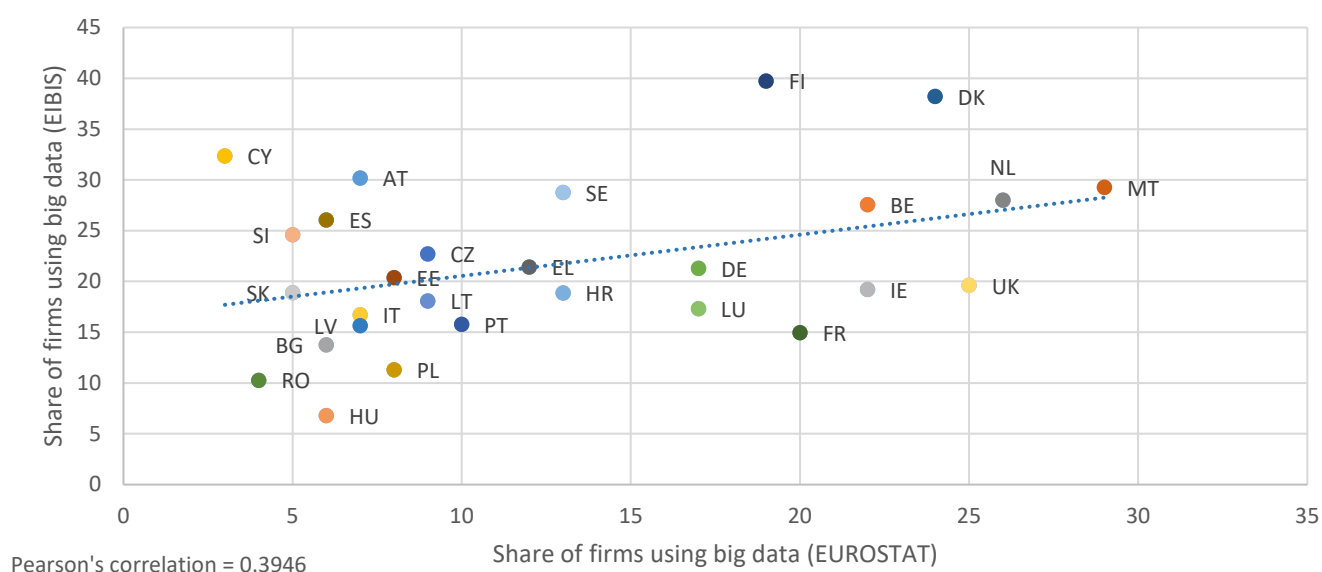
This appendix shows that the digital technologies in EIBIS and the different components of the EIBIS Corporate Digitalisation Index are highly correlated across countries with data from external sources, such as Eurostat or the different components of the European Commission's Digital Economy and Society Index (DESI).

Share of firms using 3-D printing according to Eurostat and EIBIS (in %), by country



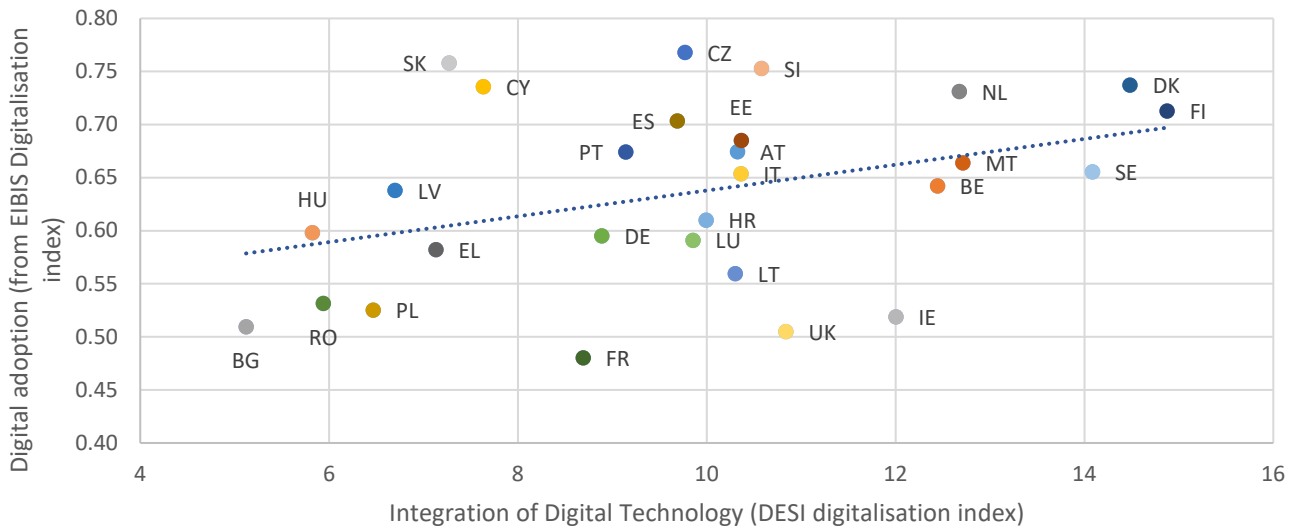
Source: Eurostat and EIBIS (2021).

Share of firms using big data according to Eurostat and EIBIS (in %), by country



Source: Eurostat and EIBIS (2021).

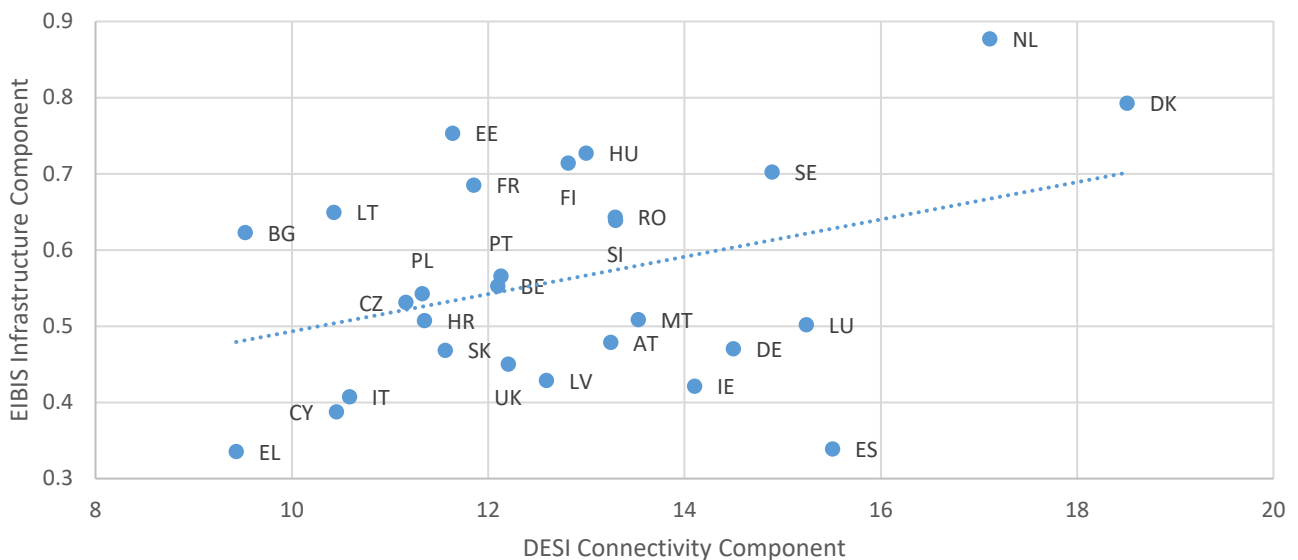
Component on connectivity of the DESI index and component on digital infrastructure of the EIBIS Corporate Digitalisation Index, by country



Pearson's correlation = 0.3747

Source: European Commission's Digital Economy and Society Index (DESI) and EIBIS (2021).

Component on integration of digital technology of DESI and implementation of advanced digital technologies, by country



Source: European Commission's Digital Economy and Society Index (DESI) and EIBIS (2021).



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