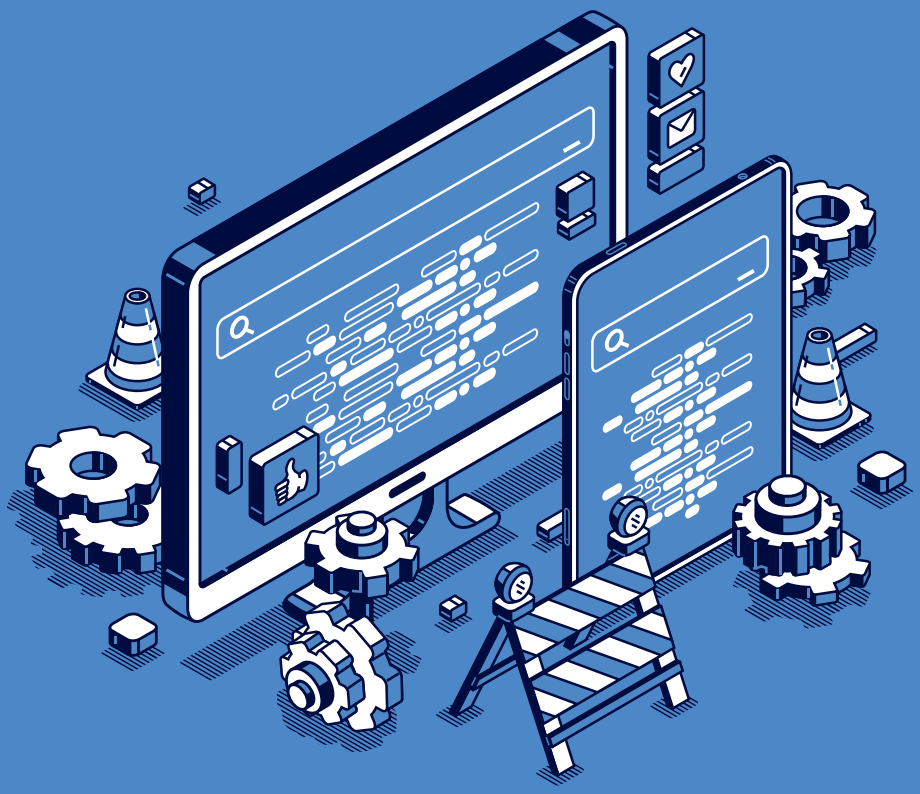


WHITE PAPER | NOVEMBER 2022

AUTOMATION

FOR SUSTAINABLE AND DURABLE GROWTH

europuls

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This whitepaper was created with the support of **Cezara Panait,** Head of Digital Policy for Europuls on 2020 - September 2022

Executive Summary

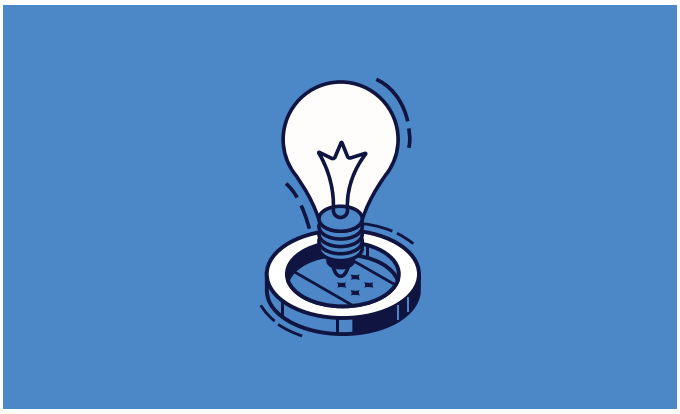
Technological innovation is widely recognised as a critical driver of economic growth. Today's developments in the design and deployment of digital technologies make no exception, helping humans reach new heights of productivity and efficiency. In the post-pandemic recovery, the role of technology grows even further: *building a more sustainable and resilient future.*

According to the PwC Global Artificial Intelligence Study[1], **the economic impact of artificial intelligence (AI) alone might contribute to an additional output of around 13 trillion USD by 2030,** resulting in a global GDP increase of about 1.2% annually. McKinsey Global Institute's Notes from the AI Frontier[2] explains that such an impact is possible due to the increased products and services innovation as well as the decrease of labour by automation.

While Europe's recovery is deeply linked to macroeconomic policies and reforms, there is consensus on the critical role of digital technologies and the need to foster green growth. The European Union's (EU) plans to harness the opportunities brought by digital transformation are commonly referred to as Europe's "digital transition." Strategic documents such as the Digital Decade Communication[3] and the subsequent Path to the Digital Decade Decision proposal articulate the EU's vision and commitments for the following years.

In addition, the centrepiece of the EU's financial stimulus package, the Recovery and Resilience Facility (RRF), requires the Member States to allocate a minimum threshold of 20% of the stimulus budget towards digital investments. The RRF funding is tied to each country's specific challenges and priorities identified in the European Semester and the 2021 Annual Sustainable Growth Strategy to encourage a harmonised digital transition across the Member States[4]. At the same time, the objectives of the European recovery strategy call for a close alignment with the European Green Deal and the United Nations Sustainable Development Goals (SDGs), encouraging the development and use of digital technologies to help improve the management of health crises, increase the resilience of governments, and tackle global challenges, such as climate change and inequality.

On the frontline of next-generation innovations lies automation - a megatrend that reinvented itself in the context of the digital economy. At the highest level, automation is a term that describes technology applications where human intervention and inputs in processes and tasks are minimised. This paper will focus on the types of automation technologies that operate in the virtual environment, which benefited from significant innovation in the last few years, respectively, Robotic Process Automation (RPA) and intelligent automation (IA) solutions in general.



1 PwC, Sizing the prize: What's the real value of AI for your business and how can you capitalise?, 2017, https://www.pwc.com/gx/en/issues/data-and-analytics/publications/artificial-intelligence-study.html

2 McKinsey Global Institute, Notes from the AI frontier – Modelling the impact of AI on the world economy, discussion paper, September 2018 https://www.mckinsey.com/~/media/McKinsey/Featured%20Insights/Artificial%20Intelligence/Notes%20from%20the%20frontier%20Modeling%20the%20impact%20of%20AI%20on%20the%20world%20economy/MGI-Notes-from-the-AI-frontier-Modeling-the-impact-of-AI-on-the-world-economy-September-2018.ashx

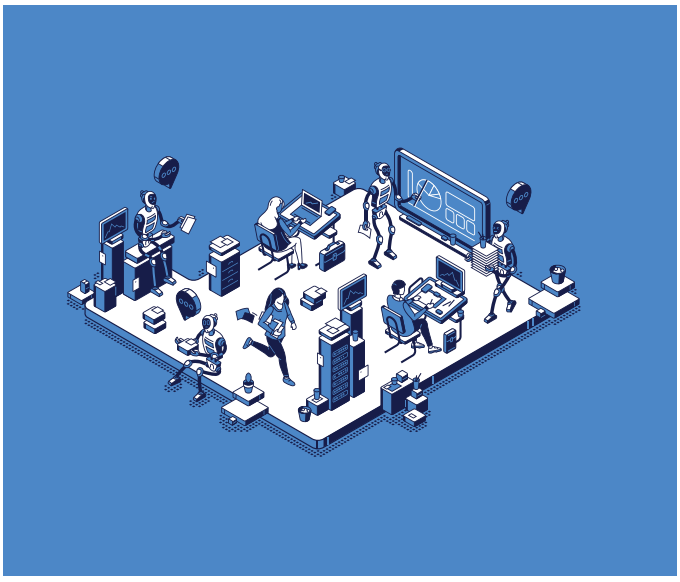
3 European Commission, Europe's Digital Decade: digital targets for 2030, https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/europes-digital-decade-digital-targets-2030_en

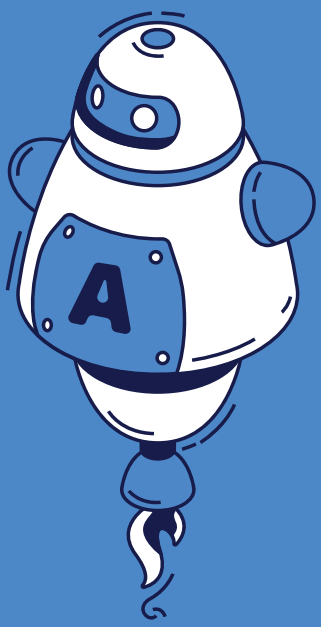
4 European Economic and Social Committee, Annual Sustainable Growth Strategy, 2021, https://www.eesc.europa.eu/en/our-work/opinions-information-reports/opinions/annual-sustainable-growth-strategy-2021

Automation enables sustainable digital government transformation as an effective cost and resources optimization strategy. Such conversion reduces the number and errors of manual processes and increases efficiency and effectiveness, thus resulting in better responsiveness and greater resilience to internal and external challenges. Hence, automation's value in the new economy could be essential for sustainable and durable growth[5].

According to the OECD Digital Economy Outlook, by leveraging RPA and integrating enormous data repositories through automation, AI will significantly improve the decision-making we know today and preserve resources in every sector of the economy[6]. Modern AI and Machine Learning (ML) workflows will be the game changers of the upcoming digital shift, testing governments and companies worldwide, already affected by the great resignation, COVID-19 pandemic and geopolitical and military escalations. The impact of human-centric automation could transform the economy, the society and the government we know by launching the untapped potential of sustainable and resilient systems which could preserve resources and contribute to positive changes worldwide.

The purpose of this research is to explore opportunities for how automation can be leveraged to help advance the ambitions of the Digital Decade while paving a new path toward a more resilient and sustainable economy.





5 UiPath. Daniel Poor, Automation's Value in the New Economy
https://www.uipath.com/blog/automation/automation-value-in-new-economy

6 OECD Digital Economy Outlook 2017,
https://doi.org/10.1787/9789264276284-en.

1 Europe's plan for the digital transition

How businesses and the public sector can benefit from digital transformation to support economic development has been a critical focus of Europe's agenda for a while now. Over the past years, the EU has launched targeted programmes and policies to encourage the development and uptake of innovative technologies. Recent examples are the Digital Europe Programme and the Coordinated Plan on AI. Furthermore, instruments such as the Digital Economy and Society Index (DESI)[7] measure the EU Member States' adoption of digital technologies.

Based on their potential to deliver the additional economic output and modernise social and business interactions, digital technologies were prioritised accordingly in the context of the EU's recovery agenda. According to the DESI[8],the EU Member States allocated 37% of their programmed digital investment towards the digitalisation of public services and 20% towards the digitalisation of businesses and opted to invest 17% of the programmed funds on human capital. Likewise, in its Coordinated Plan on Artificial Intelligence 2021, the European Commission quotes two studies concerning the "successful development and uptake of AI contributing to EU's economic growth and global competitiveness". According to McKinsey (Shaping the digital transformation in Europe, 2020)[9], new digital technologies' cumulative additional GDP contribution, including AI, could amount to EUR 2,2 trillion in the EU by 2030 (a 14,1% increase from 2017).

PwC (Sizing the prize: What's the real value of AI for your business and how can you capitalise?, 2017) comes to an almost identical forecast increase at the global level (USD 15,7 trillion)[10].

The recent Communication of the Commission on the "2030 Digital Compass: the European way for the Digital Decade" in March 2021 put forward specific targets to help drive a harmonised digital transition ("Europe's Digital Decade")[11] , establishing four "cardinal points": skills, government, business, and infrastructures. For each cardinal point, there is a set of clear and actionable targets ("Digital Targets").

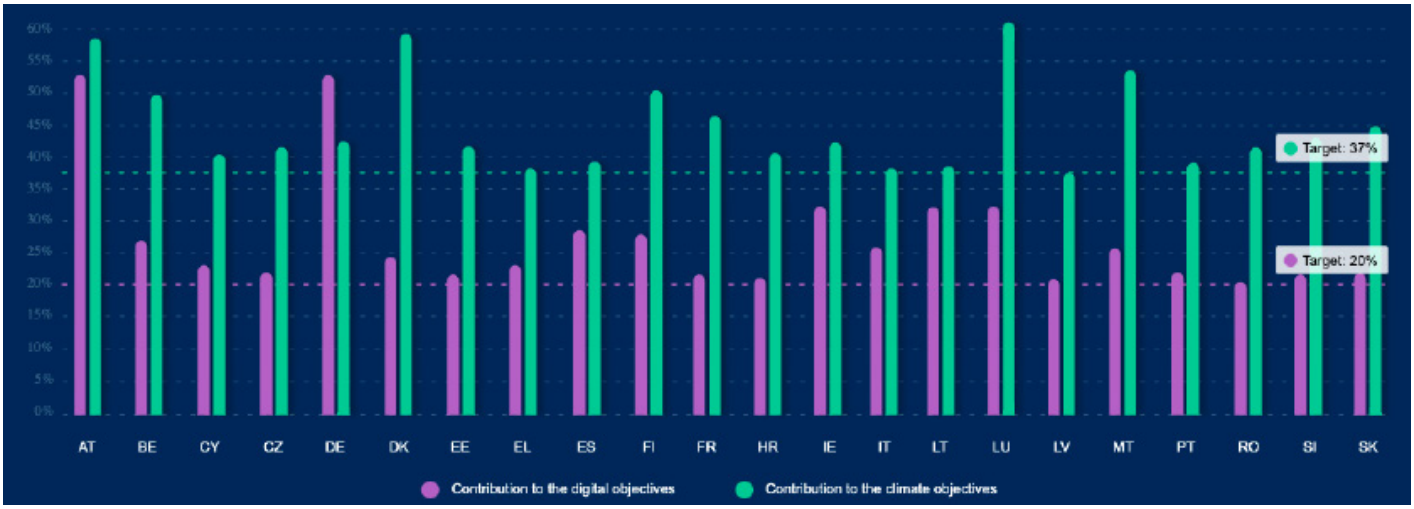


Figure 1
"Share of RRPs estimated expenditure towards climate and digital objectives"[12]

7 European Commission, The Digital Economy and Society Index (DESI), https://digital-strategy.ec.europa.eu/en/policies/desi

8 Ibid

9 McKinsey, Shaping the digital transformation in Europe, 2020, https://digital-strategy.ec.europa.eu/en/library/shaping-digital-transformation-europe

10 PwC, Sizing the prize: What's the real value of AI for your business and how can you capitalise?, 2017. https://www.pwc.com/gx/en/issues/data-and-analytics/publications/artificial-intelligence-study.html

11 European Commission, Europe's Digital Decade: Digital targets for 2030, 28 September 2021. https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/europes-digital-decade-digital-targets-2030_en

12 European Commission, Share of RRPs estimated expenditure towards climate and digital objectives, https://ec.europa.eu/economy_finance/recovery-and-resilience-scoreboard/

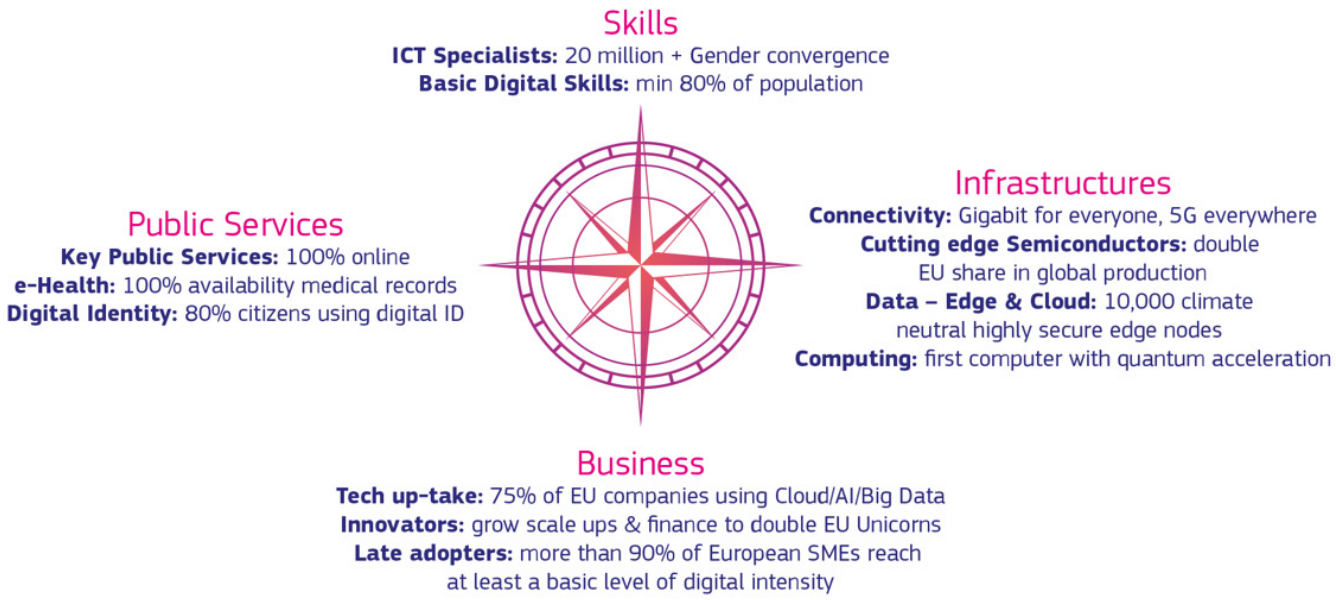


Figure 2
The Digital Compass for the EU's digital decade.
Source: https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/europes-digital-decade-digital-targets-2030_en

For public services specifically, the EU's ambition is to make sure that by 2030: (1) all key public services are available online, (2) all citizens have access to their e-medical records[13] and (3) 80% of citizens use a digital ID solution[14] (currently, the eIDAS Regulation[15] provides the basis for cross-border electronic identification, authentication and website certification within the EU and already 60% of Europeans can benefit from the current system, but take-up is low, their use is cumbersome, and business cases are limited[16]). This is complemented by the aspiration to reach a competence/skills benchmark of 80% of adults having basic digital skills and 20 million ICT specialists by 2030 (reaching 9 million in 2021[17]), while considering gender convergence[18].

Given this optimistic European ambition, we shall further explore how automation (specifically via RPA) and even intelligent automation[19] can become a crucial enabler for the abovementioned Digital Targets laid out under Europe's Digital Decade. We will also look at how RPA, an increasingly popular technology deployed in both the private and the public sectors, sets out to revolutionise industries and bring digital transformation to end-to-end business processes.



13 European Commission, Exchange of electronic health records across the EU,
https://digital-strategy.ec.europa.eu/en/policies/electronic-health-records

14 European Commission, Digital Public Services
https://futurium.ec.europa.eu/en/digital-compass/digital-public-services

15 European Commission, eIDAS Regulation,
https://digital-strategy.ec.europa.eu/en/policies/eidas-regulation

16 European Commission , Electronic identification,
https://digital-strategy.ec.europa.eu/en/policies/electronic-identification

17 Eurostat, ICT specialists workforce continued to grow in 2021.
https://ec.europa.eu/eurostat/web/products-eurostat-news/-/ddn-20220505-1

18 European Commission, Digital Skills,
https://futurium.ec.europa.eu/en/digital-compass/digital-skills

19 According to EY, intelligent automation refers to the integration of software robots with different emerging technologies, such as AI, blockchain and the Internet of Things (IoT).

2 The Role of Automation in Europe's Digital Decade

Achieving the ambitions set under Europe's Digital Decade will require close collaboration and significant collective efforts to be successful. At the same time, as each Member State experiences a different level of digital adoption, roadmaps for reaching the Digital Targets will need to be tailored accordingly.

However, there are several common aspects but also challenges and opportunities that businesses, public administrations, universities, educational organisations, and the Member States, in general, will need to observe in their efforts toward reaching the goals of Europe's Digital Decade.

Building on the Digital Targets, we will now focus on the role of automation in the context of the following main objectives:

- **Modernising and digitalising public services;**
- **Fostering innovation and digital transformation of businesses;**
- **Equipping the population with basic and advanced digital skills.**

A MODERNISING AND DIGITALISING PUBLIC SERVICES

Disruptive and rapid changes challenge governments to deliver innovative and effective policies and services across the board. Digital technologies enable capabilities that can provide strength and agility in recovering and responding effectively to disruptions. Examples of enabling technologies include AI, predictive analytics, robotics and automation, IoT, geo-spatial data, blockchain, and open government data.

At the same time, the COVID-19 pandemic has demonstrated that governments need to adapt to rapidly evolving situations while at the same time creating new opportunities. Digital technologies such as automation are well-suited to helping the public administration respond effectively to these changes, boost productivity, and deliver citizen and data-driven solutions.

According to one of the Digital Targets set for the public sector, by 2030, 100% of key public services should be available online for citizens and businesses. Digitalising public services was also one of the key topics included in the European Flagships identified by the European Commission as common challenges faced by the Member States in the context of the 2021 European Semester and the Recovery and Resilience Facility. This priority was mainly addressed in Flagship Modernise, which included the need for public administrations to provide *interoperable, personalised,* and *user-friendly digital public services.*

Furthermore, by 2030, 100% of European citizens should have access to electronic medical records, and at least 80% of European citizens should use digital IDs. The public sector cannot afford to lose the digital transformation momentum in this current climate.

To ensure a path towards achieving the ambitions set by the Digital Decade across the EU by 2030, governments should focus on the following key enablers of sustainable digital government:

1. Understand citizens better for the design of better policies and services;[20]
2. Find new resilient solutions to policy challenges;
3. Implement everyday government functions and provide responsive services more effectively and efficiently;
4. Engage with citizens, businesses and other external stakeholders in new ways to develop new innovative policies, sustainable benefits and delivery models;
5. Operate more resiliently, with transparency and accountability, improving government sustainability and legitimacy.[21]

20 PwC, Citizens at the centre: Building digital public services in CEE, https://images.content.pwc.com/Web/PwCGlobal/%7Bc9b4307d-7b5c-4f37-842e-43711258bd18%7D_PwC_Citizens_at_the_centre_Report.pdf

21 JRC Publication Repository, Exploring Digital Government transformation in the EU, 2019, https://futurium.ec.europa.eu/en/digital-compass/digital-public-services

OPPORTUNITIES TO LEVERAGE AUTOMATION IN THE PUBLIC SECTOR

A recent study from PWC on Citizens at the centre: *Building digital public services in the CEE* revealed six key technologies that are most relevant for developing citizen-centric services: AI, cloud computing, citizen relationship management (CRM), blockchain, 5G, and robotic process automation (RPA).[22] Public administrations can use RPA to rapidly automate time-consuming manual processes and routine clerical work, such as data entry into various applications and systems, to allow the staff to dedicate their time to tasks of greater relevance, reduce human errors, and decrease operational costs. Moreover, automation can improve service quality, as public services are provided faster and error-free. Furthermore, RPA is uniquely suited to integrate easily with both legacy applications and modern platforms and applications.

According to the 2019 JRC Report "Exploring Digital Government transformation in the EU"[23], RPA is considered to be sufficiently developed, resilient, scalable and reliable to be used in large government organisations and is already being applied in:

- **Central governments, for social benefits calculations, tax calculations, anti-fraud checks, licensing applications processing;**
- **For permit applications, incident reporting, case management, and contract administration, local governments.**

Furthermore, there are numerous automation applications in the healthcare industry, ranging from digitising various documents, managing the impact of COVID-19, handling and rescheduling cancelled appointments and transferring patient records. In education, most use cases for automation include managing admissions and enrolments, student timetabling and estates utilisation, student finance management and course assessment data handling[24].

Successful examples of deploying RPA in the public sector across the European Member States include adopting emerging technologies in public procurement. Based on the *Study on the uptake of emerging technologies in public procurement*, Palkeet, the Finnish Intelligent Automation company aims to provide human resources and financial services to government agencies and departments by rolling out RPA (26 bots now in operation, automating 70 processes, including processing purchase invoices and maintaining the supplier register).

In another example, the Purchasing management Platform of the Institute of Oncology of Lisbon operates a project that aims to modernise procurement using RPA and blockchain to reduce the high dependency on paper-based processes, resulting in a large amount of employee time spent on repetitive manual tasks with an increased risk of human error. Tasks to be automated using RPA include request approval, a compilation of documents, and approval of suppliers.[25]

At a more local level of governance, cities are also embracing new technologies to tackle pressing urban problems and effectively utilise their limited resources. One of the missions assumed by the European Commission is the 100 Climate-Neutral and Smart Cities by 2030, which aims to improve people's lives across Europe and beyond in a new and innovative way[26]. Smart cities tackle urban challenges by deploying innovative urban transport networks, upgraded water supply and waste disposal facilities, and more efficient ways to illuminate and heat buildings.

In terms of smart living, emerging technologies and automation provide several benefits, such as reduced costs, lower carbon emissions for constructing, using, and decommissioning buildings, multiple functions and added value on the materials utilised on buildings, better attributes, qualities and longevity of buildings and improved quality of life for users.

22 PwC, Citizens at the centre: Building digital public services in CEE, https://images.content.pwc.com/Web/PwCGlobal/%7Bc9b4307d-7b5c-4f37-842e-43711258bd18%7D_PwC_Citizens_at_the_centre_Report.pdf

23 JRC Publication Repository, Exploring Digital Government transformation in the EU, 2019, https://publications.jrc.ec.europa.eu/repository/handle/JRC118857

24 Ibid

25 European Commission Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs, Study on the uptake of emerging technologies in public procurement, https://ec.europa.eu/growth/single-market/public-procurement/digital-procurement/emerging-technologies-public-procurement_en

26 European Commission, Missions in Horizon Europe, https://ec.europa.eu/info/research-and-innovation/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/missions-horizon-europe_en

Recommendations on implementing automation technologies in the public sector

According to a recent report by the European Commission Directorate-General for Informatics[27], all EU Member States have foreseen investments to boost the digitalisation of their public sector as part of their National Recovery and resilience Plans to approximately EUR 28 billion.

Looking at cross-cutting investment trends, EU Member States are planning to further invest in the digitalisation of their public administrations. Such ambitious goals are typically implemented by adopting a holistic digital strategy at a national level, which focuses on different and often intertwined aspects, such as:

- **Simplification of internal administrative processes and procedures;**
- **Promotion of interoperability and the Once-Only principle;**
- **Introduction of more flexibility in working conditions;**
- **Improved delivery of digital public services;**
- **Enhancement of digital skills and digital awareness among civil servants[28].**

To maximise impact, governments should always try to align automation opportunities with their mission. Digital technologies such as automation can open more channels for interaction and collaboration between the public and the government. These changes, in turn, should result in more accountable, transparent, trustworthy, and efficient public administrations.

Public servants play a critical role in fostering the diffusion of new technologies in government and will benefit significantly from the latest job opportunities. At the same time, increasing human capacity to ensure sustainable digital governments is crucial for making the digital transition a reality within the public sector.

Lastly, public administrations are often challenged by organisational and bureaucratic obstacles, which decrease the usage of new technologies in the public sector. A successful digital transformation should also prioritise and nourish a culture of innovation within the public administration.

Therefore, governments should consider investing in:

- **Creating roles and career paths to attract highly skilled professionals in the areas of digital technologies to fulfil the ambitions of the Digital Decade;**
- **Equipping the public sector workforce with the digital skills required for the implementation of the Digital Targets;**
- **Prioritising and incentivising training to address the skills gap.**

27 European Commission, Digital path to recovery and resilience in the European Union, Digital path to recovery and resilience in the European Union | Joinup (Europa. EU)

28 Ibid

B

FOSTERING INNOVATION AND DIGITAL TRANSFORMATION OF BUSINESSES

According to a discussion paper from McKinsey Global Institute[29], around 70% of companies would adopt at least one type of Artificial Intelligence (AI) technology by 2030, including computer vision, natural language, virtual assistants, robotic process automation, and advanced machine learning.

To remain competitive, European businesses need to leverage technology to speed up decision-making and execution while also moving their operations onto efficient digital infrastructures. That being said, **a key digital target set for the business industry focuses on increasing the adoption of cloud computing systems, artificial intelligence, and big data. By 2030, three out of four businesses should use such technologies.**

A similar analysis was conducted by the European Parliamentary Research Service (EPRS)[30] in a briefing published in March 2021 on digital targets for 2030 and identifying current gaps. It touches upon the proposed digital compass tool and emphasises that the digitisation of European industry still lags, particularly for SMEs. The most significant gaps (below average) are found in the areas of 5G, cloud, big data, AI and having a steady number of ICT specialists that meet the demand.

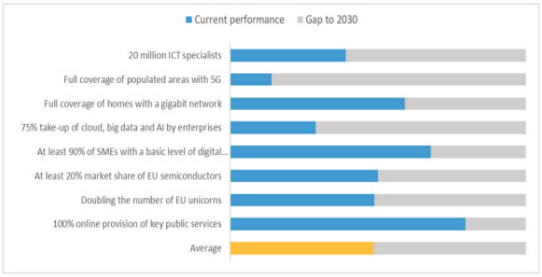


Figure 3
EU current level vs digital compass targets for 2030.
Source: European Commission, 2021[31]

Another Digital Target states that more than 90% of SMEs should reach at least a basic level of digital intensity, defined as "the degree to which different industry sectors have adopted digital technologies."

Nevertheless, several barriers to AI adoption remain, such as data accessibility, cost, and skills. A study from the OECD[32] uncovered that small and medium-sized companies (SMEs) face multiple challenges and barriers related to AI adoption, including lack of awareness about the benefits of such technologies, shortage of skilled workers, high sunk costs, and the need to engage in complementary investments. The study also mentions that SMEs encounter data analytics gaps and AI solutions implementation.

OPPORTUNITIES TO LEVERAGE AUTOMATION BY BUSINESSES

The McKinsey Global Institute (MGI)[33] has constantly been researching the impact of automation on the economy during these last few years, identifying significant benefits of deploying such technologies, such as productivity gains, improving performance, adding quality and speed, and reducing errors. MGI estimated that automation could raise productivity growth globally up to 1.4 per cent by the year 2065 annually (by comparison, IT productivity growth from 1995 until 2005 amounted to 0.6 per cent of productivity growth).

Furthermore, OECD argues that a digital uptake shift has happened since the beginning of the COVID-19 pandemic, calling for new analyses. OECD argues that micro-firms are going under the radar in most reports and that up to 70% of SMEs are making more use of digital technologies due to COVID-19. Some areas that have benefited from fast digitalisation include e-banking, e-learning, intelligent working solutions, and the leisure industry.

By identifying the global RPA market share based on the application and domain areas as statistically visualised by Grand View Research, we can get a deeper insight into tech uptake and digitalisation of SMEs. Although most RPA systems implemented globally can be found in the financial sector, IT and logistics, these other trends should not be ignored.

29 McKinsey Global Institute: Notes from the AI Frontier - Modelling the Impact of AI on the World Economy, 2018. https://www.mckinsey.com/~/media/McKinsey/Featured%20Insights/Artificial%20Intelligence/Notes%20from%20the%20frontier%20Modeling%20the%20impact%20of%20AI%20on%20the%20world%20economy/MGI-Notes-from-the-AI-frontier-Modeling-the-impact-of-AI-on-the-world-economy-September-2018.ashx

30 EPRS Briefing, The EU Digital Decade, https://www.europarl.europa.eu/RegData/etudes/BRIE/2021/696189/EPRS_BRI(2021)696189_EN.pdf

31 European Commission, EU current level vs digital compass targets for 2030, 2021, https://www.europarl.europa.eu/RegData/etudes/BRIE/2021/696189/EPRS_BRI(2021)696189_EN.pdf

32 OECD, The Digital Transformation of SMESs, https://www.oecd-ilibrary.org/sites/01a4ae9d-en/index.html?itemId=/content/component/01a4ae9d-en

33 McKinsey Global Institute: Harnessing Automation for a future that works, 2017, https://www.mckinsey.com/featured-insights/digital-disruption/harnessing-automation-for-a-future-that-works

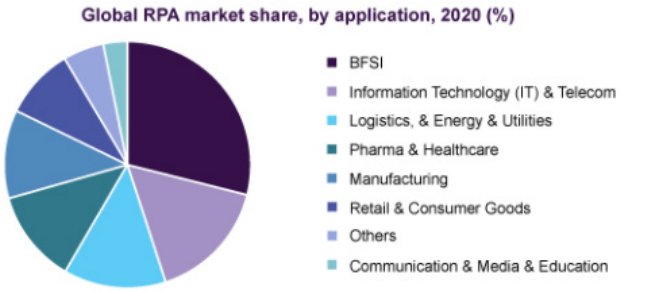


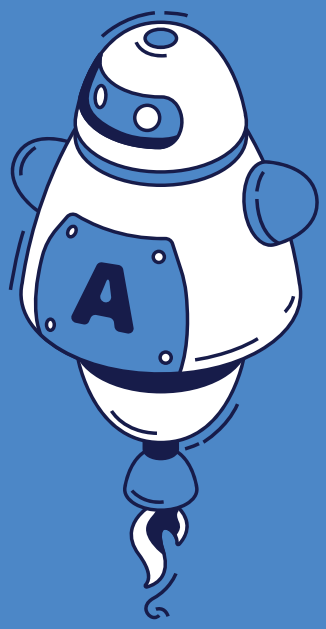
Figure 4

Source: Global Robotic Process Automation Market Size, Share & Trends Analysis Report by Type, by Service, by Application, by Deployment, by Organisation, by Region, and Segment Forecasts, 2021-2028, Grand View Research.

In addition to tackling repetitive tasks, boosting business productivity and delivering a better customer experience, RPA technologies significantly cut operational costs and increase the return on investments. The Institute for RPA[34] estimates that RPA solutions can deliver an immediate savings of 25% to 40% in labour costs alone. Additionally, based on McKinsey Digital[35], business automation with RPA can result in an ROI of between 30 and 200 per cent in the first year.

To summarise, operation leaders have identified the three most significant outcomes of implementing RPA in their business: speed and efficiency, FTE (full-time equivalent) savings targets which can be exceeded by 25%[36] improved customer service and experience.

When it comes to RPA helping the COVID-19 contingency planning, EY concludes[37]: management who implemented RPA solutions before this crisis is more likely to experience better business operations and keep a steady workflow than others. Hence, the implementation and deployment uncertainties revolving around automation are short-term because, soon, RPA, AI and OCR are sure to drive businesses to be less reliant on individual operators.



34 Gartner, Considerations for Implementing Robotic Process Automation, 2019, https://emtemp.gcom.cloud/ngw/globalassets/en/doc/documents/considerations-for-implementing-robotic-process-automation.pdf

35 McKinsey Digital, The next acronym you need to know about: RPA (Robotic Process Automation), 2016, https://www.mckinsey.com/business-functions/mckinsey-digital/our-insights/the-next-acronym-you-need-to-know-about-rpa#

36 Joanne Masters, Business Process Automation project result in rapid ROI and improved customer service for Co-operative Bank, https://www.finextra.com/finextra-downloads/featuredocs/co-op%20case%20study%20final.pdf

37 EY Belgium - How RPA can help COVID-19 contingency planning, 2020, https://www.ey.com/en_be/intelligent-automation/how-rpa-can-help-on-covid-19-contingency-planning

Recommendations on increasing the uptake of automation by businesses

In a nutshell, implementing RPA and using AI as an extension increases overall business efficiency through the betterment of productivity, accuracy, and customer experience while reducing costs[38]. For companies to achieve RPA benefits, specific preparations are necessary to ensure a smooth transition. Sources[39] advise identifying the needs of an organisation on both micro and macro levels. Secondly, the IT department should be involved from the beginning by defining software development metrics and preparing the automation documentation. Of course, in the case of SMEs, there is no need for systematic enterprise analysis, but RPA can be essential for gaining a competitive advantage[40]. This is even more important to SMEs than significant enterprises, as SMEs face budget constraints and a more limited workforce. For these organisations, automation is critical.

A pivotal opportunity to help increase the adoption of digital technologies is to ensure that such adoption caters to both the digital and the green transition. The European Commission states[41] that "Europe must leverage the potential of digital transformation, which is a key enabler for reaching the Green Deal objectives." That said, companies can leverage data-led insights and create products, strategies and business models that minimise their impact on the planet[42].

For example, some EU countries, such as Portugal, are channelling investments in the digital transition of companies to achieve sustainable outcomes. According to the targeted investment financed through the RRF, "this investment will reduce the use of paper by businesses through the dematerialisation of invoicing, create a safer and more reliable business environment, through a set of certifications, and reduce overall red tape costs structured through:

- **Promoting digital innovation hubs and centralising a set of services to support the digital transition of companies;**
- **Dematerialising invoicing by targeting the automation of the process of affixing a qualified electronic signature for issuing invoices;**
- **Developing structures for cybersecurity, privacy, usability and sustainability certification seals."**[43]

Furthermore, digitalising essential government services - especially if they meet public expectations and become more resilient, foresightful and efficient - directly impacts the digital transformation of businesses.

38 IBM, Intelligent Automation: How Combining RPA and AI Can Digitally Transform Your Organisation, 2021, https://www.ibm.com/cloud/blog/intelligent-automation-how-combining-rpa-and-ai-can-digitally-transform-your-organization

39 The European Business Review, Where to Start with RPA Adoption: a Guide for Enterprise, 2021. https://www.europeanbusinessreview.com/where-to-start-with-rpa-adoption-a-guide-for-enterprise/

40 TechTarget, RPA Is Essential for Small and Mid-sized Enterprises to Gain a Competitive Advantage. https://www.techtarget.com/searchcio/robotic-process-automation/RPA-Is-Essential-for-Small-and-Midsized-Enterprises-to-Gain-a-Competitive-Advantage

41 EU Open Source Observatory, Open Technologies in the Green Transition, 2021, https://ec.europa.eu/newsroom/joinup/newsletter-archives/38521

42 World Economic Forum, Here's how digital transformation and sustainability can flourish together, 2021, https://www.weforum.org/agenda/2021/03/here-s-how-digital-transformation-and-sustainability-can-flourish-together/

43 European Commission, Digital Path to Recovery and Resilience in the European Union, 2022, https://joinup.ec.europa.eu/sites/default/files/news/2022-03/Report_Digital%20path%20to%20recovery%20and%20resilience%20in%20the%20European%20Union.pdf

The European Commission[44] mentions how increased transparency through electronic invoice payments can save businesses in the EU up to €50 billion in total, while cross-border digital public services would help with data automation oriented interoperable platforms.

At the same time, the EU is developing many training and skills development strategies regarding automation technologies, such as the Cedefop's (European Centre for the Development of Vocational Training) Digitalisation, AI and future of work project[45]. Cedefops' analysis of automation of work aims to be a key input to the practical design of adult learning and upskilling/reskilling policies in the EU, which shows that the increased automation will not drive unemployment in Europe. Other experts agree and conclude[46] how job losses due to automation in Europe's leading economies will be offset by a shrinking working-age population and new digital and green jobs.

C EQUIPPING THE POPULATION WITH BASIC AND ADVANCED DIGITAL SKILLS

The importance of digital skills has been increasing for over a decade now, as more and more individuals are resorting to online learning platforms to develop their digital skills. However, as we transition towards an increasingly automated and data-driven labour market, digital literacy, reskilling and upskilling, reinventing education systems, and lifelong learning become part of the new future of the work paradigm and should be prioritised accordingly.

As part of the Digital Decade, at least 20 million ICT specialists should be trained by 2030, and 80% of the EU's population should be equipped with basic digital capabilities.

According to the 2020 Future of Jobs Report from the World Economic Forum[47], similar to the 2018 data, the positions that will experience an increased demand after 2022 include Data Analysts and Scientists, Software and Applications Developers, and E-commerce and Social Media Specialists. Furthermore, new roles are expected to emerge due to the enhanced understanding and leveraging of the latest emerging technologies. The acceleration of automation and the increasing cyber-security risks reflect a growing number of jobs such as Process Automation Specialists, Information Security Analysts and Internet of Things Specialists. "The jobs of tomorrow" will become a reality in this decade and will emerge from new occupations that will undergo a transformation process regarding the competencies and skills needed by the employee.

According to the same report, the top skills employers will need are critical thinking, analysis, and problem-solving, as well as self-management skills such as active learning, resilience, stress tolerance and flexibility. At the same time, 94% of the business leaders reported that their employees would probably need to build new skills. The jobs of tomorrow will create numerous opportunities for people to pivot between different professions with a grounded series of skills such as the ones mentioned above.

Automation shifts the focus from repetitive tasks to ones that need empathy, creativity, innovation, and cognitive skills. As a consequence of this, the job market will change. Some working opportunities available today will become obsolete, but innovation and technology adoption will contribute to creating many new and more rewarding roles.

According to recent research, some of the most common reasons employees quit are the unmanageable workload and the lack of meaningful work. In this context, we need to grab the opportunity to make work more valuable and fulfilling[48].

44 European Commission - eGovernment and digital public service https://digital-strategy.ec.europa.eu/en/policies/egovernment

45 CEDEFOP, Digitalisation, AI and the future of work, https://www.cedefop.europa.eu/en/projects/digitalisation-and-future-work/automation-work-and-skills

46 Pete Swabey; TechMonitor, Greater automation is coming, but it will not drive unemployment in Europe, 2022, https://techmonitor.ai/policy/education-and-employment/greater-automation-is-coming-but-it-will-not-drive-unemployment-in-europe

47 World Economic Forum, Future of Jobs Report 2020, https://www3.weforum.org/docs/WEF_Future_of_Jobs_2020.pdf

48 McKinsey, Gone for now, or gone for good? How to play the new talent game and win back workers, https://www.mckinsey.com/business-functions/people-and-organizational-performance/our-insights/gone-for-now-or-gone-for-good-how-to-play-the-new-talent-game-and-win-back-workers

At the same time, according to the 2020 Future of Jobs report from the World Economic Forum[49], developing and enhancing human skills and capabilities through education, learning, and meaningful work are critical drivers of economic success, individual well-being and societal cohesion.

PREPARING FOR THE FUTURE OF WORK

Over the next 10 to 15 years, the adoption of automation and AI technologies will transform the workplace as people increasingly interact with ever-smarter machines. According to recent research conducted by Google and McKinsey & Co.[50], more than 90 million European workers may need to develop practical new skills within their current roles, while up to 21 million may have to leave declining occupations by 2030.

Based on these predictions, in the future, people are expected to spend less time on predictable physical activities and on collecting and processing large amounts of data, activities where machines exceed human performance. Accordingly, they will spend more time on activities that devices are less capable of, at least with the currently available technology, such as managing people, applying expertise, and communicating with others[51]. Therefore, the secret to thriving in the future of work is to constantly learn and acquire "in-demand skills", both socio-emotional and technological (e.g. programming, data analysis etc.).

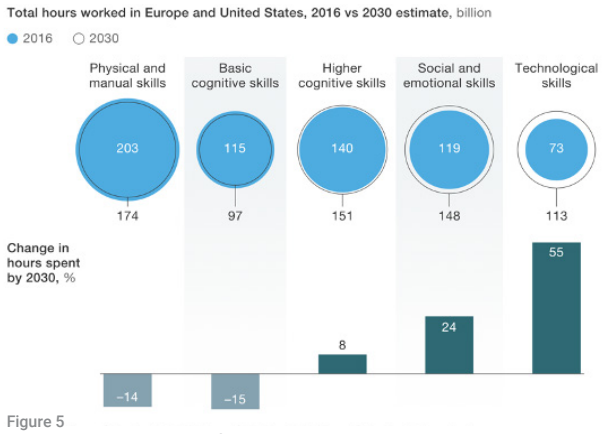


Figure 5
cKinsey Global Institute Workforce Skills Model: McKinsey Global Institute analysis

At the same time, advanced technologies require people who understand how they work and can innovate, develop, and adapt them. Essentially, there are two main options for retraining[52] employees: in-house (when companies allocate resources to constantly upskilling their employees) or working with external educational institutions.

Along with adopting advanced technologies into the workplace, there will be an increase in the need for workers with finely tuned social and emotional skills — those skills that machines are a long way from mastering. Therefore, a shift in demand toward higher cognitive skills such as creativity, critical thinking, decision-making, and complex information processing is also expected.

Automation will be present in different fields, disregarding the level of education of the employees. As stressed by the 2030 Digital Targets, everybody should acquire basic digital skills, not only people aiming to pursue a career in tech. Nevertheless, the advanced use of technology will represent a requirement for many jobs, creating opportunities to increase the number of ICT Specialists.



49 World Economic Forum, Future of Jobs Report, 2020, https://www.weforum.org/reports/the-future-of-jobs-report-2020

50 Google and McKinsey & Company, Protecting Europe's workers: The urgent need for skills, 2020, https://blog.google/around-the-globe/google-europe/protecting-europes-workers-the-urgent-need-for-skills

51 McKinsey Global Institute, Jobs lost, jobs gained: What the future of work will mean for jobs, skills and wages, 2017, https://www.mckinsey.com/featured-insights/future-of-work/jobs-lost-jobs-gained-what-the-future-of-work-will-mean-for-jobs-skills-and-wages

52 Harvard Business Review, Automation Will Make Lifelong Learning a Necessary Part of Work, https://hbr.org/2018/05/automation-will-make-lifelong-learning-a-necessary-part-of-work

Recommendations on future-proofing education

The COVID-19 pandemic directly impacted how people communicate, teach, learn, and work. At the same time, the ICT curriculum is part of various primary educational systems to familiarise students with different types of technology and how to use them.

It is essential to acknowledge that digital skills are also gained through non-formal education processes. Some companies have even eliminated the degree requirements in the hiring process. As employers can quickly assess hard skills in pre-employment testing, they have realised that the inflation of degrees might not bring added value to their need for talent[53].

At the same time, with the discrepancies brought out by the pandemic in the working and education fields, a new area started to form: the basic digital education field[54]. This creates a learning offering for those with low levels of digital literacy who need an adequate digital infrastructure.

Nevertheless, the impact of the pandemic on education will be better seen in the long term. Unequal access to the Internet, lack of digital devices, and, in the end, the educational process might make young people disconnect from the system (partially or entirely). At the same time, the learning gaps can still follow students in the labour market and create lower-income opportunities for them[55].

In addition to technology's impact on education and learning, there is also the perspective and opportunity for how the education system can benefit from increased digital transformation. The concept of ed-tech - suggesting non-conventional technology designed to deliver or augment learning could be one such example. This raises the opportunity to introduce technology-driven innovations[56] to teaching and learning and the challenge of meaningful involvement of teachers and trainers while using digital tools.

The Digital Education Plan 2021-2027 has as its main priority enhancing digital skills and competencies[57]. Now, more than ever, Europe needs an integrated approach to modernising education by ensuring collaboration and partnerships across academia, companies, public authorities, non-governmental organisations, and other learning partners, as well as shaping accessible and inclusive programs together to deliver on the skills dimension of the Digital Targets.

The pandemic raised many questions about the ability of the educational systems to help the young generation obtain the skills needed for future jobs. Therefore, it is critical to accelerate investments in learning and education and bridge the skills mismatch in the market by adopting comprehensive and inclusive policies. To increase overall life quality, no one should be left behind the technological progress.

53 Harvard Business Review, 2022, https://hbr.org/2022/02/skills-based-hiring-is-on-the-rise

54 UNESCO - Institute for Lifelong Learning, There is still no unifying idea for adult education in the digital age, 2022, https://www.uil.unesco.org/en/articles/there-still-no-unifying-idea-adult-education-digital-age

55 European Investment Bank, Education after the pandemic, 2021, https://www.eib.org/en/essays/covid-19-digital-education

56 International labour Organisation, Shaping skills and lifelong learning for the future of work, 2021, https://www.ilo.org/wcmsp5/groups/public/---ed_norm/---relconf/documents/meetingdocument/wcms_813696.pdf

57 European Commission, Digital Education Action Plan, https://education.ec.europa.eu/focus-topics/digital-education/about/digital-education-action-plan#:~:text=What%20is%20the%20Digital%20Education,States%20to%20the%20digital%20age

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