OLIGOPOLY WARNING FOR THE DIGITAL ECONOMY

By Sarah Guillou

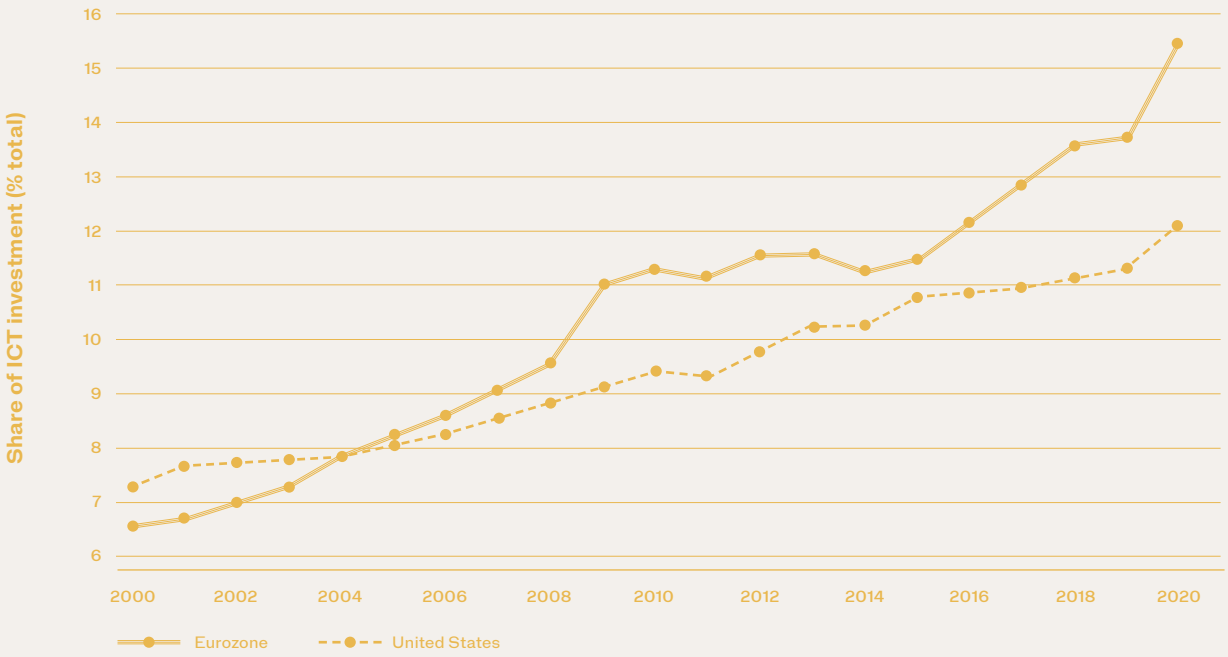
While information and communications technologies have become central to all sectors of activity and are establishing themselves as a driving force in the global economy, a handful of digital behemoths have monopolised their capitalisation, revenues, and customers. What is even more serious, writes Sarah Guillou, these omnivorous companies are practising a conglomerate strategy by investing in a wide range of sectors and intruding on areas hitherto reserved for the state.

The digital economy was originally known as the information economy, the latter being understood in a very broad sense as any signal – audio, visual, written or sensory – that can be digitised. From a production perspective, it is defined as the production of digital goods and services derived from information and communication technologies (ICTs). There is no doubt that it dominates our current lives, be it in everyday uses, administrative procedures and our interactions with local and central government, the way companies – and countries – acquire competitive positions, or the way we interact with others in the private, public and professional spheres. Around the world, the last two or three generations can look back at the devices of yesterday and appreciate the lightning speed of this penetration. How does this happen, and what are the economic and political implications?

A driving force

According to a sectoral definition of the production of digital goods and services, the digital economy has grown considerably over the last twenty years. Whereas in 2000 it represented 7 per cent of the United States' economy and 5 per cent of the Eurozone economy, it now accounts for 17 and 10 per cent,

ICT AND SOFTWARE INVESTMENT SHARE OF TOTAL INVESTMENT (TANGIBLE AND INTANGIBLE) IN THE UNITED STATES AND THE EUROZONE



Source: EU KLEMS 2024

respectively. However, these figures reflect only part of the digitisation of the economy, since all sectors – and not only ICT sectors – are increasing the digital content of their goods and services. Another way of looking at the phenomenon is to consider the share of investment in ICT hardware, software and databases in an economy, relative to the accumulation of capital across all assets. In the Eurozone, this share almost doubled between 2000 and 2020 (see figure above). The level of investment in ICTs also indicates the technological potential of this economy as the technology determines both future innovations and the capacity of all economic players to absorb them.

A global oligopoly

Although all companies are participating in the digitisation of the economy and the spread of ICTs, companies in the digital economy drive the growth engine and have risen in many corporate performance rankings, overtaking the dominant position once held by the major oil and energy companies. But among them, a global oligopoly is fuelling this dynamic and supplying the main goods and services. The concentration of economic power in this oligopoly is clearly obvious when we look at other dimensions of the performance of the digital economy, such as capitalisation, revenues and spending on research and development (R&D).

This is particularly true for market capitalisation. The GAFAMs (Google, Apple, Facebook, Amazon and Microsoft) are emblematic in this respect. In August 2020, Apple's market capitalisation exceeded USD 2 trillion, which seemed to be a record at the time. By 2024, Nvidia, a manufacturer of graphics cards, motherboards, chipsets and processors, had surpassed Apple and Microsoft, becoming the most valuable company in the world with a capitalisation of over USD 3 trillion in a striking illustration of the recent enthusiasm for artificial intelligence (AI). One must go back to 2011 to see one company, at that time ExxonMobil, accumulate the highest valuation in the United States and worldwide. Of the 2,500 to 5,000 largest R&D investors in the world, the capitalisation of ICT service companies has increased the most: it accounted for 10 per cent of the total in 2005, rising to 21 per cent in 2022, following the same growth curve as that of the capitalisation of ICT goods producers.

This capitalisation is correlated with revenue prospects. By 2023, Alphabet, Amazon, Meta, Apple and Microsoft had combined revenues of USD 1.5 trillion (equivalent to the gross domestic product of Spain or Brazil). These companies have become conglomerates that are involved in a wide range of activities, a sign of their omnivorous approach to technology, even though most of their revenues still come from just a few of their activities.[1]

Meanwhile, R&D spending by companies in the digital services sector represented more than 20 per cent of total spending by global companies in 2022. It is interesting to compare the share in the same year with those of sectors that have traditionally been major contributors to R&D investment, such as pharmaceuticals and biotechnology (21 per cent), automotive (19 per cent) and technological equipment (computers and robots) (22 per cent). The digital services sector, which accounted for 9 per cent of total R&D investment in 2005, is now just behind pharmaceuticals, with an expenditure multiplied by 2.4. Its share has risen sharply over the past decade, while the global total number of companies involved has barely changed over the same period: from 450 in 2005 to 447 in 2022.

A unique economy

The production of digital goods and services also differs from all others in terms of demand behaviour, competition and partnerships. Carl Shapiro and Hal Varian, professors of economics and management at the University of California, Berkeley, were the first, in 1999, to highlight distinctive features, including:

• a cost function such that marginal cost tends towards 0 (the cost of acquiring a new consumer is almost zero);

• value creation based on capturing the attention of as many people as possible, making the user database a captive asset as well as an abundant and virtually free raw material, which leads to very significant economies of scale and network economies;

• inter-company strategies for managing interconnection due to the strong interdependence between software (immaterial digital) and hardware (material digital);

• a sustained rate of disruptive innovation, making certain technologies suddenly obsolete and interrupting their production cycle.

This is typically a network economy, in which the greater the number of users or consumers of the good or service, the greater the utility derived by a user or consumer, and the more attractive the good or service becomes. This mechanism leads to contamination of the market, which grows exponentially. This reinforces the characteristic mentioned above, whereby the value and price of a good or service depend on customers and their usage much more than on the cost of production, and in particular on the anticipation or belief that the good or service in question will become the standard.

Another consequence of this mechanism is a considerable advantage to the *first mover*, as the trajectories of Facebook and Google clearly illustrate: the first company to enter a market gets a head start in the explosive growth that follows, creating a high barrier to entry for potential competitors in a market that is, in effect, already captured. Nonetheless, the digital economy remains an area of continuous innovation, which is both a self-regulating element, enabling dominant market positions to be challenged, and a means of ensuring consumer appetite and maintaining high margins. It is also characterised by a web of commercial and/or financial alliances between suppliers at different stages of the production chain, as well as between content suppliers and hardware suppliers (for example, the alliances between Intel and IBM, Google and Samsung, or OpenAI and Microsoft), resulting from the close technological ties forged between a small number of players to conquer the market and dominate it by setting the standard. These alliances are also driven by the high cost of the technology, which players do not wish to duplicate when the market has already been captured. For example, rather than trying to duplicate ChatGPT, Apple has chosen to integrate it into its services.

[1] Apple derives most of its profits from the iPhone, Amazon from its Cloud service (AWS) and Alphabet and Meta from advertising revenues, concentrated around a few advertisers.

Differentiated productivity gains

ICTs are ***enabling*** technologies. In other words they have multiple uses. They combine with existing technologies to make them more efficient, and enable the discovery of new technologies (such as AI for health discoveries). They are at the heart of the current artificial intelligence revolution. From IT to digital infrastructure, from software to AI programmes and processor architectures, mastering and using these technologies is fundamental to the technological trajectory of an economy and its growth.

Are digital technologies productive?

Solow's paradox, also known as the productivity paradox, was formulated in 1987 by the economist Robert Solow, who noted that in the United States, computers were visible everywhere except in productivity statistics. By virtue of this paradox, two explanations have been proposed to explain low productivity gains due to digital technology: on the one hand, the digital innovations of the 1990s to 2010 were not as disruptive as electricity and transport were at the beginning of the twentieth century; on the other hand, there is a significant time lag between the appearance of new technologies and their effects on productivity, due to the need for their integration.

ICTs also drive productivity gains in jobs, and therefore in businesses, that are essential to boosting the economy's growth potential. Although ICTs are becoming more and more widespread in production, inputs and processes, they are slow to manifest in productivity figures, wherein slow growth, if not stagnation, over the last twenty years contrasts with the gains of the 1960s. This observation, reminiscent of Solow's paradox (see box on left), does not question the inescapable role of ICTs in the acquisition of market power. In fact, while there are no productivity gains (yet) at the macroeconomic level, there are clearly differentiated effects depending on the sector and the absorption potential of companies: the more productive companies already are, the quicker they are to invest in and take advantage of ICTs, precisely because they already have the skills and technical resources to be among the most productive. The adoption of AI will inevitably proceed in this way, with the high performers benefiting first. The same logic of self-reinforcement of the most efficient (which can also be seen in industrial strategies) is apparent in productivity. ICTs therefore exacerbate inequalities between companies and across employees.

Increasing interference with state governance

One of the distinctive features – and not the least of them – of the digital economy lies in the political arena. Leaders are adopting strategies to develop and interact with other market players that increasingly interfere with state governance. As a result, the digital economy is becoming a growing incubator of challenges to the political sovereignty of states, with which it sometimes competes.

Major players in the digital economy are moving into areas that were once the domain of the state: space missions (e.g. Elon Musk's SpaceX and Jeff Bezos's Blue Origin), currency (Meta, Apple, Binance), communications and information (SpaceX, Google, Meta, X), archiving of public data (Amazon, Microsoft, Google), and security and surveillance (Palantir, Tencent). Governments have always depended on the technological power of private players, especially in the defence sector. But today we are witnessing a strengthening of private power vis-à-vis the public sector due to the increasingly technical nature of services and their cost, leading public officials to increasingly outsource. In addition, as mentioned above, digital players are adopting a conglomerate approach (growth by expanding into different but related activities) with the goal of multiplying synergies (for example, Amazon buying WholeFoods, Apple buying Shazam, the Alphabet group expanding into healthcare). To make the most of network economies, they seek to cover markets at a national level at the very least, and preferably at a global level. This conglomerate and global, if not totalitarian, strategy should be considered in the light of their abuse of dominant market positions and other circumventions of competition rules.

In terms of competition, the regulation of digital companies has become a matter of concern, insofar as concerned authorities are increasingly powerless to control abuses of dominant positions in market structuring. These companies have positioned themselves at the crossroads of users' digital interactions

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worldwide: in commerce (Amazon), in information search and advertising placement (Meta, X and Google), in application downloads (Apple, Google), and in data storage and processing (Microsoft, Amazon, Google). Not only do they control these hubs and charge for their use and the regulation they introduce, but they also sell their own products there, with a clear advantage. It becomes very difficult for users to bypass these 'gatekeepers', and this is often done at the cost of lost profits or efficiency. This is the case for advertisers, application developers, booksellers, public administrations for cloud services and simple end-users of the platforms – all users whose weight, and therefore power, as buyers or consumers is greatly reduced in the face of these monopolies.

When it comes to mergers, because they hold considerable cash, digital companies acquire young start-ups that are potential competitors, but whose market share is below the level that triggers the thresholds for oversight by the authorities. A recent example of this phenomenon is the acquisition of only part of the entire target company, meanwhile becoming its main employer and the sole owner of its intellectual property through the purchase of licences (Microsoft with Inflection, for example). As owners of human and intangible capital, the digital giants therefore escape the reach of antitrust authorities monitoring ownership of all assets. The latter are not fooled, but must adapt their rules to implement sanctions.

High-carbon activities

The digital economy's contribution to carbon emissions will continue to grow, for two reasons: first, because the extraction of critical metals for the manufacture of digital components is highly polluting; second, because the consumption of electricity and water by the servers that store, process, analyse and transform digital information is constantly growing.

Global electricity consumption by servers is expected to more than double in the four-year period from 2022 to 2026, rising from 460 TWh to 1,000 TWh, the latter being equivalent to the electricity consumption of a country like France. Even if Europe is less affected than the United States, where most data centres are concentrated, a country like Ireland, which hosts a large number of European servers, will have to cope with a growing demand for electricity, already estimated at 18 per cent of the country's total consumption according to 2024 figures from the United Nations Conference on Trade and Development.

In line with the 2015 Paris Agreement, major digital companies have committed to achieving carbon neutrality by 2040. To achieve this, they are seeking to use advantageous accounting standards. While they claim to have exemplary transparency, they are lobbying and directly funding regulatory bodies to shape accounting rules to their liking. In particular, they are insisting that the carbon emissions associated with their electricity consumption be deducted from the renewable energy credits (certificates) that they purchase. American digital companies are currently leading purchasers of these credits, to the point where the credits exempt them from any effort to reduce gross emissions. Furthermore, the purchase of these certificates does not guarantee a global emissions decrease.

A sign of the digitisation of human activities, the growing importance of the digital economy is essential to the productivity gains urgently needed by ageing societies facing environmental challenges. In many ways, the dynamism of the sector can be seen as a vector for growth opportunities. However, a

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handful of digital companies concentrate capitalisation, revenues, R&D and customers. For these companies the virtuous circle of synergies, network and scale effects, and accumulation of cash, enabling growth through acquisition, is conducive to abuse: self-sustaining concentration of economic power, pricing abuses, market partitioning, crowding out of competing customers, and even the emergence of political power (campaign financing in the United States, use of social networks such as Facebook to influence elections, the Starlink constellation interfering in the Russian-Ukrainian conflict, etc.). The capture by small communities of the power to influence social values and rules is a vital challenge to democracy.

REFERENCES

→ United Nations Conference on Trade and Development (UNCTAD), *Digital Economic Report*, Geneva, 2024.

→ Gaglio, C. and Guillou, S. 'L'Europe numérique: entre singularités, faiblesses et promesses', *Revue de l'OFCE*, 158, 2018.

→ Guillou, S., *La Souveraineté économique à l'épreuve de la mondialisation*, Paris: Dunod, 2023.

Shapiro, C. and Varian, H. R., *Information Rules. A Strategic Guide to the Network Economy*, Cambridge: Harvard Business School Press, 1999.

Sarah Guillou, an economist, is Director of the Innovation and Competition Department at the Observatoire Français des Conjonctures Économiques (OFCE) (French Economic Forecasts Observatory) She co-leads the Public Policy and Business Competitiveness Unit and focuses on investment, particularly in the digital industry.