How can Europe catch up on its digital backlog?

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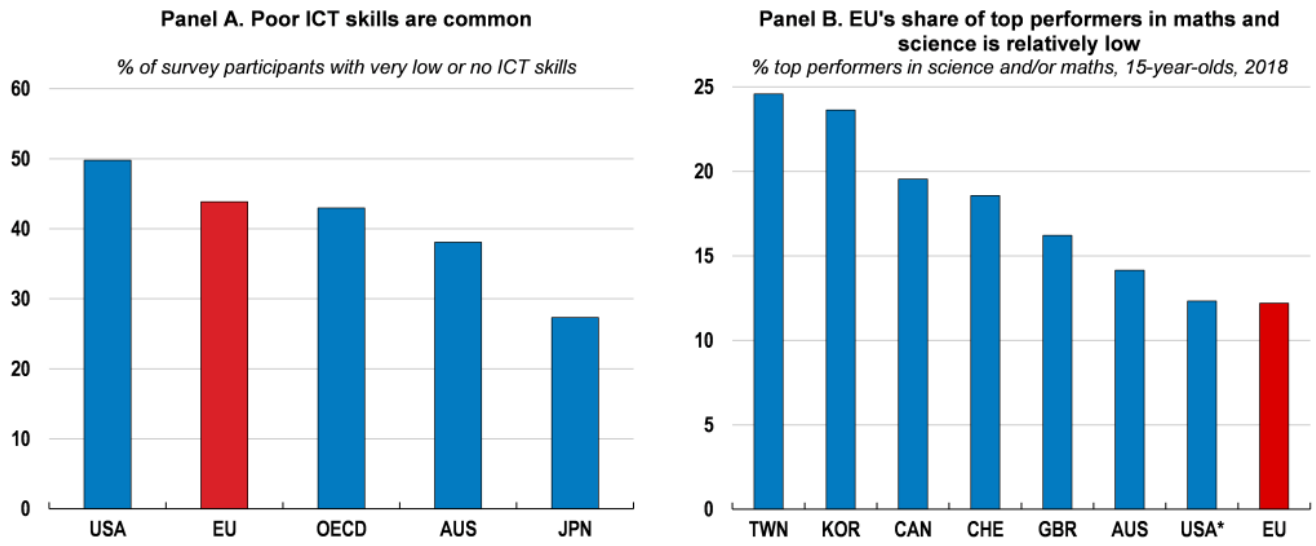
With political agreement on two big regulatory reforms – new rules about online content moderation and competition rules for big digital platforms – in the last two months, the European Union is showing that digitalisation continues to be a policy priority despite the geopolitical turmoil related to Russia's war in Ukraine. The issue certainly requires urgent attention: Covid-19 has resulted in many activities moving online and underlined the importance of innovation. In order to thrive in the future, economies will need to be nimble when it comes to using and producing digital technology. This blog post[1] argues that the EU will need sizeable efforts to keep up with the United States and parts of Asia. So far, it lags behind in the skills and innovation needed to reap the benefits of digitalisation and has been "generating" relatively few technology-frontier firms.

Escaping the low digitalisation trap will demand forceful investment to tackle pre-pandemic weaknesses in digital skills, innovation and tangible capital, as well as pro-competition reforms to encourage the entry and growth of innovative, high potential firms (Andrews, Nicoletti and Timiliotis, 2018; Sorbe et al., 2019). This is also key for the transition to net zero carbon emissions. This transition relies heavily on bringing *future* technologies to the market. The EU must tackle all its problems faster than it has been used to, because in a digital world "winner takes all" dynamics rapidly widen the gap between those regions *who have it* and those *who do not* (Barwise and Watkins, 2018).

Boosting skills and attracting skilled workers

Many Europeans lack the skills necessary to succeed in a rapidly digitalising economy. The OECD *Survey of Adult Skills* shows 43% of the respondents in participating EU countries having a very low proficiency in the category "problem solving in technology-rich environments" (Figure 1, Panel A), meaning they could not perform simple digital tasks. While the EU shares this challenge with other OECD economies, including the United States, it compares unfavourably in terms of education outcomes. The share of top performers in maths and science is low, especially compared to Asian economies like Korea, but also Canada and Switzerland (Figure 1, Panel B). These deficits in the scientific education system risk making it harder for the next generation of Europeans to find well-paid and highly productive employment opportunities.

Figure 1. Many Europeans lack digital skills

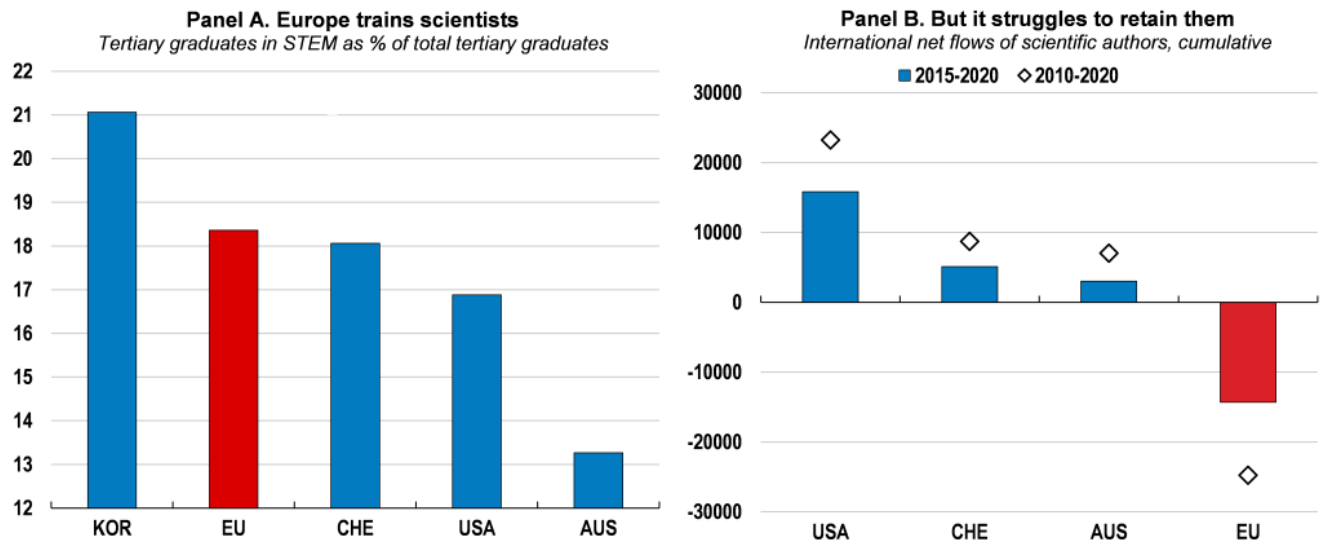


Note: Panel A: Very low or no ICT skills refers to level 1 or lower proficiency in problem solving in technology-rich environments. EU is the unweighted average of the following EU member states: AUT, CZE, DNK, EST, FIN, DEU, GRC, HUN, IRL, LTU, NLD, POL, SVK, SVN, SWE. Panel B: Top performers refer to students who have achieved at least Level 2 in all three core domains and at Level 5 in mathematics and/or science. EU is the unweighted average of EU27 countries. * Data did not meet the PISA technical standards but were accepted as largely

comparable. TWN denotes Chinese Taipei.
Source: Survey of Adult Skills (PIAAC) (2012, 2015, 2018), PISA 2018; and OECD calculations.

In addition, while the US makes up for lower skills attainment by attracting highly qualified people from abroad, the EU suffers net outflows of its scientific workforce. It is remarkable that the share of tertiary graduates in STEM is relatively high in the EU (Figure 2, Panel A), but there is a steady stream of scientific authors leaving the EU for countries that offer higher wages or better working conditions, such as Australia, Switzerland, or the United States (Figure 2, Panel B).

Figure 2. The EU struggles to retain talent



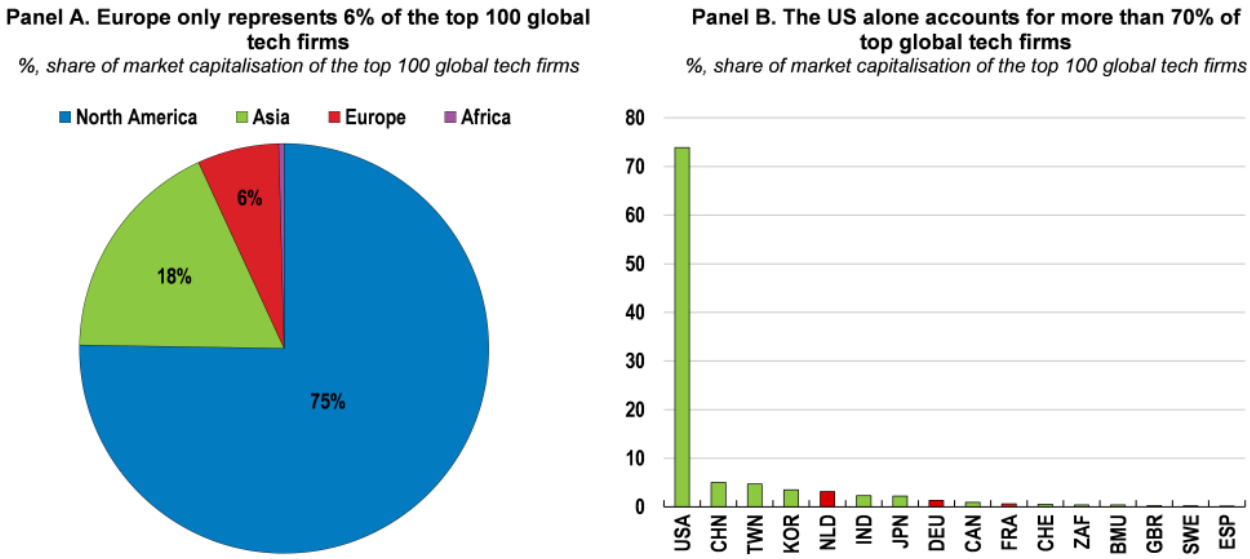
Note: Panel A: STEM refers to natural sciences, mathematics and statistics, ICT, engineering and engineering trades. Tertiary education refers to education levels of short-cycle tertiary education, bachelor's or equivalent level and master's or equivalent level. EU refers to the 22 EU members that are also members of the OECD. Panel B: EU refers to the 27 member states of the EU.
Source: OECD Education at a Glance, OECD Science, Technology and Industry Scoreboard; and OECD calculations.

The EU performs poorly in digital innovation

Beyond the human capital factor, the EU is lagging behind in the global race for technological leadership. Today's tech

giants, including Apple, Facebook, Google, Alibaba or Tencent, are dominated by the US and China. Of the 100 largest global tech firms by market capitalisation, the share of European tech companies amounts to only 6%, while the share for the US alone represents 75%, and for the US and Asia combined 93% (Figure 3).

Figure 3. Few tech giants are European

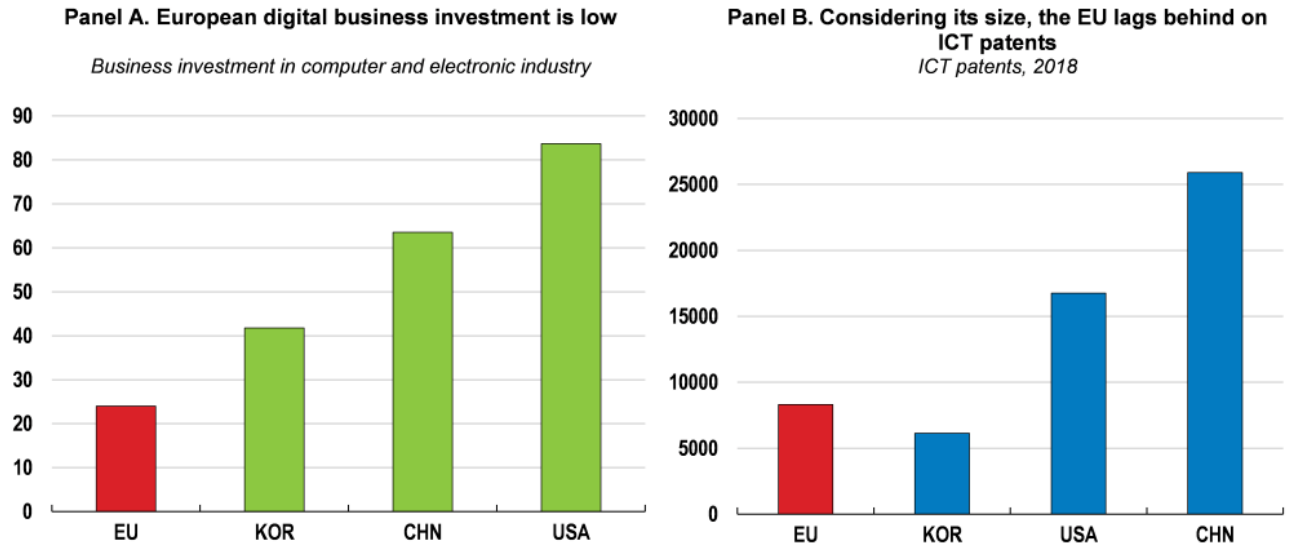


Note: The market value is the average of January 2022 and converted to million USD. Technology firms refer to firms that fall under the category of Computer Services, Internet, Software, Computer Hardware, Electronic Office Equipment, Semiconductors and Telecommunications Equipment. Panel B: TWN denotes Chinese Taipei.
Source: DataStream Global Equity Index and OECD calculations

Insufficient digital investment and research and development (R&D) are at the heart of the issue. European businesses invest significantly less in the tech industry than the United States or Asian economies like China or Korea (Figure 4, Panel A) – and the EU falls behind on important innovation output indicators such as information and communications technology (ICT) patents (Figure 4, Panel B). Bridging this digital investment gap and lack of R&D will be essential to allow the EU to boost innovation, productivity growth and avoid falling behind the curve on the technology front.

Figure 4. Europe needs to pick up digital investment and

research



Source: OECD Science, Technology and Industry database.

A lack of innovation may also hamper the EU's climate ambition

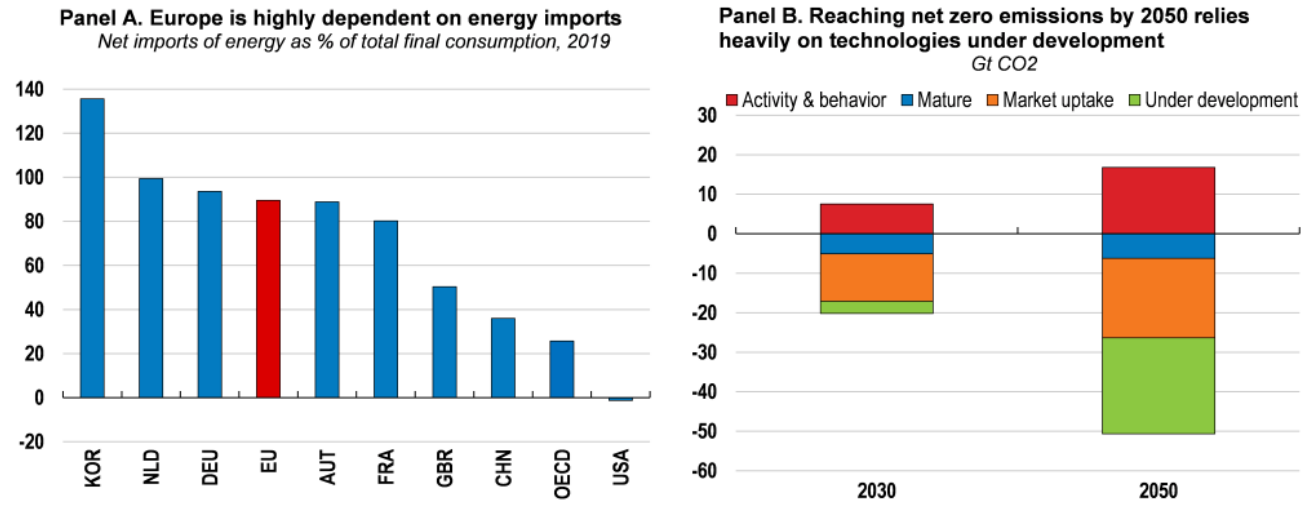
Insufficient investment in innovation, research, and skills also risks obstructing the transition to net-zero emissions (NZE) by 2050, which requires huge leaps in clean energy innovation and the widespread deployment of clean energy technologies.

The EU's high reliance on energy imports makes its energy-intensive sectors particularly vulnerable to energy supply shocks and energy price rises, as witnessed during the pandemic and war. To secure reliable energy sources and deliver on its climate ambitions, EU economies will need to substantially ramp up clean energy investment and accelerate clean energy innovation (Figure 5, Panel A).

According to International Energy Agency (IEA) scenarios (International Energy Agency, 2021), many clean energy technologies needed to reach CO_2 emission reduction targets by 2030 already exist today. However, while some of these technologies are mature, meaning that they are established in the market, many still require increased commercialisation or a wider integration into the market to reach its full market potential (Figure 5, Panel B). In addition, the IEA estimates

that by 2050, almost 50% of the emission reductions needed will depend on technologies that are currently under development, i.e. at the demonstration or prototype stage (Figure 5, Panel B). This means that further effort in new technology development, as well as deployment will be needed, in addition to the required tripling of annual clean energy investment already by 2030. These will be essential to bringing new technologies to the market on time and reaching net zero emissions.

Figure 5. To reach climate targets, the EU must accelerate innovation



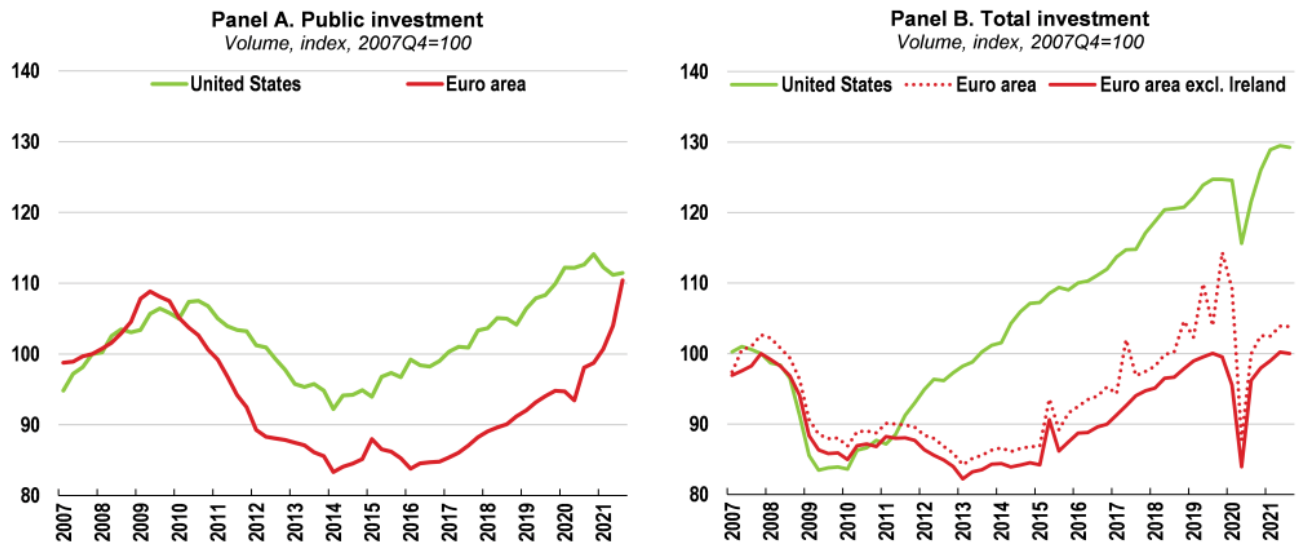
Note: Panel A: Total final consumption refers to the sum of the consumption in the end-use sectors and for non-energy use, excluding for own use of the energy producing industries, backflows from the petrochemical industry, international aviation bunkers and international marine bunkers. A negative rate indicates a net exporter of energy, while a dependency rate above 100 % means that energy products have been stocked. Panel B: shows global CO2 emissions changes by technology maturity category in the NZE by 2050.
Source: IEA World Energy Balances database; IEA (2021), "Net Zero by 2050"; and OECD calculations.

Increasing tangible investment in the EU

All of the above suggests that only a significant investment effort will be able to achieve the EU's laudable ambitions, the twin objective of faster digitalisation and a smooth path

to net zero. Both public and private capital will have to play an important role in delivering the large amounts of investment needed to make the digital and green transformations a success. The EU should be commended for avoiding the mistakes of the Global Financial Crisis, when public investment spending was cut drastically in an attempt to consolidate government budgets. It activated the Stability and Growth Pact's escape clause and set up the Recovery and Resilience Facility. With the support of accommodative monetary policy, these measures allowed governments to use fiscal policy to start addressing structural problems and even countries that were hit hard by COVID-19 could increase their productive spending. After a long weakness, public investment in the euro area surged during the pandemic and is now above 2007 levels in volume terms and catching up with the United States (Figure 6, Panel A).

Figure 6. Investment needs to increase in order to meet future challenges



Note: Euro area refers to the 17 members of the euro area that are also members of the OECD.
Source: Economic Outlook 110 database; and OECD calculations.

However, while public investment can crowd in private capital, it accounts for less than a sixth of overall investment. Overall investment has been affected more severely by the pandemic, and has only recently reached pre-GFC levels (Figure

6, Panel B). This is inconsistent with the aspiration to accelerate digitalisation and ultimately increase productivity. In addition, the composition of investment will have to change, with more focus on digital and green technologies for productivity, environmental and security reasons.

A combination of national and EU policies will have to be deployed, including:

- structural policies at the level of member states to improve their attractiveness as destinations for investment and talent
- redoubling EU efforts to deepen the capital markets union to enhance return on private investment
- better EU and national fiscal frameworks to support investment over the short, medium and longer term.

References

Andrews, D., G. Nicoletti and C. Timiliotis (2018), "Digital technology diffusion: A matter of capabilities, incentives or both?", *OECD Economics Department Working Papers*, No. 1476, OECD Publishing, Paris, https://dx.doi.org/10.1787/7c542c16-en.

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[1] This blog post is based on an issues note for the Informal Meeting of the EU Ministers for Economy and Finance (ECOFIN) on 25 and 26 February 2022.

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