

The challenges of digitalisation and economic competitiveness  
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May 2021

1) During late spring of 2020, within just a few weeks of Covid-lockdown the world saw teleworking, e-commerce, and online education advance as much as over five years under normal conditions. Digitalisation showed then its crucial role and proved its importance in everyday situations.

2) The overall impact of the ongoing fast digitalisation is likely to be very significant and the implications of digital transformation extend gradually far beyond the economy it penetrates almost all spheres of everyday life. The digital transformation in the economy and the society is changing many economic and social factors, e.g., business models, methods of production and distribution as well as the employment, quality of labour force and the way of living, learning, data processing, access to information and media, etc. Digitalisation is a global phenomenon that certainly opens a new epoch, namely the 4th industrial revolution in the economic and social history of mankind. This revolution consists of developments in information technology combined with robotisation, automatisisation, the internet of things (IoT), 3D printing, Big Data, smart (driverless) car, drones, etc. All these heralds a new economy and hence a new world of production and work as well as way of living, education, and media consumption, etc. It will need the acquisition of new knowledge, practices, and ethical norms.

### Economy

3) Digitalisation may be considered as a technology/supply shock that affects the main economic aggregates, notably via competition, productivity, and employment effects, as well as through its interaction with institutions and governance. Digital technologies are also changing how firms do production and business as well as interact with their customers and suppliers. Understanding digital transformation and the channels through which it influences the economy is therefore increasingly relevant not only for the economic actors but also for determining the direction and way of conduct of various areas of public policies.

4) As digitalization disrupts society ever more profoundly, the concern is growing about how it is affecting issues such as production, distribution, jobs, wages, inequality, health, resource efficiency, and security. The 4th industrial revolution will create new types of jobs, new sectors, new products and services, and distribution channels and patterns. Digitalisation changes the concept of locations where costs are incurred, and value-added is created so they are no longer closely associated with each other as well as with production and consumption. It is already clear that this phenomenon has e.g., national, and international trade and tax policy, etc. importance.

### Production

5) There are two principal new features of the development of digitalisation: one is the evolution of the platform-based economy, founded on new economic models, and the other is the development of peer-to-peer exchanges.

6) Digitalisation has a strong impact on enterprises, both in manufacturing and services industries, where converging trends are detectable in the way micro, small and medium-sized enterprises interact with customers and employees. The main factors for successful adaptation are the ability to collect and exploit data, the interconnection of value chains, the creation of digital customer interfaces. Digitalisation can substantially lower market entry barriers, opening potential national and foreign markets that firms, even SMEs can serve, and create new ones. Digitalisation has also reduced the costs of scaling up production, advertising, and distribution. The widespread use of algorithms enables online platforms to exchange goods and services including labour. Algorithms are also transforming traditional companies, enabling them to better manage their assets and processes, while redefining their strategies according to innovative solutions. The availability of cloud computing services provides smaller and newer firms with flexible access to considerable computing power without investing in physical infrastructure.

7) Digital transformation offers the potential to stimulate competition and yield substantial consumer benefits. Platform-based business models (Airbnb, Uber, Amazon, eBay, etc.) have also raised competition in some traditional markets (e.g., accommodation, transportation, or retail services) where online and offline business models compete. Trends in 'platformisation' and asset dematerialisation are significantly reducing costs of using ICT tools, (e.g., data storage, sharing and processing), and improving collaboration. Overall, digitalisation reduces transaction costs, maximises trading volumes, and improves demand and supply matching. There are some important characteristics of the digital economy. First, it creates massive economies of scale and scope that may present challenges to maintaining competitive conditions. Second, digital production typically features significant upfront costs to develop products and near-zero marginal costs. Third, intangible assets (intellectual property, algorithms, software, data) have particular importance in an effective competition.

8) Digitalisation will result in an increasingly data-driven economy, in which platforms can benefit from economies of

scale and scope in collecting data. Data has become a very valuable asset in the digital economy. Access to large amounts of data can result in improvements in analytics and machine learning, which can further help firms to improve the quality of their production process and services. However, a thriving market for data between firms also exists, which may contribute to alleviating the asymmetries in data collection between smaller and larger players.

9) Platform businesses also exhibit strong network effects, which further reinforce the benefits of scale, potentially creating difficulties for new entrants to break into a range of markets where they need to compete with large established firms.

10) In traditional businesses and industries digitalisation affects existing organisational and management structures, which is most visible due to the higher flexibility and fragmentation of work, changing work monitoring methods and skill and training needs. More generally, the real challenge for industrial established firms is whether they can engage their digital transformation before disruptive competition forces them out of business.

### Employment, wages

11) The question of whether digital technology creates or destroys jobs is gaining momentum. Digitalisation creates new types of jobs and professions (e.g., data analysts, data miners, data architects, as well as software and application developers, etc.) on the one hand and certain jobs will be at risk over the next decades due to computerisation, automatisisation, and robotisation. Digitalization could create up to several million jobs worldwide in this decade in the logistics and electricity industries. There is no consensus on exactly how many jobs will be lost but automation will displace many human beings and their number will be very high. Some current estimates of global job losses due to digitalization range from several million to 2 billion by 2030. This means that more than half of jobs may be at risk. There is great uncertainty, with concerns also about its impact on wages and working conditions. With both winners and losers resulting from digital transformation, a huge premium rests on the near-term ability of businesses to upskill employees and shape the next generation of talent for the machine age.

12) The digital revolution has created new roles (such as search engine optimization managers and social media account managers), new types of organizations (cloud computing providers and social media agencies), and even new sectors of the economy (digital security and data science). The impact of digitalization has also acted as a catalyst for employment growth in the wider economy.

Quite little is surely known about what is going to happen even in the near future. What will the economic impact of innovations be in the future? How will humans interact with machines and algorithms? What kind of skills do we need and how should we learn? How will all of this impact labour market?

13) Based on current knowledge, there will be three types of jobs categorized by the likely effects of digitalisation: Jobs that will disappear (lost the race against the machine) e.g., clerks and administrative staff, or truck drivers.

Jobs that are in collaboration with machines/algorithms (run with the machine). For example, those professions that rely on cognitive and social capabilities, such as doctors/surgeons.

Jobs that are completely new or remain largely untouched (running faster than the machine or running a different race). For example, roles in the creative arts are unlikely to be automated, as are new roles that involve managing data and machines.

In sum, there will be both winners and losers while the net impact on jobs in certain industries or sectors could be positive whereas many sectors will experience job losses.

### **Global competition for digital technological leadership**

14) The US, China, and the European Union are trying to impose their technological leadership over the next wave of digitalization. This rivalry or contest among the three main powers in the world is expected to be intensifying even further. With US hegemony in relative decline and China's rising importance, the EU is getting caught in the crossfire of this technological war between the other two technological powers (e.g., the global role of the tech giant Huawei). One can witness a speeding race for global technological dominance in particular in the field of digitalisation. The EU aims at boosting or maintaining Europa's „digital sovereignty" as digital technology has become a matter of power politics.

15) The alternative for all three digital technology powers is either 'it leads the way on digital or it will have to follow the ways of the other one or two, that is/are setting the standards for the whole world'. Thus, the question is who will obtain the world's digital market supremacy. The most important two areas of this digital supremacy are the technical and regulatory standards. The standards themselves are also subject to competition.

16) Countries and/or companies seek to set their standards as the norm for others. The issues of technical standards have for a long (for a century) been well known. Digitalisation in a globalised world and the digital economy increased

significantly the importance of regulatory standards and the dominance or prevalence of certain regulatory standards in the whole world, e.g., in the areas of issues like data protection, digital taxation, platform regulation, digital services, disinformation, eCommerce, eHealth, eAdministration, eTransport, etc. Some of these areas need international regulations, however, in the case of the others, the regulations of the pioneer hegemon country will set the direction for the followers.

17) Regarding the rest of the world countries in the peripheries in Europe and the world economy, they will follow the technology paths determined by the leading digital powers. Besides the advantages of digital technology, the risks for the periphery countries are most likely higher to be adversely affected by the job destruction caused by the digitalisation of jobs. Likewise, countries with developed broadband infrastructures and workers' e- skills, as well as the widespread use of the internet and digital public services, are likely to be less threatened by digitalisation than countries with less developed digital infrastructures.

### **Digital media and access to content**

18) One of the main areas of everyday life that digitalisation has significantly transformed is the media industry. This transformation process in the media industry has been underway for some five decades having already several waves of digitalisation that cut costs by simplifying production. Improvements in the storage of binary information soon pushed digitization into the distribution and consumption of media, leading to the emergence of videotext and Teletext, and the switch from traditional audio and audio-visual recording to CDs and DVDs. It brought about that more content can be produced and distributed by more enterprises and individuals than ever before.

19) However, while the internet creates opportunities for online content, e.g., file-sharing, streaming, social and mobile-driven by the demand of consumers to access any content from anywhere in the world at any time, it yields only limited monetization for news and general information providers. Social media, video-streaming services, and smartphone apps compete continuously for the consumers' attention. These developments have combined media, computing, and telecommunications industries to create convergence that combines and integrates various means of communication. These in turn increase flexibility and speed, create economies of scale and integration that change the economics of content distribution, and shift greater control to consumers by allowing them to select, filter, search, control, and participate in multiple forms of communication. Moreover, digitalisation is bringing many new entrants into the media markets, creating new types of content, and providing a wider variety of ways to access news, information, and entertainment. It has broken monopolistic and oligopolistic control over distribution mechanisms and empowered consumers to seek and share content in new ways and to become producers as well as consumers of content.

20) Although digitization affects all media, its effects on business models and competition are not universal. Print outlets, for example, are now coping with digital distribution and consumption challenges. The pursuit of cost savings and flexibility through digitization is pushing book, magazine, and newspaper publishers toward e-readers as consumption platforms. The internet provides some opportunities for online content, but it has yielded only limited monetization for news and general information providers. The business model of internet advertising is especially problematic because it requires very many regular users before it can begin obtaining a significant revenue stream and for this reason, it has not provided yet sufficient funding in general to maintain the levels of journalistic activity previously provided by print newspapers. Because of the ways that websites, aggregators, and search engines are being used by the bulk of online news and information seekers, and because websites have difficulty maintaining exclusive information due to cross-platform dissemination, linking, and forwarding capabilities, there are several new issues to be solved on the fields of regulation, e.g. determining copyrights, sharing ad revenues between platforms and content creators, financing quality content, fight disinformation, providing access to pluralistic information, etc.

21) Because the means of distribution are now global rather than national, conflicts occur worldwide over-taxation of content and how to handle content deemed subversive, offensive, or otherwise undesirable (e.g., disinformation). Domestic and international law regarding taxation, the freedom to disseminate and receive, and mechanisms to censor or punish were created in the analogue age, when borders, importation processes, and domestic distribution systems were more controlled. Although we live already in the digital age, policies and laws are not aligned yet to the new realities of digital products such as personalization, global distribution, and fluid networks. Most policies and laws on taxation, trade, libel, privacy, obscenity, and copyright date from an era when there were identifiable producers, publishers, and broadcasters who created and disseminated information - and could be held responsible for it (i.e., editorial responsibility).

22) Today, content is not disseminated merely through traditional channels for which policy processes and procedures were established but is transported through constantly changing networks in which identifiable and anonymous users choose whether or not to access content, reconfigure and retransmit content, and create content of their own - thus gaining power over the content themselves. Another critical issue is to ensure that mechanisms exist for content creators to benefit financially from their work. While there are economic and moral prerogatives for these protective mechanisms, these must be balanced against the social benefits brought by the flow of content, i.e., information and

ideas. Consequently, copyright and related rights protection need to be balanced with fair use and other provisions that protect use by educational institutions, libraries, and protected groups, such as disabled persons. Many provisions to protect the business models of audio and visual producers have been put in place internationally and domestically over the past decade. The "related rights" have been enshrined in copyright law mechanisms (e.g., Digital Millennium Copyright Act in the US, the Copyright Directive in the EU, the World Intellectual Property Organization Copyright Treaty and Performances and Phonograms Treaty).

23) Digitization and convergence have created multiple ways to access content on mobile devices. Across the world, mobile devices such as smartphones and internet-equipped mobile devices are replacing personal computers as the primary means of digital content acquisition.<sup>12</sup> In many parts of the world - especially Asia, Africa, and Latin America, where the cost of computers is high and electrification low - individuals who have never had personal computers are skipping that platform altogether and moving to mobile platforms. However, these changes are not likely to lead to the death of the PC shortly, because PCs remain necessary for business, education, health, and media production. The actual possibilities will be extended even further by 5G and 6G technologies. In this very competitive media market, content is no longer enough as technology has also a very important function.

### **Social inclusion and exclusion the treat of the increasing gap**

24) Digitalisation, the use of the Internet of Things (IoT) and media convergence, etc. are altering the currently known society and its structure and functions by creating a networked society that operates at many levels (personal, community, national, global). This process alters traditional social relations and changes many things including the roles of legacy media. How it will ultimately change social life is not yet fully apparent, but it is clear that emerging roles and types of relationship reduce the roles of - and the power previously exercised by - social institutions such as the state, church, parties, unions, clubs, and associations.

25) Members of a society are now reducing their participation in civic, religious, trade, and political organizations and pursuing their interests through other - often less formalised - interest groups and virtual communities that replace many social interactions that were facilitated by traditional social institutions. These changes appear to be altering the influence of those institutions on attitudes, norms, and public opinion formation and increasing the influence of new interactions and less formal networks. For example, media organizations that once enjoyed significant control over the agendas of public discourse are also losing influence, as people increasingly become content redistributors and creators themselves. Under such conditions, digital literacy will have crucial importance. There will be people and social strata all over the world that will be able to cope with the new challenges created by digitalisation and turn the technical possibilities to their advantages while others will not be able to live up to them. For this reason, digitalisation is very likely to increase the polarisation within societies characterised by gaping inequalities between various social strata, creating digital winners and losers. Among others e.g., the fates of a significant part of the middle classes, medium-skilled jobholders, and the mass workers seem to be still unclear and unpredictable. One thing is foreseeable there will be a growing need for new social charters to regulate the social aspects of the digital economy.

26) Shifts in existing jobs towards their digitalised counterparts will occur both in each national economy and in the global economy. There are various factors which will play important roles, e.g., the levels of economic development (an industrialised or developing country that is center or periphery), the importance of digital platforms and crowd working, high and low levels of social protection, the quality of the education systems to provide skills, etc.

### **Education and digital skills, ethics and trust**

27) Education including teaching digital skills has a critical role to prevent or at least mitigate social exclusion. An adequate and modern education system can positively affect social cohesion, which is a pre-condition for economic growth, job creation, employment, and competitiveness. Educated citizens represent a fundamental pillar of democratic societies because they can orient themselves better in the world, and exploit their abilities and competencies as well as shape the common future of the society.

28) Digital technologies fundamentally transform organizations, with the pace of technological change exacerbating the challenge. Both education systems and economic organizations must have coherent strategies that include plans to educate the young generations and later reskill adult workers. Life-long learning of new skills is becoming a fundamental element of the future social infrastructure. Whereas previous technological revolutions (most notably the industrial revolution) played out over a relatively long time, now the speed of digital transformation is such that education systems and businesses need to move quickly. For governments, the challenge is equally pressing. The potential inequality and wage deflation or even potential social unrest require urgent actions to prepare the new workforce for a digital future.

29) Education systems must provide a not only quality education that is accessible to all but must equip the new

generations with the ethics of digitalisation including that of the use of artificial intelligence (AI), access to information and use of data, respect of data privacy and its protection, and concerns over security, etc. The key factors here are trust in others and gaining the trust of others. The trust in all technology-based sectors and institutions will further erode unless broader ethical norms regarding the ways how individuals and organizations use digital technology are shared and commonly respected.