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IMPACTS OF GLOBAL TRENDS ON THE EUROPEAN UNION COMPETITIVENESS

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ABSTRACT

The mighty forces driving global transformation started in the early nineties of the last century are changing the world face more and more quickly and deep. The world becomes increasingly complex, a source of more challenges and less safe. In the context of the current global scenario, characterized by intense interconnectedness and rapid changes, Europe faces a series of challenges and opportunities arising from key global trends: aging population, social changes, digital transformation, climate changes and health crisis and pandemic. These factors, along with others, play a fundamental role in shaping the continent's competitiveness in the international economic landscape. The aging population imposes new pressures on pension and healthcare systems, while social changes, such as growing environmental awareness and diversification of consumer preferences, are redefining market dynamics. At the same time, digital transformation is revolutionizing industries, business models, and interpersonal relationships, opening up new opportunities for innovation and economic growth. In this context, this review paper aims to explore in detail the complex impacts of these emerging global trends on competitiveness in Europe reshaping our future and at the same time try to find solutions to handle of these ones.

Keywords: Global trends, competitiveness, social, environmental and economic impacts

1. Introduction

Europe has regarded as an outperforming region of the world in both quality of life and policies supporting people. However, the wellbeing of Europeans challenged from several aspects. The world has been changing over the coming decades, and so will Europe. Combining of long-term goals into near-term decision-making can raise chances of success. The better you understand the true nature of emerging challenges, empowering you to anticipate and prepare for coming, future shaping transformations.

According to the definition, global trend mean as any major changes, shock, or development that has the potential for serious global impacts (Gelsdorf, 2010). This paper provides

overview about five main, complex, unprecedented global trends affecting essentially on the European Union long-term prosperity. These trends are: 1) Aging population and at the same time with a growing middle class and widening inequalities. 2) Social and cultural changes 3) Digitisation processes, which can be invader and their applications transforms societies in almost every aspect lead to radical, disruptive changes. 4) Managing scarcity of resources becomes an increasing challenge, with rising energy consumption and shifting patterns of production. 5) Health Crises and Pandemics (ESPAS, 2015; ESPAS, 2024).

Interconnections of these trends and interdependence of countries, now a fact of global life, not matched by strengthening global governance. The world order becomes more fragile and unpredictable. Economic weight and political power is shifting to Asia. Sustained development of the world economy is becoming more vulnerable to challenges and to weaknesses in the globalisation process. Developed countries have to promote awareness concerning global challenges and it may result with a domino effect for other states.

Furthermore, the authors suggest recommendations for exploitation of the future potential opportunities and avoiding the hidden unknown pitfalls.

2. Methodology

In this paper, the authors made bottom-up approach inductive research strategy, which is exploratory, flexible, adaptable to new findings and based on qualitative observation analysis (like textual or visual analysis, to find patterns and themes in the data). With this method, new theories and ideas can be made from the data. In this context, the authors had studied the available relevant theoretical literatures as reference base, gathering, structuring data and draw conclusions. The implementation methodology based on secondary or “desk” research analysing international organisations documents (European Central Bank /ECB/, European Commission /EC/, The European Strategy and Policy Analysis System /ESPA/, OECD, UN), scientific publications, studies, online literature sources. After than, five contemporary global trends were set up and concerted research works made revealing the complexity and the interconnections of these processes. The conclusions and suggestions made by this research work in this article reflect the private professional view of the authors.

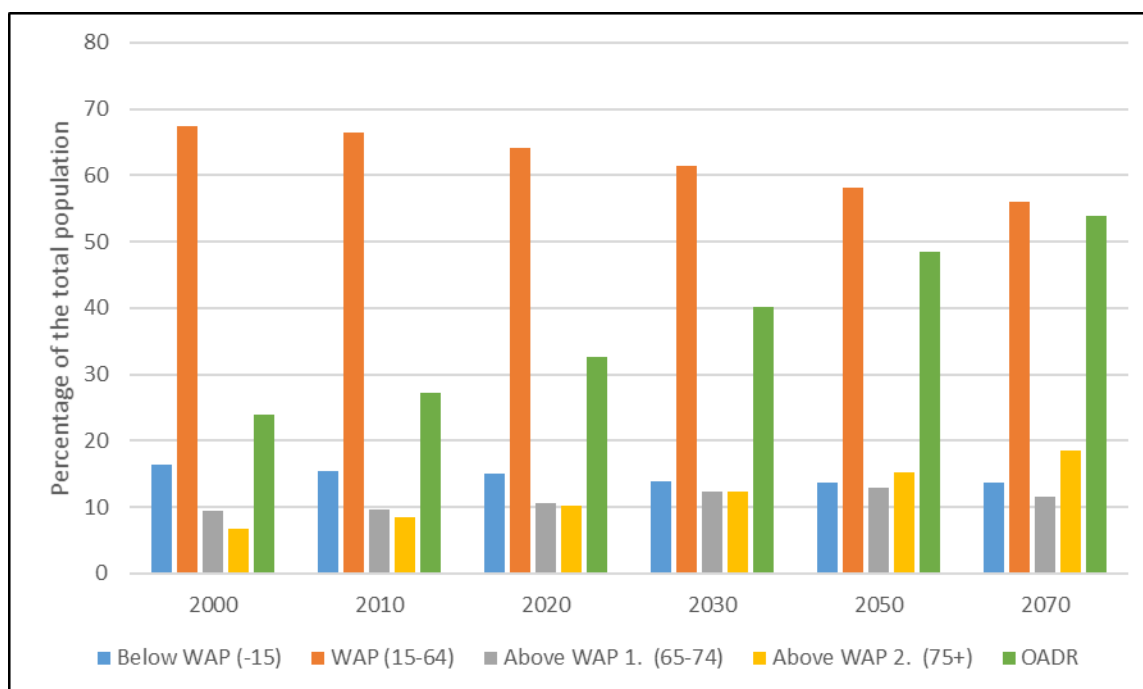
3. Analysis of the emerging global trends

3.1. Aging populations

The first global trend is the aging population: a richer and older group characterised by an expanding global middle class and greater inequalities. The projections for the 2030 are that ageing will be global. The world population growth will slow and peak, possibly within 20 years, at around 8.3 billion people. A new global middle class in the emerging countries will expand rapidly, mainly in cities. Dynamic and technologically empowered, this new group will be especially vulnerable, subject to increasing inequalities and unprecedented ageing. In the period to 2030, global demographics will continue to alter under the impact of increasing life-expectancy, declining fertility and rising levels of education. These developments will modify the structural foundations of the global economy: an ageing world population could have a major impact on developed and emerging economies. If the latter maintain steady growth, then ageing will be accompanied by the rise of a global middle class. The latest growth estimates for the world population contrast with earlier forecasts of a global population increase. The decline in fertility rates in many emerging countries could be greater than forecast and off-set continuing high-fertility rates in Sub-Saharan Africa and in India. With life-expectancy overall increasing, the world population could peak at around 8.3 billion towards 2030, 9.2 billion in 2040, and is projected to rise to 9.7 billion by 2050 (Bodnár&Nerlich, 2022; UN, 2020).

While the longer-term effects of demographic changes are more uncertain, they may well change the global economic and political environment. On the one hand, ageing and the slowing of population growth in most parts of the world would help reduce poverty, but on the other they could also slow the pace at which the emerging economies catch up with the developed. The ageing of the world's population will be amplified as time passes: the number of people over 65 will double over the next 25 years, rising to 13 % of the world population. In many of the most developed countries, the active population (20–70-year-olds) is already declining and will be only partially offset by increasing employment of women and older people. Widespread ageing will probably have major repercussions on the labour force, personal savings and global productivity. Social protection systems in the advanced countries, particularly in Europe, will come under pressure, especially in the health sector, and will struggle to manage the consequences of old-age dependency: between 1965 and 2005 the average retirement age increased by only six months, whereas life-expectancy went up by nine years. By 2040, the EU will have 17 million fewer people of working age than in 2023 and lose a further ten million by 2050 if it remains its current size (Bodnár& Nerlich, 2022; ESPAS, 2015, ESPAS, 2024). Figure 1. illustrates predicted shifts among the age cohorts of the EU demographic structure.

Figure 1. Projected changes in the age cohorts of the EU demographic structure (2000-2070)



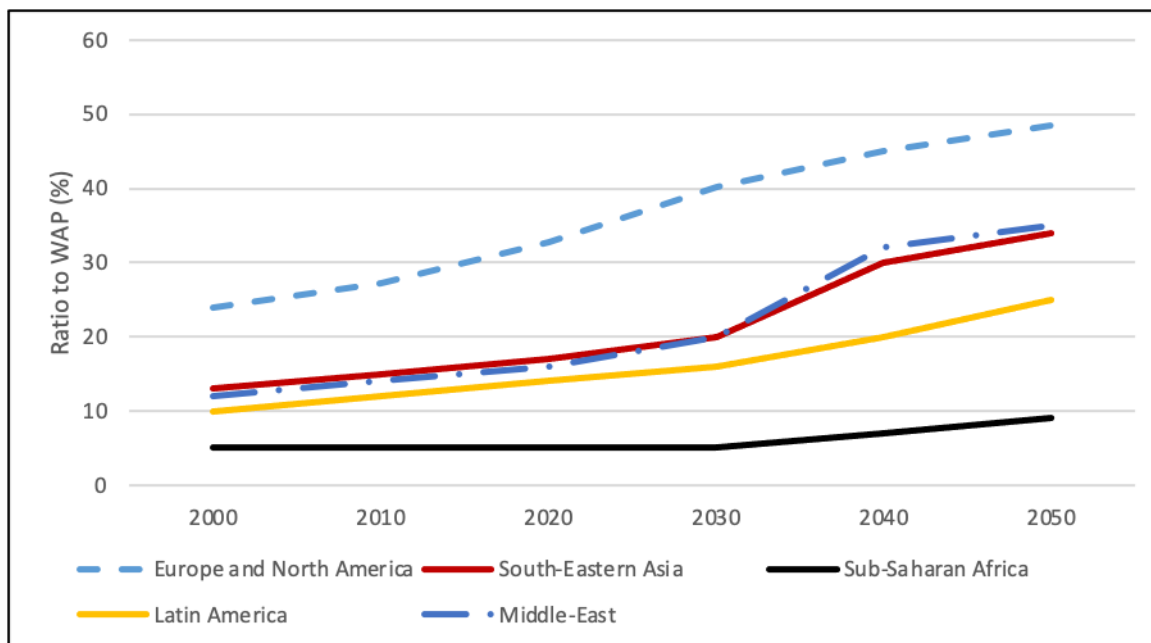
Source: Own edition based on Bodnár&Nerlich, 2022

Notes: Working-Age Population (WAP) is defined as the population aged 15-64. The Old Age Dependency Ratio (OADR) is defined as the ratio of those above 65 years to working-age population. OADR is one of the most widely applied indicator monitoring the changes in the population structure.

The demographic changes in the euro area are acting as a drag on labour supply. Both components of labour supply, the working age population and the labour force participation rate, are affected by population ageing. First, the share of the older working age cohort, those between the ages of 55 and 64, has been gradually increasing. Second, working age population growth is declining and will turn negative dragging down the euro area labour supply. The aging population poses challenges to Europe's labor force dynamics. As older workers retire, there is a shrinking pool of skilled labour, leading to potential shortages in key sectors. This can adversely affect productivity and innovation, particularly in industries that

rely heavily on experienced professionals. Moreover, the burden of funding pensions and healthcare for retirees strains public finances, limiting investment in education, infrastructure, and research, which are essential for long-term competitiveness. The aging population exerts pressure on healthcare systems, leading to increased healthcare expenditure. As older individuals tend to require more medical care and long-term support services, healthcare costs escalate, consuming a significant portion of public budgets. Rising healthcare expenditures divert resources away from other areas crucial for competitiveness, such as education, infrastructure, and research. Addressing the healthcare needs of the aging population while maintaining fiscal sustainability is essential for safeguarding Europe's competitiveness. Another important fact affected by the aging population is the pension system and social security. Europe's pension systems and social security programs face sustainability challenges in the context of demographic aging. With fewer active workers contributing to social security funds and a growing number of retirees drawing benefits, pension systems come under strain. This can lead to fiscal imbalances, necessitating reforms to ensure the long-term viability of pension schemes. Adapting pension systems to accommodate longer life expectancies, promoting private savings, and encouraging workforce participation among older individuals are vital for ensuring the adequacy and sustainability of retirement income, thereby supporting competitiveness. Despite the challenges, the aging population also presents opportunities, for example for knowledge transfer and skills. In fact, older workers possess valuable expertise and institutional knowledge accumulated over decades of experience. Employers can leverage this wealth of experience through mentorship programs, training initiatives, and flexible work arrangements. By facilitating intergenerational collaboration and knowledge exchange, organizations can enhance innovation, productivity, and competitiveness (Bodnár, 2018; Bodnár & Nerlich, 2020; OECD, 2020). The Figure 2. reveals the growth of the OADR by regions.

Figure 2. OADR trends by regions (2000-2050)



Source: Own edition based on UN, 2020

3.2. Social and cultural changes

The second global trend is the social and cultural changes that have been happening globally in recent years. Europe's embrace of diversity and inclusion is not only a reflection of changing demographics but also a strategic imperative for businesses seeking to thrive in a

rapidly evolving marketplace. The region's diverse population brings a wealth of perspectives, experiences, and talents, driving innovation and creativity. Companies that prioritize diversity in their workforce and cultivate inclusive cultures are better positioned to attract and retain top talent, foster collaboration, and adapt to the diverse needs of global markets. Moreover, research consistently shows that diverse teams outperform homogenous ones, leading to improved financial performance and competitiveness. To capitalize on the benefits of diversity, European businesses are implementing initiatives such as unconscious bias training, mentorship programs, and affinity groups to create more inclusive work environments. By valuing diversity as a source of strength and promoting equity and inclusion in all aspects of their operations, companies can enhance their competitiveness and drive sustainable growth in an increasingly diverse and interconnected world (Boucher & Samad, 2013; Lewis, 2019; Aslan & Satman, 2024).

Social and cultural changes are influencing consumer behavior and preferences, driving demand for products and services that align with values such as sustainability, ethical sourcing, and social responsibility. European consumers, particularly younger generations, are increasingly conscious of the environmental and social impact of their purchases and are demanding greater transparency and accountability from businesses. Companies that demonstrate a commitment to sustainability, ethical business practices, and social causes not only meet consumer expectations but also build trust and loyalty, gaining a competitive edge in the marketplace (Nayeem, 2012; ESPAS, 2015; ESPAS, 2024).

To respond to changing consumer preferences, European businesses are integrating sustainability into their business models, supply chains, and marketing strategies. From adopting renewable energy and reducing waste to supporting fair labour practices and community engagement, companies are aligning their values with those of their customers, driving brand loyalty and competitiveness. Moreover, digital technologies such as social media and e-commerce platforms enable companies to engage directly with consumers, build authentic relationships, and communicate their values effectively, further enhancing their competitiveness in the market (Fang, 2023).

The composition of the European workforce is evolving rapidly, driven by social and cultural shifts, demographic changes, and technological advancements. As societies become more diverse, businesses are recognizing the importance of building inclusive work environments that value and celebrate differences. Inclusive workplaces not only attract top talent from diverse backgrounds but also foster creativity, innovation, and collaboration. By promoting diversity in hiring, leadership, and decision-making, European companies can harness the full potential of their workforce and drive competitiveness in the global market. To foster workforce diversity and inclusion, European businesses are implementing a range of initiatives, including diversity training, employee resource groups, and flexible work arrangements. By addressing unconscious biases, creating opportunities for underrepresented groups, and promoting a culture of respect and belonging, companies can create environments where all employees can thrive and contribute their unique perspectives and talents. Moreover, inclusive workplaces are more resilient to change and better equipped to navigate the complexities of a rapidly evolving business landscape, enhancing Europe's competitiveness in the global economy (Rafaqat et al., 2022, Tworek et al., 2020).

Social justice movements and activism are reshaping the business landscape in Europe, with growing pressure on companies to address systemic inequalities and social injustices. Businesses that take proactive steps to promote social justice, diversity, and inclusion not only fulfill their moral and ethical obligations but also gain a competitive advantage. By championing diversity in leadership, advocating for equitable policies, and supporting social causes, European companies can build trust with stakeholders, enhance their reputation, and

strengthen their social license to operate, driving competitiveness in the marketplace. To respond to social justice movements and activism, European businesses are integrating social responsibility into their corporate strategies and operations. From advocating for policy reforms and supporting marginalized communities to investing in diversity and inclusion programs and measuring social impact, companies are aligning their business goals with broader societal goals, driving positive change and enhancing their competitiveness. Moreover, by collaborating with civil society organizations, governments, and other stakeholders, companies can amplify their impact and contribute to creating a more equitable and inclusive society, further strengthening Europe's competitiveness on the global stage (ESPAS, 2015; ESPAS, 2024).

Europe's rich cultural heritage and soft power assets are sources of competitive advantage, shaping perceptions of the region and its products and services. From its historical landmarks and architectural marvels to its vibrant arts, music, and culinary traditions, Europe's cultural heritage attracts tourists, investors, and creative talent from around the world. By leveraging its cultural assets and promoting cultural exchange and collaboration, Europe can enhance its soft power and influence, strengthening diplomatic relations, fostering economic cooperation, and promoting its values and interests on the global stage.

3.3. Digital transformation

Another important global trend is without doubt digital transformation. Digital transformation is revolutionizing economies and societies worldwide, heralding a new era of innovation, connectivity, and opportunity. In Europe, the relentless march of digitalization is reshaping industries, transforming business models, and redefining the concept of competitiveness.

Digital transformation is revolutionizing economies and societies worldwide, heralding a new era of innovation, connectivity, and opportunity. In Europe, the relentless march of digitalization is reshaping industries, transforming business models, and redefining the concept of competitiveness. Economic performance is measured using GDP per capita, while SDG scores represent sustainability. The use of computers and the Internet in enterprises, the volume of e-commerce, and the percentages of implementing new digital technologies, such as cloud computing, Big Data, and the Internet of Things, illustrate digital transformation. The main drivers of digital transformation are the use of computers and the Internet in enterprises and e-commerce. However, new digital technologies exert increasingly noticeable effects, particularly in developed European countries.

The digital revolution is a critical driver in the global evolution of society and the economy. As digital technologies rapidly flourish, they generate significant challenges and opportunities at individual and organizational levels. Digital technologies are essential for achieving economic and sustainability goals. The evolution and increasing implementation of new digital technologies are apparent, with organizations and governments recognizing the competitive advantage that innovation and digital transformation offer. Digital technology can enhance economic growth while being environmentally friendly. Moreover, digital technologies have potential in many relevant fields, such as knowledge exchange, communication, management, information transfer, and employee coordination.

Within the European Union, this digital transformation process profoundly impacts its member states' economic performance and sustainability orientation. The role of digital transformation in ensuring sustainability has not received particular attention. Nevertheless, multinational organizations use new digital technologies to transform business models to address sustainability challenges. Regarding the economy, digital technologies have ushered in a new era of business. E-commerce has become a significant force, disrupting traditional business models. Companies use data analysis to understand consumer behaviour better and

adapt their products and services. Innovation is accelerated, and start-ups can become market leaders in record time. However, this transformation also brings challenges like data security and privacy concerns. Digital technologies have become an essential driver of change and progress in the economy. Cloud computing, Big Data, the Internet of Things (IoT), and artificial intelligence (AI) are several new digital technologies that have joined existing information and communication technologies (ICT) and e-commerce, revolutionizing the conduct of economic processes. Information and communication technologies (ICT) and e-commerce have contributed to the digitalization of society, facilitating online communication and transactions. Cloud computing (CC) has changed how data and applications are stored, managed, and accessed. Through cloud services, data can be stored in virtual data centers, easily accessible from anywhere and on any device connected to the Internet. Clouds have transformed work patterns, allowing access to information and resources regardless of location. Moreover, it has reduced IT infrastructure costs, facilitating development and innovation in both business and the public sector. Big data (BD) has enabled the management of vast amounts of data generated by internet users, IoT devices, and other digital sources. The analysis of this data provides valuable information for businesses, research, and governance. Big Data has transformed the decision-making process by revealing hidden patterns and trends, contributing to improving products, services, and operational efficiency in various industries. The Internet of Things (IoT) has created a global network of connected objects, from cars to household appliances and industrial sensors. These devices communicate and collect data, allowing remote monitoring and control. IoT brings significant benefits, such as more efficient resource management and increased comfort and security in homes and businesses. Artificial intelligence (AI) is a rapidly evolving technology that involves teaching machines to solve complex tasks, allowing for autonomous activity in various fields (EC, 2020; ECB, 2024).

In the digital era, all aspects of technology are closely tied to how information is collected, stored, processed, and transmitted in digital format. Digital technology enables the collection, through IoT and Big Data, storage, via Cloud Computing and Big Data, and processing, through Big Data and Artificial Intelligence, of vast quantities of data, which is crucial in the economic domain. Digital technology facilitates global communication. Email, instant messaging, social networks, and video conferences, among others, rely on transmitting and processing digital information. The speed and capacity of these communications would be impossible without digital technology. Digital information underpins discoveries and technological advancements.

Digital technologies have improved efficiency, connectivity, quality of life but have also brought challenges, such as data security and their impact on employment. It is essential to approach these technologies wisely and manage the transformations they bring to ensure sustainable growth. Understanding and adapting to changes in digital transformation are crucial parts of the evolution of our society. Emerging digital technologies, such as cloud computing, big data, the Internet of Things, and artificial intelligence, along with existing information and communication technologies (ICT), are reshaping how individuals and businesses operate. In addition, Industry 4.0 has ignited a digital transformation, allowing for the collection and processing of large amounts of data and facilitating access to information and services. Digital technologies, combined with a change in mindset, can provide new opportunities for planning, management, and sustainable development. Industry 4.0 represents the integration of advanced information technologies based on integrated and increasingly intelligent software systems, enabling the interconnection of all production process units. IoT, with its sensor-embedded assets, provides vast datasets. Information technologies supply increasingly enhanced IT solutions for efficient real-time data collection and analysis,

supported by Big Data and analytics based on artificial intelligence systems. In addition, cloud computing technologies enable remote solutions for those without access to advanced hardware or specialized IT solutions. Although EU enterprises are gradually adopting new digital technologies, the acceptance of advanced digital technologies remains low. Implementing AI-based technologies, in particular, is limited due to their complexity, which smaller enterprises may find challenging to manage. However, AI's potential for transformation is considerable, with a wide range of applications in various economic and social fields and is expected to play an increasingly significant role in finance and the global economy (Galovic et al., 2024).

Digital transformation significantly impacts business models, enhancing the effectiveness of business operations. The digital revolution also has an extraordinary effect on society, revolutionizing access to information, the way of interaction, and access to services. It is also worth emphasizing the positive impact of computer and internet use in enterprises, such as the increase in the volume of e-commerce, on the digital transformation process of enterprises. Digital transformation is a game-changer for small and medium-sized enterprises (SMEs), empowering them to compete on a global stage alongside larger corporations. In Europe, initiatives like the Digital Single Market and Horizon Europe are instrumental in supporting SMEs to embrace digital technologies, access funding, and explore new markets. These initiatives provide essential resources, guidance, and incentives for SMEs to embark on their digital journey, enabling them to stay ahead of the curve in today's fast-paced digital landscape. One of the most significant advantages of digital transformation for SMEs is the ability to leverage digital platforms and e-commerce marketplaces to reach customers worldwide. With the rise of online shopping and digital transactions, SMEs can now showcase their products and services to a global audience, breaking down geographical barriers and expanding their market reach exponentially. This newfound access to international markets not only drives export growth but also fosters job creation and economic prosperity within the SME sector. Moreover, digitalization enables SMEs to streamline their operations, improve efficiency, and enhance customer experiences. By adopting digital tools and technologies such as cloud computing, data analytics, and automation, SMEs can optimize their business processes, reduce costs, and respond more effectively to customer needs and preferences. This increased agility and responsiveness are essential for SMEs to stay competitive in today's dynamic business environment, where customer expectations are constantly evolving, and market trends are rapidly changing (Brodny & Tutak, 2022; Bocean & Vărzaru, 2023).

Furthermore, digital transformation enhances the resilience and long-term viability of SMEs, enabling them to adapt to disruptions and seize new opportunities in the digital age. By embracing digitalization, SMEs can future-proof their businesses, staying ahead of the curve and remaining relevant in an increasingly digital and interconnected economy. Whether it's embracing remote work technologies, digitizing supply chains, or investing in cybersecurity measures, SMEs that prioritize digital transformation are better equipped to navigate the challenges and uncertainties of today's business landscape.

Digital transformation has the potential to address pressing societal challenges such as climate change, healthcare disparities, and social inequality. In Europe, digital technologies are driving the transition to a low-carbon economy through renewable energy deployment, smart grid technologies, and energy efficiency measures. In healthcare, telemedicine and digital health platforms improve access to care, reduce healthcare costs, and empower patients to manage their health more effectively. In education, digital learning platforms and online courses provide accessible and flexible learning opportunities, narrowing the skills gap and promoting lifelong learning. By leveraging digital solutions to address societal challenges,

Europe can foster inclusive growth, enhance quality of life, and drive competitiveness in the global economy. As Europe embraces digital transformation, policymakers face the challenge of balancing innovation with regulatory oversight and ethical considerations. Initiatives such as the General Data Protection Regulation (GDPR) and the Digital Services Act (DSA) aim to protect consumer privacy, promote fair competition, and ensure the responsible use of digital technologies. By establishing clear regulatory frameworks and ethical guidelines, Europe can foster trust and confidence in digital technologies, encouraging innovation and investment while safeguarding citizens' rights and interests (EC, 2020; ECB, 2024).

3.4. Growing connection between climate change, energy, and competition for resources

Despite the slowing growth of the world population, global competition for access to natural resources and associated risks will continue to intensify, in terms of market volatility, geopolitical tensions, and instability. This is because large-scale exploitation and extraction of natural resources will remain concentrated in a small number of producing countries. For all 19 resources (including crops, timber, fish, meat, metals, fossil fuels, and fertilizers), the top three producers on average account for 56% of global production. The eight dominant actors are China, the United States, Australia, the European Union, Brazil, Russia, India, and Indonesia. In the face of increasing demand for raw materials, the global capacity in the extraction sector is expected to double by 2030. Volatility is poised to increase due to the heightened "financialization." By 2030, managing scarcity will represent the primary challenge for water and food supply. Food demand is forecasted to increase by 50% compared to 2008. This increase is mainly due to the improvement in the standard of living of the rapidly growing middle class in major emerging economies. Another significant challenge will be the availability of agricultural land and certain agricultural inputs, particularly those based on potassium. In the absence of corrective policies over the next 20 years, drastic and irreversible changes are predicted in global ecosystems that will impact climate, the biosphere, continents, and oceans. The World Bank estimates that by 2025, climate change will exacerbate food and water scarcity issues affecting 1.4 billion people. These shortages could pose a serious threat to Southeastern Europe, South America, Africa, and Asia (ESPAS 2015, ESPAS 2024, Joseph et al., 2024).

Unless significant technological progress occurs, water scarcity will have a drastic impact on agriculture: in some countries like China, 90% of water consumption is allocated to food production. By 2030, between 1.9 and 2.6 billion people may lack access to water resources. In Europe, water supply difficulties in the south and east are expected to worsen. The next two decades will see an increasingly close correlation between issues arising from climate change and resource scarcity. Recent studies highlight the growing threat posed by rising sea levels resulting from accelerated melting of Antarctic glaciers. These glaciers contain enough water to raise sea levels by over 1.2 meters, with potentially dramatic consequences for the most exposed coastal areas, where over 60% of the world's population resides (Iberdrola, 2024; Joseph et al. 2024;).

By 2030, the impact of climate change on the European economy will likely still be limited. However, shortly afterward, surpassing the concentration of CO₂ in the atmosphere of 450 parts per million, long considered the critical limit, could lead to much stronger global social impacts, with climate disasters such as floods, droughts, and food shortages likely to generate significant migration flows and conflicts. There is still much debate among scientists and policymakers about the extent of the effects on agricultural production, migration, infectious diseases, and vulnerability to extreme conditions. However, these effects are already being felt worldwide, as highlighted in the fifth report of the Intergovernmental Panel on Climate Change, published in 2014. It also warns that "further warming will increase the likelihood of severe, widespread, and irreversible effects." Risks are considered high to very high if global

average temperature increases exceed 4°C. Even an increase of about 2°C could result in global income losses of around 2%, reduce ocean productivity, and compromise food security. The consequences of increased CO₂ in the atmosphere not directly related to the climate will become increasingly evident and attract growing media attention, particularly ocean acidification and the resulting loss of biodiversity. By 2030, some countries severely affected by certain effects of climate change may even attempt local geoengineering operations, such as cloud seeding using sulfur compounds. Global mobilization by 2030 will depend on the international agreement on combating climate change adopted in Paris at the end of 2015. The European Union, currently responsible for only 10% of global greenhouse gas emissions, will work to influence global policies in this area. Without an ambitious agreement, it would seem impossible to keep average warming below 2°C compared to pre-industrial levels. It will be a challenge to encourage key actors to take collective and decisive action. Otherwise, the fight against climate change would become an issue reserved for individual states willing to do so (Singh, 2013; ESPAS 2015; ESPAS 2024; OECD, 2023).

While it is undeniable that the polar ice caps are shrinking, there is uncertainty about the rate of melting and the possibilities of exploiting the seabed or opening up navigation routes. However, recent studies tend to provide higher estimates of melting than in the past, as the observed rate is well above model-based predictions. Recent scientific studies predict that between 2020 and 2080, the Arctic ice will completely disappear in some areas during the summer, and it is extremely likely to occur between 2020 and 2040. It is necessary to anticipate its profound impacts: the environmental balance in the Arctic is unstable and therefore susceptible to marked changes, the consequences of which will be irreversible given the fragility of its ecosystems. Half of the sea level rise caused by global warming will be due to the melting of the Arctic ice caps and the Greenland ice sheet. Regardless of the scenario, it is certain that the Arctic region will become increasingly accessible. Yet, this will not only be a source of opportunities but also of economic, geopolitical, environmental, and human challenges. Europe and Russia will occupy a strategic position in controlling access to the Northern Sea Route, which will remain open for more than 50 days in the summer (Northeast Passage). The Arctic region contains significant natural resources, between 15% and 30% of unexplored gas reserves, and mineral resources (zinc, nickel, graphite). Arctic waters are the richest fishing grounds in the world, and global warming will drive a number of economically interesting species northward. In terms of connections between Europe, North America, and Asia, the opening of semi-permanent navigation routes will bring significant benefits, especially when they become navigable for long periods during the year. This could influence global trade routes, although forecasts on traffic are still very uncertain: Arctic routes could represent between 2% and 15% of total cargo traffic by 2030. By that date, at least 500 ships per year could use the Northern Sea Route, totaling 1.4 million TEUs (twenty-foot equivalent units) (Singh, 2013; Berwyn, 2024).

Natural resources, the opening of navigation routes, increased tourism, and scientific research will make the Arctic a highly coveted space and a valuable transit route. From the Arctic, the borders between Russia, Canada, North America, and Europe are much closer. However, governance has not yet met the challenges. Tensions over the exploitation of the polar region could worsen due to territorial and maritime disputes over resource usage rights. Managing navigation routes and access to new resources will require political cooperation to avoid overexploitation and irreversible damage to the natural environment. The relevant forum, the Arctic Council, includes states bordering the region; among the observers are major states like China and, perhaps in the future, the European Union. Its success will depend on the issues at stake and could be influenced by conflicts between the main stakeholders, namely Russia, the European Union, and the United States.

Even in the best-case scenario, the effects of current increasing energy consumption will be lasting and may even worsen in the near future. The increase in global consumption will be mainly linked to population growth and rising incomes. By 2030, 93% of the increase in consumption will come from non-OECD countries. By 2030-2040, energy savings and the development of renewable sources will not be sufficient to limit the growth of CO₂ emissions. The use of traditional nuclear energy will remain controversial but, in any case, will not be adequate to address the gravity of the problem. Progress in energy efficiency, CO₂ storage, and demand management may also not be enough (BP, 2013; OECD, 2023).

The global energy landscape will be characterized by a change in supply flows rather than abundant reserves, including those from unconventional sources such as shale gas. Global energy policy will continue to be transformed by new extraction technologies. Since the first oil crisis in 1973, energy geopolitics has reflected the balance of power between producing countries, especially the Organization of the Petroleum Exporting Countries (OPEC) and Russia, and importing countries, particularly the United States and Europe. This balance will change profoundly when the United States becomes largely energy-independent. In Asia, the share of energy imports globally will further increase significantly. In particular, China will have a growing role as an importer but also as a diplomatic actor in the oil-producing region. OPEC's importance may also diminish as its share of global production decreases. In many producing countries, activity is shifting from large multinational corporations to national enterprises, sometimes returning to a policy of "resource nationalism." This could impact research and development of less accessible reserves, for which such enterprises do not possess the technical capabilities or investment resources (Elass et al., 2012; WEF, 2023).

3.5. Health Crises and Pandemics

The COVID-19 crisis has had an abrupt impact on the EU27 economy and triggered unprecedented policy responses across Europe and the globe. As the pandemic is still unfolding globally, and at the time that a second (and potentially even a third) wave still keeps Europe and the world in its grips, it is too early to assess the full impacts of this crisis.

The impact of the COVID-19 pandemic on the EU economy

The GDP of the euro area contracted by 6.6% in 2020, marking the deepest recession since the Second World War. Compared to the global economy, the euro area has experienced a larger hit in 2020 and started a slower recovery in 2021. However, it is important to note that a return of the economic activity to pre-crisis levels entails slow growth for the EU economy. After the initial shock in the economic activity in Europe in the first half of the year, the EU economy rebounded in the third quarter, as containment measures were gradually lifted. However, the resurgence of coronavirus infections led to another decrease in economic activity in the last quarter of 2020. According to the European Winter 2021 Economic Forecast, the recovery in Q3 2020 did not reach the levels of actual hours worked preceding the COVID-19 crisis. Furthermore, the labour market situation is expected to further worsen in 2021 due to the expiry of government measures, with unemployment figures increasing before declining again in 2022. The production in the industry (manufacturing) in the EU27 experienced a sharp decrease in March and April 2020 (respectively -11.1 and -20% change on the previous period), which coincided with the first wave of the spread of the coronavirus. It was then followed by a rebound in May and June 2020 (respectively 13% and 10.4% change on the previous period) and then by a small but increasing values in the period September-November 2020 that coincided with the resurgence of COVID-19 cases. To some extent, these dynamics point to an adaptation of the EU manufacturing companies to the new realities of the pandemic and a milder impact of the second lockdown upon the EU27 industry (Tudorache et al., 2021).

For 2021, the projections for the real GDP growth in the euro area range from 3.6 to 4.2%). Even though this can be considered as a positive forecast as compared to the economic forecasts produced in 2020, the dominant outlooks show a path to slow economic recovery in the next 2 years. Compared to the estimates for the real GDP of the global economy, the euro area has experienced a larger hit in 2020 and will experience a slower recovery in 2021. The EU economy experienced a stronger shock than China and the US (2% growth and -3.6% decrease respectively) in 2020, while it is significantly lagging behind the recovery forecasts for China (7.9 and 5.2% change on preceding year for 2021 and 2022, respectively). There are two important caveats as concerns the above forecasts. Firstly, the COVID-19 pandemic is ongoing, and then situation might change rapidly depending on the speed of rollout of the vaccination process, the efficacy of the vaccines, further mutations of the virus, and government decisions on how to handle the health risks. These will determine the occurrence and strength of further COVID-19 waves. Consequently, the economic forecasts will continue to change (similarly to the adjustments made throughout the whole of 2020). Secondly, in spite of the improving outlook for the EU on the return to the pre-crisis level of the economic activity, such a return would still mean slow growth for the EU economy. Another concern for the EU economy is the rise in unemployment. The unemployment rate increased sharply in 2020, both in the EU27 and the euro area, reaching 7.8% and 8.7% respectively in the period July- September 2020. In the remaining months of 2020, it slowly decreased. On a positive note, the EU unemployment rate is still far from the rates recorded after the 2008 financial crisis. However, the evolution of labour market slack suggests that the impact of the pandemic has been more severe than indicated by the traditional indicators. This is illustrated by the index of total actual hours worked (de Vet et. al., 2021).

According to the latest developments, the eurozone economy stagnated at the end of 2023 due to the rigorous financing conditions, moderate confidence from the interested stakeholder side and past competitiveness losses on European level. Nevertheless, moderate speed-up in economic growth can be forecast for 2024, as real disposable income rises - alongside falling inflation and strong wage growth - and the terms of trade improve. Presumably, the current transportation disruptions in the Red Sea will not lead to the re-emergence of significant supply constraints, export growth is expected to catch up with strengthening external demand. In medium term, the gradual fading of the effect of the European Central Bank's monetary policy tightening should also help to foster the recovery. As a result, real GDP is expected to grow at an average annual rate of 0.6% in 2024, rising to 1.5% in 2025 and 1.6% in 2026. The unemployment rate will remain around 6.6%, as in recent years (ECB, 2024b).

Globally, goods trade fell more rapidly and recovered more swiftly than during the previous financial crisis, but so far, services trade remains depressed. In the euro area, there is a clear deviation in the manufacturing and services Purchasing Managers' Index (PMI) since January 2020, with services clearly hit much harder. The PMI shows very different dynamics as compared to the 2008 crisis, when services experienced a smaller decrease as compared to the manufacturing PMI. Yet, the recovery in industrial production remains incomplete due to considerable investment weakness. Global economic growth will remain subdued as monetary policy tightening continued to be transmitted through the economy. Global GDP growth was 3.4% in 2023 and predicted around 3.2 % over 2025-26, slightly below the average over the last decade (Cifuentes-Faura, 2021; ECB, 2024b).

After the analysis of the impact of the COVID-19 crisis on the overall EU economy, in the following sections, we focus on specific sectors of the EU industry (Cantore et al., 2020; ESPAS, 2024; Khlystova et.al., 2022; KPMG, 2020; Nayak et.al., 2022).

There are remarkable differences in performance across, but also within sectors (EC, 2021; ECB, 2021). A large part of the digital industry has performed well, and so has the healthcare industry. Enabling industries like chemicals, construction, and the food and drinks sector are likely to experience a V-shaped recovery from the crisis. Despite the initial shocks, automotive and textile industries appear to be on a recovery path since the first lockdowns. Sectors that are dependent on human contact and interaction, such as the cultural and creative industries and the aerospace industry (due to the decrease in mobility and tourism activities), have experienced substantial hits by the crisis, and they are likely to suffer for extended periods from these unprecedented shocks. The pandemic acted as an accelerator of digitalisation. The differences in the severity of COVID-19 effects are partially explained by the ability of businesses to go digital. Furthermore, the crisis leads consumers to re-assess their needs and allows for a potential acceleration of the green agenda. For example, in the automotive sector, despite the decline in the demand for new vehicles, the impact of the pandemic on the demand for electric vehicles seems to be much less severe. This also affects the forecasts positively for the rebound of the batteries supply chain. Overall, the pandemic has increased the awareness of the benefits of the digital and green transition, which needs to be coupled with adequate investments and political drives. The COVID-19 crisis has taken various forms across the world, and early scenarios of the COVID-19 pandemic often depicted waves, including a second wave in late 2020. The expectations for a second wave in the European Union materialised, and at the time of writing this report, it has still not abated, with concerns for a possible third wave due to virus mutations. As shown in the graph, the European Union recorded a higher number of COVID-19 deaths per million people than the global trend and much higher than the reported cases in China, for instance. The numbers in the EU are currently lower than in the United States (US), which also experienced a pronounced second wave. However, in terms of vaccinations, the EU is currently lagging behind the US (de Vet et. al., 2021).

Impact on the automotive industries

Accounting for 5% of the EU total value-added and corresponding to about €675 billion, the automotive industry plays a major role in the economy, generating various business services and influencing a vast supply chain. The manufacturing subsector of the automotive industry alone employs 2.6 million people and represents 8.5% of all EU manufacturing jobs. The industry accounted for 2.6% of the total EU value-added in 2019. Already before the global spread of the COVID-19 pandemic, the automotive industry had to face several challenges related to climate change and a fast changing consumer demand. Major disruptions related to COVID-19 pandemic impacted global supply chains, connected, autonomous, shared and electric mobility have been transforming industry, consumer behaviour and production facilities and forced industrial players to find new solutions, change production, and initiate new fleets (Deloitte, 2020; ING, 2020, Javorcik, 2020).

As outlined in the Commission Staff Working Document on Identifying Europe's recovery needs, the automotive industry belongs to the industries hit hardest by COVID-19 during the first wave. The supply chains of the European automotive industries were disrupted from the first shutdowns of Chinese factories. More severe, however, was the shutdowns of factories in Europe between March and May. Across the EU Member States, automotive factories were closed for an average of 30 days, with the shortest downtime in Sweden (15 days) and the longest in Italy (41 days). In the first half of 2020, the EU automotive industry suffered production losses of 3.6 million vehicles, which reflects a loss of €100 billion. Until the end of September 2020, this number increased to 4,024,036 motor vehicles, representing 22.3% of the EU total production in 2020. As of September, the demand for cars in the EU decreased by 28.8% compared to the previous year. The pandemic affected more than 1.1 million jobs

directly due to shutdowns of factories between March and May. Additionally to comply with hygiene, distance, and security measures, and due to reduced performance and demand drops, the number of people actively working in the factories was substantially reduced. In addition to workers who were laid off, many were re-employed on short-term contracts: in Germany, for instance, 95% of all companies in the automotive sector set their workforce on short-term working during the first lockdowns.

New lockdowns and confinement measures taken from November onwards in nearly all EU Member States triggered repercussions on the automotive industry, as dealer ships had to close and general economic insecurity of consumers increased. While these effects have been varying significantly across Member States, in general, the second wave has been showing to be less severe in the stringency of its measures. In addition, car purchasing incentives, including tax incentives and purchase subsidies from governments, have been substantially higher. Moreover, in many countries, registration offices and service centres have remained open during the lockdowns, which improved the overall business practices during the second wave as compared to the first. Car registrations also during November -December period have been down by 12.0 and 3.3.% respectively, on a year-on-year comparison.

The most likely scenario of recovery for the automotive sector appears to be U-shaped. Even though the second wave brings less severe restrictions for the automotive industries and their production facilities, the EU passenger car market contracted by 23.7% year-on-year compared to 2019, corresponding to about 9.9 million units in 2020, due to the COVID-19 pandemic. A persistent drop in sales into 2021 is likely, due to smaller production capacity, as distance regulations remain in place in factories, and decreased consumer confidence. The European Automobile Manufacturers' Association (EAMA) forecasts that the fallout in sales will continue during the first quarter of 2021 before recovery will pick up in the second half of the year. The EAMA expectations are that sales will rise by about 10% during the course of 2021, as compared to 2020. Another issue emerging in the automotive industry relates to the changing circumstances of the industry, namely relative to the development and expected uptake of connected, autonomous and electric vehicles. COVID-19 is argued to accelerate and amplify these trends and contribute to affect consumer behaviour.

Impact on the aerospace industries

In 2019, the European aerospace (including military aviation) industry generated about €260 billion of total turnover providing about 890,000 direct jobs. Aerospace is considered a 'strategic ecosystem' as defined in the New EU Industrial Strategy, which will require increasing supply capacity within the EU Single Market to meet the challenges embedded in the twin (green and digital) transition. These include efforts towards decarbonisation, through the establishment of greener, modern generation aircraft to guarantee emissions and fuel reduction, as well as further digitalisation of factories and logistics to achieve more efficient flight and overall sector management. Guidelines to increase investments in innovation to further enhance Europe's technological stand in the global aerospace sector are presented in the recently published Action Plan on Synergies between civil, defence and space industries (EC, 2021b).

The outbreak of the pandemic in Europe triggered a sudden drop in demand for civil aviation, evident in the daily trend of March, a month which ended with an 86.1% decline in air traffic compared to 2019 levels, and in the unprecedented drop by 92.8% in mid-April, when mobility and transport restrictions were implemented by most EU Member States. Between January and June 2020, the number of aircraft grounded in Europe increased by a total of 80% as compared to the previous year, making Europe the region featuring the worst global trends. Figures point to a very moderate recovery starting at the beginning of the summer, with a -

72.8% difference in June and a further stabilisation to -51% in August with respect to 2019, in parallel to lifting travel restrictions across the region over the summer.

The immediate drop in the demand for the production of aircrafts, coupled with disruptions in the supply of raw materials caused by the limitations in cross-border movements over the first quarter of 2020, triggered supply delays and massive fallouts in production. These, in turn, resulted in critical cashflow issues for many companies at all stages of the aerospace supply chain, many of which, notably second and third-tier suppliers, are small and medium-sized enterprises (SMEs). In opposition to general trends of the industry, commercial aerospace experienced an uptake in logistics for specific market subsectors, especially during the first months of the crisis. These activities, however, did not strongly impact the overall yearly figures.

Spiking infection rates and the reintroduction of government restriction measures across Europe caused a traffic decrease at a weekly daily average of -73% between September and December. European demand for aerospace manufacturing decreased in overall by 43% in 2020, primarily driven by Airbus order deferrals. As for the service subsectors, airlines have been struggling since the outbreak of the crisis. Many fell into bankruptcy or engaged in strong business restructuring resulting in forced costs and asset reductions, and ultimately job losses. With a total of €56.2 billion of net losses for airlines, airports and air navigation service providers, national markets in the EU fell between 40% and 73% as compared to 2019, with flights decreases ranging from 61% in the UK to 56% in Germany and 60% in Italy. Leading aviation groups experienced unprecedented losses associated with the overall 54% intra-European and 59% extra-European traffic decrease of 2020. About 191,000 direct jobs were lost for the whole European industry in 2020, each of which is estimated to support another six jobs in the economy. European traffic for 2021 is expected to recover to 51% of the 2019 levels. The sector could sustain a moderated recovery in 2022, but an effective recovery to pre- COVID-19 levels is not expected before 2024.

Impact on the food & drinks industries

The food and drinks industries employ about 4.82 million people and generated a value-added of €266 billion in 2019. In addition, the food industries have substantial linkages and interrelations to other sectors such as agriculture and the hospitality sector. Already before the COVID- 19 pandemic hit, the food industries have been subject to changing consumer behaviour and emerging trends, such as rising demand for more local products, and hence keeping shorter supply chains. The Farm to fork strategy and the general awareness of the need for a higher degree of sustainability, healthy and nutritious food are forcing suppliers to adapt.

To assess the impacts of the COVID-19 pandemic on the EU food industries, it is of particular importance to differentiate between the different subsectors, as the impacts are highly diverse. While subsectors with close links to the Hotellerie-Restaurant-Café (HORECA) were hit the hardest, food retailers experienced increased sales due to a drastic shift in consumer behaviour from outdoor eating towards food consumed at home. Retailers of frozen and packaged foods experienced the steepest increase in sales. For example, during the second half of March, sales of frozen foods have been 63% higher in France than during the same period in 2019. Similarly, packaged food sales in Germany increased by 56% during late March, compared to 2019. Even after the initial spike during the first weeks of the pandemic, demand stabilised at +15-20% during the summer, compared to the same period in 2019. In general, the decline in food and drink industry production was much lower compared to total manufacturing production (-9.1% in Q2 2019). A similar trend was observed for the year-on-year development in food and drink industry turnover compared to total manufacturing (-6.6% and

-22.9% respectively compared to Q2 2019). Similarly, the employment levels in the food and drink industry decreased as well, but to a lesser extent than for total manufacturing. The supply chains of the food industries remained relatively resilient. At the same time, some bottlenecks emerged due to closed borders, which distorted the supply for inputs, transport of goods as well as through confinement caused labour shortages. Another problem in supply arose from panic buying and stockpiling by consumers in the first weeks of the pandemic. Nevertheless, as stockpiling behaviour disappeared and supply chains have been supported by measures such as green lanes and considering food industry employees as ‘essential’, supply chains stabilised quickly and remained resilient. During the second wave, the food industries have been impacted to a much lower extent than the first wave. While the subsectors linked to the HORECA have still been negatively affected, this is likely to be less intense, as some producers have been able to adapt to new demand and adjusted packaging, labelling, and production. Additionally, borders remained open, and consumers refrained from panic buying and stockpiling. Hence no shortages emerged, and supply chains remained resilient.

Production in the EU food and drink industry continued to recover in Q3 2020 with an 8.2% increase compared to Q2. Turnover also increased by 5.9%, compared to the previous quarter. On a year-on-year basis, the food and drink industries experienced only a low decline of 0.4% to Q3 of the previous year and hence nearly recovered to pre-crisis levels. Similarly, turnover for Q3 of the interrelations to other sectors such as agriculture and the hospitality sector. Already before the COVID- 19 pandemic hit, the food industries have been subject to changing consumer behaviour and emerging trends, such as rising demand for more local products, and hence keeping shorter supply chains. The Farm to fork strategy and the general awareness of the need for a higher degree of sustainability, healthy and nutritious food are forcing suppliers to adapt. In general, the decline in food and drink industry production was much lower compared to total manufacturing production (-9.1% in Q2 2019). A similar trend was observed for the year-on-year development in food and drink industry turnover compared to total manufacturing (-6.6% and -22.9% respectively compared to Q2 2019). Similarly, the employment levels in the food and drink industry decreased as well, but to a lesser extent than for total manufacturing.

The supply chains of the food industries remained relatively resilient. At the same time, some bottle necks emerged due to closed borders, which distorted the supply for inputs, transport of goods as well as through confinement caused labour shortages. Another problem in supply arose from panic buying and stockpiling by consumers in the first weeks of the pandemic. Nevertheless, as stockpiling behaviour disappeared and supply chains have been supported by measures such as green lanes and considering food industry employees as ‘essential’, supply chains stabilised quickly and remained resilient. Recovery in the food and drinks sector depends substantially on the subsector. While food retailers have been able to adjust to the changing demand, in particular in the case of large retailers, the recovery of the catering subsector focusing on hotels, fairs and events, will largely depend on the possibility to re-open hotels, hold fairs and organise events. Hence the recovery seems to be very similar to that of the hospitality sector. For the overall sector, a V-shaped recovery seems most likely, as a very quick rebound started already during Q2 and continued in Q3. For other sectors of the food and drinks industries, the question is not necessarily how long the recovery will last but how long it will take consumers to re-adapt their behaviour to the ‘new normal’. It is highly likely that as soon as restaurants are open again, fewer people will cook at home than at present. Similarly, the trends of consumers increasing the demand for food labelled as healthy, sustainable and local food, which have been grow in already before the pandemic and have only been accelerated by it, are unlikely to change substantially. Additionally, it is likely

that demand for basic foods, e.g. pasta, potatoes, rice, and flour, will decrease again with increasing economic and labour market security.

Impact on the cultural and creative industries

In 2019, the sector generated approximately €643 billion in turnover, contributing to about 4.4% of the EU GDP. Around 7.6 million people in the EU are employed in Cultural and Creative Industries (CCIs), representing almost 4% of total employment. In the EU, self-employed constitute about 33% of the cultural sector, a proportion representing more than double the average observed for the rest of the EU economy (14%). Moreover, the sector features a significant presence of short-term, seasonal and part-time contracts, while many of its professionals belong to the informal economy. For these reasons, employment in CCI is frequently qualified as precarious, and the severity of the impacts of COVID-19 on the sector can be only partly captured by national statistics. At the outbreak of the pandemic, almost all cultural production sites were forced to close in most EU countries in an effort to contain the spread of the virus. Whereas some CCI actors had the capacity, skills and resources to adapt their business models to the new circumstances (e.g. through online performances and virtual museum visits), this was not possible for many businesses. Moreover, the cultural sector's higher fragmentation level, its jobs' reliance on live events and physical venues and the lack of capacity of a large part of its employees to benefit from social protection schemes indicate that cultural industries were generally more affected than creative ones.

IT and software industries, on which economic growth concentrated during the crisis, contributed to the restructuring and repositioning of CCIs industries in the market, with new value chains appearing in the music, cinema and publishing industries. Television, streaming, music and radio services endured a solid uptake; technology and logistics providers and suppliers of home-based leisure (e.g. Netflix, Amazon, Facebook) also largely profited. In addition, quarantine conditions triggered the emergence of new activities, including home-based arts and crafts, and practitioners. Whereas the crisis was more severe for cultural professionals, COVID-19 impacted various subsectors of the whole CCIs, including suppliers of infrastructures, equipment and facilities constituting the CCIs production system, providers of marketing, advertising, selling and distribution of products and services. In a survey carried out with more than 7,000 European CCIs representatives between March and April 2020, 60% of respondents indicated they experienced a drop in sales over to 30% during the first two months of the crisis; in the long-term, 45% expect a decline in sales of up to 40%, and 52% expect losses of 50% to 75%.

With many EU Member States easing restriction measures, from June onwards, certain production activities re-started, and cultural production places partly re-opened with the adoption of stringent sanitary rules and social distancing measures. Clubs and other live venues were, for the most part, excluded from such partial re-opening. In addition, citizen behaviour affected by the high risk of contagion linked to limits to the mobility of people contributed to discouraging the frequentation of creative venues, concentrated in large European cities where the numbers of COVID-19 cases were substantially higher. Thus, most CCIs subsectors experienced drops in both supply and demand. In October, the increasing number of COVID-19 cases across the EU and subsequent governmental restrictions triggered the shutdown of spaces that had benefitted from partial re-opening in the summer. In many countries, the situation has not changed to date. Based on available sectoral data, it is estimated that, in 2020, the overall European industry will experience a net decrease in revenues by 31% (worth €199 billion) from 2019. In this context, it is important to note that the gains from the further acceleration of digital trends in the overall sector are far from compensating the losses through the absence of live and physical event sales. Music and performing arts were the worst-hit, with an expected revenue decrease by 90% and 76%,

respectively. The only subsector that to date benefitted from the crisis is that of video games, for which an increase of 9% in revenues was foreseen for 2020.

No comprehensive data is currently available on the estimate job losses in European CCI since the outbreak of COVID-19, due partly to the difficulty to perform an early assessment, and partly to the incomplete figures depicting numbers of active professionals in the sector. However, jobs at risk are estimated to range from 0.8 to 5.5% of total CCI employment across the Organisation for Economic Cooperation and Development (OECD) regions. In Germany, the CCI unemployment rate was 6.2% in June, representing a higher number than the unemployment rate in the whole economy, with product and visual designers (9.2% and 10.6% respectively) and performing arts professionals (13.1%) being the most affected subsectors. Together with the aerospace sector, CCIs are the most adversely affected by the pandemic. The uncertainties featuring the sector's recovery outlook suggest a largely extended U- shaped, if not an L-shaped recovery scenario. As for the aerospace industry, government restrictions on the mobility of people, in addition to strong sanitary and distancing requirements, are the major factors negatively affecting the sector's performance during the pandemic. Therefrom, recovery scenarios are strongly dependent on the effects of the vaccine and governments' policies but also on the capacity of players in the sector to adapt to public requirements in case of a persisting emergency. In this regard, it is crucial to note that the overall impact picture in the sector has so far been varied.

If well-established and more structured businesses (e.g. national theatres or top-performing artist crews) suffered, smaller and independent entities faced even stronger challenges due to the lack of skills, resources and overall capacity to adapt their businesses to health demands in times of a pandemic. This increased the already consistent inequalities that characterise the sector.

Impact on the digital industries

The digital sector is one of the most dynamic and Research and Development (R&D) intense ecosystems of the European economy. In 2019, the industry employed more than 6 million people in the EU and represented 4.77% of the EU27 value-added, accounting for about €645 billion. While the further development of the digital ecosystem and a digital economy is a priority of the EU, as also indicated in the EU Digital Strategy, the ecosystem was weakened before the COVID-19 pandemic hit the globe. It suffers from low and fragmented investments and slow adoption of digital innovations in both the public and private sectors. The pandemic boosted the penetration of Information and Communications Technology (ICT) and digital adoption (digital adoption increased from 81% to 95% in the EU); however, also the digital sector experienced negative impacts from the pandemic, in particular during the first wave. Supply chains have been disrupted and slowed down or stopped production in many countries. In addition to hampered supply, a fall in demand hit the manufacturing part of the sector's supply chains (e.g. demand for hardware). Demand was further contracted by confinements of industries such as the automobile or the hospitality sector (due to their face-to-face Business-to- Consumer (B2C) character), implying lower demand for digital manufacturing and service products. Nevertheless, due to the need for telework, the demand for digital infrastructure increased substantially. A survey among European ICT companies (including service-oriented and manufacturing- oriented ICT companies) showed that one third of the companies have been expecting layoffs. While total employment increased by 0.5% in Q2 compared to the previous year, hours worked per person decreased by 6.4% in the same period. Although this implies that short-time working schemes have also been in place in the digital sector, the sector scores relatively well compared to others. This can also be observed by the annual changes in value-added of Q2, featuring a decrease of 4.8% and making the digital industries is among the sectors which experienced the smallest drop,

compared to the previous year. During the second wave, the sector seems not to have been negatively impacted by the pandemic. The number of people employed in the industry grew by 0.9% in Q3 compared to the previous year; similarly, the value-added in Q3 increased by 1.8% compared to the previous year¹²⁹. As shown, in particular infrastructure as a service experienced continuous year-on-year growth in demand in 2020, compared to 2019. Another sub-sector within the industry that even benefited from the crisis is that of devices, such as Personal Computers (PCs) and tablets, for which demand rose by 4.6% year-on-year until December 2020. Similarly, demand for the software market focussing on remote collaboration and consumer experience gained from work-from-home policies and demand increased by 4% during 2020. While these positive shifts limit the overall damage in the sector, general purchases by enterprises decreased. Additionally, server, storage and network equipment contracted by more than 5% during 2020; last, SMEs, which constitute a large part of the sector, have been hit particularly hard by the pandemic and the confinement measures.

The recovery outlook for the sector is relatively positive, and most digital industries which have been damaged by the crisis are expected to start recovering during 2021. The latest available forecasts for total ICT spending show that the latter will be lower (-1.8%) in 2020: however, to a lesser extent than feared during the first wave. While early signs of recovery are expected in 2021, full recovery took place in 2022. Hence, the recovery could be described as a flat v-shape (with a small temporary decrease), as the initial drop in spending on the industry is not far-reaching (Nosike et al., 2023).

Summary and conclusions

The EU finds itself in the midst of trends, which could generate interlocking crises at home and abroad. Europe needs a new platform for sustainable, durable economic growth and mobilization of public and private investment to help to boost Europe's economy.

The ageing of the EU population will bring increased demands on healthcare systems, with implications for the costs and organization of care. Approaches to family, parenthood, contributions to society or the economy are shifting, especially in more advanced economies. In this context, shortages in both high-skilled and low-skilled occupations are expected to continue as the population ages and the demographic transition continues. Europe may be affected by large-scale migration due to floods, droughts, and food shortages.

Digital transformation is reshaping the competitiveness landscape in Europe, driving innovation, productivity, and economic growth across industries. By embracing digital technologies, empowering SMEs, transforming traditional industries, addressing societal challenges, and navigating regulatory and ethical considerations, Europe can unlock the full potential of digital transformation and position itself as a global leader in the digital economy. Through collaboration between businesses, governments, and civil society, Europe can harness the power of digitalization to drive inclusive and sustainable growth, enhance quality of life, and ensure prosperity for future generations.

Furthermore, development of a genuine 'Energy Union' and combating against climate change, since competition for energy resources will continue with substantial changes in consumption. According to the latest data, global energy consumption in 2030 will be 30% higher than 2010 levels. Advancements in nuclear fusion technology could alter the energy landscape and, in the long timescale terminating and reverse back global warming. In addition, promoting a society of change and innovation, enabling individual empowerment and democracy, enhancing the international role of the European Union.

To leverage its cultural heritage for competitiveness, Europe is investing in cultural preservation, promotion, and innovation. From UNESCO World Heritage sites and cultural festivals to creative industries and digital platforms, Europe is showcasing its cultural diversity and creativity to global audiences, driving tourism, trade, and investment. Moreover, by supporting cultural diplomacy initiatives, cultural exchanges, and cross-cultural collaborations, Europe is fostering mutual understanding, dialogue, and cooperation, enhancing its reputation and influence in the international community, and driving competitiveness in the global marketplace.

The EU has only chance to overcome these difficulties, if the decision makers making coordinated approach with alignment across the EU institutions and the Member States is more likely to succeed than an approach where different instances take contradictory or opposing positions. In the EU context, consensus has always been an important factor; as a rule, stronger consensus is conducive to better outcome. Passivity is the worst option; determined and united action across all its areas of activity seems essential, in order to turn challenges into new opportunities to maintain and spread peace and prosperity in Europe and beyond crises.

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