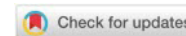


# DIGITALIZATION, A VITAL ISSUE FOR ALL COMPANIES

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**Abstract:** Despite the success of its start-ups, Europe is struggling to compete with the United States when it comes to the digital economy and society. Challenged by this assessment, which confirms the Nordic countries' lead each year, the Senate Delegation for Business has entrusted Ms. Pascale Gruny (Les Républicains, Aisne) with a fact-finding mission on supporting the digital transition of SMEs. In marketing, the concept of "customer experience" is now at the heart of strategies. Similarly, the digital transition of small businesses based on the "SME-VSE experience" highlights the question: how do they view or experience this transition today? How can we help them digitize in better conditions? Because, apart from start-ups - whose DNA it is - and SMEs or VSEs that have made digital their core business, many of them have not yet taken the plunge, or only partially. Certainly, structures, aid and information abound on the digital transition of companies, whether it is seen as a new El Dorado or as a threat. But public policy in this area has tended to neglect traditional and small-sized companies, for which digital is not or only slightly the natural environment. Yet they are the most numerous. It is therefore through the prism of SMEs and VSEs that this text intends to contribute to the "taming" of digital technology, to help small and medium-sized companies in North Macedonia of course with the help of professionals who, on the ground, in our country, feel both overwhelmed by information or commercial offers, and helpless in the face of this tsunami. Because it is indeed a profound transformation of the life OF the company and in the company in North Macedonia.

**Keywords:** Digitalization, Digital culture, Digital economy, Small and medium-sized companies, EU

**Field:** Social Sciences and Humanities

## 1. INTRODCUTION

The stakes are nevertheless high: modernization and adaptation of the whole of society to the world of the 21st century, competitiveness, growth, employment, across the whole territory. We can see that there are many obstacles that remain to bring the whole of the European economic fabric into this "new economy": - Lack of time for business leaders to know "which door(s) to knock on" in a context of complexity of structures and systems, public and private (a diagram in the report attempts to illustrate this "maquis"); - Internal organizational rigidities; - Lack of financial room for maneuver; - Skills deficit and difficulties in recruiting the necessary talent. In this context, and given Europe's delay in digital matters, it is a revolution in supporting SMEs and VSEs that the EU needs! For this reason, it is urgent to put the managers and employees of small and medium-sized enterprises at the heart of discussions and measures. The digital transition must be done with them and for them! The EU has adopted 14 recommendations, based on the real needs of many SMEs and VSEs. They aim to: - Promote a digital culture among all Europeans, starting from primary school, in order to develop skills; - Better inform, encourage and support SMEs and VSEs in their investments in digital equipment and training; - Help them face the threats linked to the digital revolution: cybersecurity, unequal balance of power with digital platforms; - Reduce the digital divide in the territories in terms of very high speed for businesses, by guaranteeing more effective competition that respects SMEs in the telecoms sector; - Establish regular exchanges between the players in the "mille-feuille" of public and private actors in order to make the ecosystem supporting SMEs in digital more efficient. Even though the Macedonia of Nord is not a member of the EU, this recommendation is part of the current context of the deployment of 4G and optical fiber. These technologies are indeed those that are still intended to structure our territories in the years to come. The upcoming application of 5G will partially change the situation. Similarly, access to the Internet via satellite could help to reduce the digital divide. The "giant steps" in terms of technology show how much of a priority it is to help small businesses to seize them so that they too can benefit from them rather than risk being victims. The economic and social dynamics in our country require us to win this bet!

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## 2. A FOURTH INDUSTRIAL REVOLUTION

What is the digital economy? A global transformation. The digital economy covers very different realities, especially since this name has evolved over the years: new technologies, new economy, information and communication technologies, electronic economy, etc. In public statistics, the digital economy is assimilated to information and communication technologies (ICT), and in particular to the production sectors. According to the Organization for Economic Cooperation and Development (OECD), the ICT sector includes companies that produce goods and services supporting the process of digitization of the economy, i.e. the transformation of information used or provided into digital information (IT, telecommunications, electronics). The digital economy is not limited to a particular sector of activity. It is necessary to take into account all sectors that rely on ICT, producers and users. Some sectors have emerged with technological development and do not simply cover activities that use new technologies for the sole purpose of increasing their productivity: this is the case for e-commerce and online services, which are central players in the digital economy. Four categories of players should be distinguished: 1) companies in the sectors producing information and communication technologies (ICT) within the meaning of the OECD, whose activities are carried out in the fields of computing, telecommunications and electronics; 2) companies whose existence is linked to the emergence of ICT (online services, video games, e-commerce, online media and content, etc.); 3) companies that use ICT in their activity and gain in productivity thanks to them (banks, insurance, automotive, aeronautics, distribution, administration, tourism, etc.); 4) individuals and households who use ICT in their daily activities, for leisure, culture, health, education, banking, social networks, etc. In reality, digitalization now goes beyond a sector, an activity or even a branch of the economy but also seizes the whole of society. The scale of this economic transition has been highlighted many times: “dazzling transition” that causes a “systemic upheaval” of the world opening up “a universe of possibilities that defies understanding” according to Pierre Giorgini, former director of “Research and Development” at Orange Innovation (Lendi, 2023, 62,p.). For Marc Andreessen, designer of the first graphic browser (Mosaic, in 1993), “software is devouring the world” (Alesio, 2022, p.28). According to Gilles Babinet, advisor on digital issues, this change is holistic with a “unification of IT processes within a digital platform that delivers all services both internally and externally” and creates an “era” that opens the prospect of a “new age of humanity” (Smith, 2021). For geographer Pierre Bekkouche, this is the “anthropological turning point that is undoubtedly the fastest in human history” (Berger, 2021). According to Pierre Sillard, this upheaval could lead to the creation of a “homo sapiens. (Lendi, 2020)

## 3. A DISRUPTIVE INNOVATION THAT AFFECTS THE ENTIRE ECONOMY

Since the decision taken in 1993 by Al Gore, then Vice President of the United States, to demilitarize the Internet, we have been witnessing a fourth industrial revolution, which constitutes a disruptive innovation and affects the entire economy. It is inevitable, inescapable and irreversible. This fourth industrial revolution comes after the first during which water and steam made it possible to mechanize production, the second, which exploited electrical energy to create mass production, the third which relied on electronics and information technologies to automate production. The fourth, that of digital technology, is characterized by a fusion of technologies that erases the boundaries between the physical, digital and biological spheres. It “creates a world where virtual and physical production systems around the world will cooperate flexibly: it will be possible to fully customize products and create new operating models”. Compared to previous ones, it is totally different in its speed, scope and impact. The speed at which current innovations appear is unprecedented. This revolution is evolving at an exponential pace, not a linear one. The acceleration of innovation and the speed of upheaval are difficult to understand and anticipate and constantly surprise even the most connected and informed business leaders. The telephone (launched in 1878) took 75 years to reach 100 million users, the mobile phone (1979) 16 years, the internet (1990) 7 years, Facebook (2004) 4 years and the “Candy Crush Saga” application (2012) 3 months. The digitalization of the economy is also a disruptive innovation, a process by which technological innovations cause the bankruptcy of large firms, because unlike efficiency innovations that reduce the cost of production and distribution of existing products and services, they produce transformative innovations (“empowering innovation”) that transform complicated, expensive and inaccessible products into simple products for the greatest number. They cause a disruption, an innovative value proposition that emerges in market segments where the offer is the most commoditized and the margins the lowest. The digitalization of the economy causes a global transformation of the entire economy: the internet is no longer the playground of a few companies or a few specialized sectors and the digital revolution no longer refers only to the impact of technological

innovations on the economy but to the transformation of the economic system itself. The scale and importance of these changes herald the transformation of entire systems of production, management and governance. We are in fact at the dawn of a third wave of the internet. The first was to build the technical infrastructure to connect the Internet to itself, a global network of machines. The second wave, which was manifested by the explosion of mobile and the rapid adoption of smartphones, has allowed more people to be connected to each other. The third wave is “the one where any industry can now be disrupted, where the Internet will no longer be limited to machines and people, but to everything that happens between them, in the way they learn, how they take care of themselves, how they manage their money and even how they eat.” (Kastrenakes-Beeple, 2021)

#### **4. A NEW ECONOMY WITH NEW ECONOMIC RULES**

The consequences of this digital revolution do not only affect the economy but all forms of organization, invited to replace its pyramidal form with collective intelligence: “The major challenges facing humanity are not hunger, poverty, sustainable development, peace, health, education, the economy, natural resources... but our ability to develop new organizations capable of resolving them. Our main challenge is collective intelligence. For companies, too, the challenge is absolute. Today, most of them encounter insurmountable difficulties in the face of the complexity, the unpredictability of the world, and globalization. They are subject to permanent conflicts of interest between profitability and sustainable development, secrecy and transparency, values and value, individual and collective dynamics, fertilization of knowledge - which opens - and competition - which locks in” They also have a geopolitical or even societal and ethical scope when Google claims to want to improve the human species, and promotes the concept of technological singularity, that is to say the advent of an artificial intelligence that will exceed the capacities of the human brain by triggering a runaway technological growth that would induce unpredictable changes in human society by creating a powerful superintelligence that would qualitatively far exceed human intelligence, at the risk of humanity losing control of its destiny, the new superintelligence continuing to improve and evolve technologically at a speed incomprehensible to humans. For companies, the digital transition has given birth to an ecosystem whose components are as follows. (Gorian, 2022)

#### **5. THE DIGITAL ECOSYSTEM**

The Internet of Things (IoT) refers to devices and objects whose state can be changed via the Internet, with or without the active participation of users. This category includes objects and sensors that collect data and exchange it with other devices and with humans. These devices are an important source of data to support big data analytics. Big data analytics refers to a series of techniques and tools used to process and interpret the enormous volumes of data resulting from the increasing digitalization of content, the increased monitoring of human activities and the widespread use of the Internet of Things. It allows relationships to be inferred, dependencies to be established and outcomes and behaviours to be predicted. Companies, governments and individuals thus have access to unprecedented volumes of data that inform decision-making in real time, thanks to the combination of a wide range of information from different sources. Big data analytics in turn contributes to machine learning, one of the drivers of artificial intelligence (AI). Artificial Intelligence (AI) refers to the techniques used to create machines that simulate human cognitive functions. Its rapid diffusion is explained by recent advances in machine learning, a discipline of AI that automatically identifies patterns in complex data sets. AI makes devices and systems intelligent, and paves the way for new types of software and robots, which stand out from previous generations of machines by their increasing ability to act as autonomous agents and to demonstrate independence from the decisions of their inventors and operators. AI is expected, in the future, to help solve complex problems, generate productivity gains, improve the efficiency of decision-making and reduce costs. Blockchain technology is based on a decentralized architecture, without intermediaries, which facilitates economic transactions and peer-to-peer interactions. In addition to the exchange of information, it supports protocols for the exchange of values and legal contracts, and opens the way to other comparable applications. Public (permissionless) blockchains, such as Bitcoin, function as a tamper-proof distributed database that serves as an open, shared, and secure public ledger that cannot be tampered with and that anyone can inspect. The transparency of transactions, strict rules, and constant monitoring that characterize blockchain-based networks are all conditions that foster user trust in the transactions that take place there; there is therefore no need for a trusted authority or intermediary operator.

## 6. HOW DIGITAL IS TRANSFORMING THE ECONOMY

Faced with this accumulation of technological disruptions, the entire economy is adopting a new grammar, that is to say, fundamentally new rules. The private appropriation of an object is replaced by a temporary right of use, which calls upon the notion of sharing. This economy of functionality covers an economy of cooperation (economic actors - communities and companies - cooperate by pooling uses in order to satisfy a need while limiting negative externalities) and a collaborative economy (where two consumers are linked so that one sells a use to the other). Thus, the platforms do not hold any assets linked to their activity: Uber does not own any vehicles and AirBnb, any housing. We no longer buy a DVD, we subscribe to a platform. We no longer listen to a CD, we listen in streaming. The (intellectual) resources of this economy are increasingly constructed and no longer collected (when they were material). If the old economy is subtractive, the digital economy is summative. The other dimension is the collaborative economy, a common innovation factory that large companies offer through open platforms that allow innovations to be captured. Apple's applications thus generated \$130 billion in revenue (including \$30 billion for Apple) in 2017, redistributed to 2.5 million individual developers in the United States and 1.6 million in Europe. As indicated in the 2018 Villani report on artificial intelligence, if data is the fuel of the digital economy, computer programming interfaces (APIs) are its engine: "APIs correspond to interfaces made available by platforms to allow third-party actors to innovate using their resources. It was a Facebook API that allowed it to spread the like button on the web and dominate the recommendation market. Similarly, the thousands of developers who use Netflix APIs are at the origin of its success. According to its leader, having these developers in-house would have cost it nearly a billion dollars per year. The dominance of platforms is largely explained by this ability to aggregate ecosystems around them and occupy their center. The heart of these ecosystems is precisely the APIs. To meet the growing need for innovation, large companies encourage "intrapreneurship", by encouraging executives to work on innovative projects. This is the case of Google, which, since 2011, has allowed its employees to devote 20% of their time to exploring new projects. If the projects are mature, the "employee-intrapreneurs" create their start-up and become entrepreneur-shareholders, Google being able to help them in the form of investment thanks to Google Ventures, its venture capital investment fund. These large companies can also buy start-ups or SMEs, where innovation is more conducive thanks to more agile and responsive structures. Digitization causes a drop in production costs (all the lower as their content contains more digital data, the costs of which are themselves very low) and distribution. The costs of network economics do not increase with the size of the company, but the returns increase with the size of the network: the more users use the platforms, the more profitable they are because the initial technological investment has a negligible cost, and once the acquisition of traffic has been carried out - the creation of visibility is more expensive - the cost of acquiring an additional user gradually becomes zero and brings in more and more, while the management cost for a billion users is comparable to that for a million users. Digitalization makes it difficult to measure productivity. The innovative goods and services created are "non-competitive", that is to say they dominate highly competitive markets thanks to their zero marginal cost, synonymous with a price reduction that is extremely advantageous for the customer. Traditional statistics are unsuitable for translating consumer gains that are not reflected in increased turnover or increased profits. (Kamau, 2022) The companies resulting from this revolution have one thing in common that demonstrates this profound change: they evolve very quickly and are no longer subject to the law of diminishing returns, as evidenced by the almost zero costs of reproducing and storing data. This evolution tends towards the creation of economically dominant situations on markets, or even monopolies. The colossal profits of the platforms allow them to sell at a loss to attract new customers, which disrupts the traditional frameworks of competition. Digital rent is replacing physical rent. (Diaz, 2010)

## 7. THE NEW GRAMMAR OF THE ECONOMY

The digital transformation of the economy combines effects of automation, dematerialization and reorganization of intermediation schemes according to the following triangular diagram: Automation Dematerialization Disintermediation / Re-intermediation Each of these families of effects interacts with the other two and is reinforced in this interaction and has three effects: Behind automation are the effects of increasing performance in the use of production factors as we already knew them in the previous stages of computerization: effect 1 Labor productivity; effect 2 Capital productivity, whether fixed capital (machines, equipment, trains, planes, etc.) or circulating capital (stocks of intermediate goods and finished products); effect 3 Productivity of energy and raw materials (quantity optimization, fight against waste, smart grids). Dematerialization is a different movement: that of the substitution of material processes based on atoms

by immaterial processes based on “bits”. It results in three economic effects: effect 4 Appearance of new communication and distribution channels (fixed and mobile internet) that compete with other sectors (see printed books, mailed letters, recorded music) or other circuits (see counters, agencies, stores); effect 5 Lower production costs, with a transformation of the industrial economy characterized by a law of increasing returns (curve of decreasing production costs according to the size of the series) to move, with robotization and the increasing share of software in the value, towards what Jeremy Rifkin calls a zero marginal cost economy, that is to say an economy where costs are concentrated on the first copy (design, prototyping and testing costs) with almost zero reproduction costs (square production curve); effect 6 Sharp drop in transaction costs, the level of which conditioned the scope of companies and what they integrated as functions, according to Ronald Coase’s theory of the firm; this effect is reflected in the rise of network organizations and the structuring of ecosystems around the “plates” of economic activities. A third, even newer family concerns the effects of reorganization of value chains with the emergence of new business models that take into account the phenomena of disintermediation and re-intermediation with added value: effect 7 Role played by people who no longer consider themselves only as producers or consumers, but as actors who participate in innovation, come together to finance, order or support projects of common interest, resell goods to each other, pool and share the use of their home, their car or their equipment; effect 8 New resource constituted by data, the number of which is growing exponentially with the sophistication of machines, the traceability of events, the interaction between people and which feeds a new source of wealth, whether it is used internally (segmentation, optimization), captured and resold (targeting, advertising), exchanged and shared (forecasting, innovation); effect 9 New players represented by the players in the digital sector itself, whose power and influence have increased, moving from the role of tool suppliers (see hardware), to that of solution builders (see software) and then to that of information system and social network operators. (Lemoin, 2014) a) What is not the digitalization of a company A digitalized company is not only: - a company that has an e-commerce site, because digital transformation cannot be reduced to a medium, to technology. The change is deeper and concerns the company’s economic models, its approach to the market, its customer relations; - a company that invests in start-ups, because digital transformation is not only external, it is mainly internal. It concerns above all processes and mentalities; - a company that is present on social networks, because it must above all listen to its customers, its suppliers, its employees, all stakeholders; - a company that has simply appointed a CDO (“Chief Digital Officer”), because digital transformation affects all activities, all departments, all functions and all users. (Thomas, 2021)

## 8. CONCLUSION

a) Digitization must be a strategy, accompanied by economic monitoring based on a compromise between “hypertechnological overinformation that gets lost in geek community newsletters and underinformation that is content with a few limited and intuitive living room exchanges”. b) What the digitization of a company requires The digital economy is based on the exploitation of data and more particularly on the valorization of the free work provided by users, who produce an activity “whose positive externalities will, in the form of data, be incorporated into the production chain without monetary compensation” for the latter, and from which the digital company creates its value chain. c) The OECD points out that this digitalization of the economy has been made possible, on the one hand, by the exponential growth of computing power, with a doubling of the number of transistors on integrated circuits every 18 to 24 months, i.e. a density multiplied by 100 every 10 years, and this, for nearly 50 years (Moore’s law); on the other hand, by the development of uninterrupted mobile connectivity. d) The more data production capacities increase, the more their price decreases. While in 1956, the megabyte cost 10,000 dollars of the time, or 93,000 dollars in 2019, (via the Rmac 305, the first computer containing a hard drive, which would be worth 467,000 dollars in 2019), the gigabyte (1,024 times the megabyte) fell below 10 cents in 2010 and reached 0.05 euro cents in 2015 (via a hard drive or HDD). A new technological breakthrough is coming with quantum computers. In 2015, Google and NASA managed to solve a problem in 1 second thanks to their quantum supercomputer. This would have taken 10,000 years for a classical computer. d) Big Data is one of the biggest challenges not only for the economy but for contemporary societies as a whole. Every day, the average user checks their mobile phone 221 times. Without Big Data, machine learning and artificial intelligence would be nothing. Data is the tool that allows Artificial Intelligence (AI) to understand and learn the way humans think. Big Data is what accelerates the learning curve and enables the automation of data analysis. The more data a machine learning system receives, the more it learns and the more accurate it becomes.

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