



## The Social Impact of Technological Innovation in Europe

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### Abstract

The current digital transformation is due to the exponential development of technology being successfully implemented in all strata of society. The new technological age is built on countless innovations and countless changes. In some cases, as with blockchain, its hostile approach to centralized systems has many legal and governance implications, while laying the foundations for change or the emergence of business models in the economic realm and different management models in the administrative and organizational realm. Mandatory changes were made in many areas such as companies and public administration. Likewise, robotization and artificial intelligence are particularly important technological developments because of their controversial impact on businesses and their growing demand today. In this context, the legislator is faced with the reorganization of the markets and sanctions. Technology, Law and Economy, as inseparable fields, their interaction is increasing day by day.

**Key Words:** Digital transformation, blockchain, artificial intelligence

### Introduction

A disruption is an unexpected and unpredictable shock that gives rise to far-reaching changes that transform humanity. Any significant technological disruption or leap with global repercussion, any paradigm shift about it; and everything that supposes the rupture or rethinking of past models to which society has become accustomed, implies facing challenges and uncertainties for which there is no roadmap.

Under this approach, this work aims to raise the dimension of the changes that the digital transformation is shaping, showing the issues and controversies that the digital transformation of society raises, making special reference to the regulatory challenges of technological development. In this sense, we will study with particular attention the question of data protection, the control of the power of large technology companies and the complex regulatory issues that originate with blockchain, as occurs with robotics and artificial intelligence. In addition, we have also included a key social question: How will digital transformation affect future employment?

The current digital transformation is due to the application in all orders of society of an exponential development of technology, enhanced by a convergence or coupling of technologies with different origin or application. In this context, the digital society develops and, within it, the digital economy (Tapscott, 1996), which can be understood as the broad set of economic and business activities whose fundamental or differentiating feature with respect to economic activities Traditional is the prominent use of digital technologies.

The introduction and popularization of the Internet during the second half of the nineties of the last century already gave rise to the most generic and primordial concept of digital society, while the more specific meaning of “digital economy” was established a few years later, as the new business-economic model of the second decade of the XXI century. Particularly, starting in 2007, coinciding in time with the outbreak of the global economic crisis (2008-2014) and coincidentally with the appearance of the smartphone. It is convenient to add another synchronicity: the birth of Bitcoin and blockchain technology, in 2008, giving rise, in the midst of the financial crisis, to the beginning of the first digital distributed financial record system independent of national

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monetary sovereignties, a true financial disruption that shakes some classic paradigms of centralized models, fundamentally based on the sovereignty of States, and that leads to the introduction of the new concept of “decentralization of trust” (Palomo, 2018a-2018b).

The digital economy is made up of three layers: the layer of digital infrastructure or supporting elements (equipment, computer programs and networks), the layer that concerns digital products and services and, thirdly, the layer that deals with management processes of digital-based economic and business activities. Likewise, the digital economy has five main attributes: digitization (everything that becomes digital), disintermediation or attenuation of the role of intermediaries (the so-called peer to peer model), connectivity, personalization of services (change of a supply model to a demand model) and payment for use (which relativizes the need for ownership of things).

## **Two technologies for a change of era: blockchain and artificial intelligence**

The new technological era is built on innumerable innovations, but the following areas or technologies should be highlighted: artificial intelligence, robotics, blockchain, 3D-4D printing, cloud computing, big data, nanotechnology, artificial reality, augmented reality, IoT (Internet of things), semantic web, drones, autonomous driving of vehicles, conscious technology, biotechnological applications, etc. Among all of them there are two that seem especially transcendent: blockchain technology; and artificial intelligence (AI).

The voice blockchain ("chain of blocks") identifies a technology that is part of the scope of the so-called distributed ledger technologies or DLT (Distributed Ledger Technologies), since it records transactions through simultaneous or distributed notes in all the nodes of the network. In other words, it is situated in a higher stage than decentralization. It operates using cryptographic keys and the transactions processed within blocks are summarized, which are joined by hash functions that act as links, creating a linear sequence or chain (Pilkington, 2016). This procedure allows blocks to be chained sequentially and, therefore, the information they contain is registered in an immutable and unalterable way, in addition to being replicated and shared in a consensual way between all the members of each blockchain network, granting a verifiable transparency by the members of the network, who act as “nodes” of the network, which implies a kind of “distribution” of the concept of trust that does not require the existence of a “central entity” (Preukschat, 2017).

Thus, a distributed, decentralized, shared and replicated database is created, which can be public (or totally open, as is the case with Bitcoin) or private, which, in turn, can be permitted or totally closed, such as This is the case of Hyperledger, the open source blockchain platform promoted in 2015 by the Linux Foundation. The data or transactions registered in the blockchain must be immutable, auditable and have a system to verify their veracity. The network itself acts as a notary, introducing trust systems between strangers (Workie and Jain, 2017).

The first blockchain was Bitcoin<sup>3</sup> (born in 2008), being one of the most prominent Ethereum<sup>4</sup>, which has been suitable for incorporating the so-called smart contracts, including the ERC-20 protocol for the creation and exchange of digital assets representative of other assets (tokens ). The possibilities of applying blockchain and the automatic self-execution software of smart contracts or the tokenization of assets, allow us to glimpse an infinity of applications that will take shape over the next few years (Hileman and Rauchs, 2017).

Encryption is essential in blockchain networks. In 1976, Whitfield Diffie and Martin Hellman created the algorithm that bears their name, with which they proposed to divide the encrypted keys into two keys: one public and one private. With the first you can encrypt a message, but the second is necessary to decrypt it. The creators of this cryptographic system are Ralf Merkle (who contributed the so-called Merkle trees with his research), Ron Rivest, Adi Shamir and Leonard Adleman (creators of the RSA algorithm, composed of the initials of their surnames, and which allows the encryption and decryption of messages).

The underlying philosophy of distributed systems and its antagonistic approach to centralized systems has many legal and governance implications, while laying the foundations for change or the birth of business models

in the economic sphere and of different business models. management in the administrative and organizational field of companies and public administration (Lerida and Mora, 2016).

Distribution versus centralization can significantly alter the long-established traditional centralized systems to which citizens are accustomed (property registration, civil registration, medical records, academic degrees, etc.). In fact, a large part of the current legislative body has been built, for centuries, under approaches of coordination, administration and centralized management (Atzori, 2015).

DLT technology is being applied or tested in many areas, such as: crypto assets (many of which are cryptocurrencies); payment systems; stock markets, identity management of people and things; security and authorization systems; supply chains; traceability of goods; intellectual property management; provision of services and exchanges of the collaborative economy; notary records and services; authentication of titles or curricular merits; public contract bidding systems and many more use cases that are being devised every day. To all of them are added some particularly popular ones, such as the new forms of financing business projects, through the so-called cryptocurrency offers, known as ICOs (Initial Currency Offers), STOs (Security Token Offers), or SAFTs (Simple Agreement for Future Token) whose issuance or authorization is so controversial from a regulatory point of view. Thus, the CNMV statement, dated March 16, 2019, can be seen on the precautions that investors should have in relation to raising funds through these operations (Sebastian, 2017).

An application with worldwide resonance was the formal announcement and publication, on Tuesday, June 18, 2019, by the consortium led by Facebook, of the so-called "White Paper" or explanatory document on the launch of "LIBRA" for the year 2020. A means of payment among users of the social network (practically a quarter of the inhabitants of the planet), which has a volume of 2,700 million users. LIBRA is a definitive boost to the development of a virtual, global and parallel monetary system, which moves in a dimension alien to the sovereignty of the States, configuring an innovative, fascinating and also disturbing "beginning" of an alternative monetary system. native. The document indicates the creation of the LIBRA Association as the governing body of the network, in which companies such as Mastercard, Visa, PayPal, PayU, Stripe, eBay, Facebook (through the Calibra company for this purpose), Lyft join. , Spotify, Uber, Vodafone Group, Coinbase, Union Square Ventures, and non-profit organizations. This association aspires to have 100 members by 2020 and the incorporation of the greatest possible diversity of organizations, including universities, is encouraged. It will function as a "permissioned" blockchain, which even has its own programming language (Move), leaving the nodes in charge of these companies; However, it contemplates a future "opening" of the network and Facebook promises to withdraw from the initial leadership to be one more member when the system is in stable operation. An especially significant element that differentiates LIBRA from others such as Bitcoin, is that it will be backed ("Libra Reserve") by risk-free financial assets (bank deposits and short-term fixed income) to reduce its volatility and maintain its value on a relatively low path stable. The potential of this and other virtual currencies is relevant, given that today it is estimated at 1,700 millions of inhabitants, those who still do not have a bank account; and many of them do have access to the internet and use social networks.

Robotization implies the incorporation of robots (versatile and autonomous machines that adapt themselves) to production processes, so it differs from mechanization (machines that perform simple and repetitive tasks) and automation (machines that allow reduce human intervention). For its part, artificial intelligence (AI), closely linked to robotics, supposes the attribution of "intelligence" qualities similar to human ones, since they provide the ability to solve problems or learn. In this sense, artificial intelligence learns through training ("machine learning") provided by humans and by its own self-learning. Basically, AI can identify results or predict future behaviors through data review, using an algorithm that generates behavior patterns. In addition, the results it obtains provide it with experiences that it adds to its records and that improve the algorithms with which it was programmed.

Robotization and artificial intelligence are especially transcendent technological developments due to their controversial impact on the jobs carried out by humans (Salazar, 2019), to a much greater degree than the mechanization or automation experienced since the beginning of the first industrial revolution. It will not only

affect routine tasks but also many other current professional activities (Frey and Osborne, 2016; McKinsey, 2017), also creating new professions linked to the development of these technologies.

Most developed countries have already drawn up guidelines on artificial intelligence that move between two main coordinates or precepts: on the one hand, they want to stimulate their development due to the economic and competitive consequences that they imply; but, on the other hand, they are concerned that ethical principles are preserved in their development. Thus, for example, at the beginning of 2019, the Spanish Government published the document *The Spanish Strategy in R & D & I in Artificial Intelligence*<sup>12</sup> that collects both approaches.

It is already seen that the speed of change of digital transformation and, in particular, of the application of AI, will grant a very narrow margin of time to be able to propose the recycling of employees who will lose their jobs. A new “industrial reconversion” has already begun, such as that which took place in developed countries in the decade of the eighties of the last century; and there is a perceived fear that a large unadaptable or superfluous human group will accumulate (Hariri, 2016) in the new socio-technological context, for which the concept of “universal basic income” will begin to take center stage in economic policies and social.

### **Challenges for a society in digital transformation**

The main historical stages of human society, properly speaking, go back to its origin in agrarian society (between 8,000 and 10,000 years ago) until the 18th century, followed by two and a half centuries of industrial society - it could well be the year 2007 - and that has been the prelude to the current digital society, which is estimated to extend -in its first stage- until 2030. After that date, we will supposedly make the leap to a new model of intelligent society that will prevail for the rest of the XXI century. In all these stages, technology has been, is and will be one of the main factors of change of time.

But, with an eye on the normal parameters of human longevity, that is, looking at the next decades, it can be seen that what will be called intelligent society -an imperfectly defined concept- that began to be used in 2016 - It will refer to the evolution experienced by the digital society at the beginning of the 21st century towards a more technologically advanced and “empowered” society with new communication, decision-making and individual sovereignty capacities. This will be the consequence of the exponential evolution of technology and its interconnection in the way of interconnecting between individuals (P2P), between machines (M2M) and between individuals and machines (P2M-M2P).

In this intelligent society, artificial intelligence, robotics, the Internet of Things (IoT), blockchain technology, neuroscience, genetics, social networks, collaborative economics, economics. circular, smart cities, etc. they are defining elements on which new socioeconomic systems are built. In turn, these also pose major legal challenges on privacy or protection against the influence of large technology and social media corporations.

The intelligent society is a nominally recognized fact, as shown, for example, by the Public Consultation on the digital strategy for an intelligent Spain, issued in autumn 2017, by the Secretary of State for the Information Society and the Digital Agenda of the Ministry of Energy, Tourism and Digital Agenda, transcendent in the concept and in its objectives.

It may be that an intelligent and interconnected society that is more and more and better / less informed<sup>15</sup> -it is already talking about infoxication- increasingly questions the conventions, reaching the very essence of the State and the institutions.

Hyperconnectivity brings out new behaviors and social and economic interactions that were previously impossible. Thus, new business models emerge, such as participatory platforms, which connect individuals and create interdependencies between them, which, in turn, generate opportunities. Although these relationships will also change later, reaching direct relationship systems between the parties (peer to peer or P2P) that will give rise to legal or para-legal relationships, many of which, especially when they have economic significance, will move into regulatory limbos. between what is legal, what is alleged and what is illegal.

Society has changed, has changed, and continues to change, and it may exude a certain air of rebellion against what seemed solidly established and assumed. This generates risks, but also favors the appearance of

new opportunities and new business models that will also require the introduction of a new legal body that can consider the legal consequences of technological innovation. For example, the well-known Apple Store or Android platforms allow anyone to citizen or company work for companies Apple, Google, Samsung and many others, developing applications (Apps) that can be offered through these sales platforms. This can make the community of users and creators those who develop the expansion of the business and complement the products and services of said companies<sup>16</sup>, without the developers being employees of said companies.

The challenge of regulation in the digital society or of the intelligent society extends to all sectors (Cuadra-Salcedo and Pinar-Manas, 2018). Thus, in a sector as regulated as the financial sector, innovation has led to the need to develop regulatory sandboxes that accommodate the new proposals of the growing Fintech-Insurtech sector (United Kingdom, Australia, Singapore and even Spain) but there is a lack of a “ global sandbox ”applicable to more than one country or jurisdiction (Arner, et al, 2015).

Continuing with the examples from the financial sphere, the British Financial Authority (FCA, Financial Contact Authority) has proposed to create a global network of financial innovation that allows sharing experiences and analyzing how to advance in a supranational regulation, given that the technological environment overwhelms the jurisdictional boundaries. The financial sphere, due to its strategic and particularly sensitive nature, requires special attention.

Technology is a co-substantial element in modern financial markets and more and more algorithms are making decisions to form investment portfolios or to advise their clients (Palomo et al., 2018; Fernandez, 2019). A significant case is the one that happened on May 6, 2010, in the episode dubbed the flash crash, when the North American Dow Jones Index plummeted nearly 1,000 points in just a few minutes due to the gregarious behavior of the financial robots of HFT (High Frequency Trading) which, fortunately, was able to recover twenty minutes later.

Another cross-cutting element in technology is data protection, which has become the cornerstone for an orderly development of the digital society (Pinar et al, 2016). Special effort has been made to protect personal data, but the importance of the data generated by things is already guessed, since, directly or indirectly, information about people, companies or institutions is transmitted from our interactions. The already close development of 5G communications networks and, with it, the exponential multiplication of the data generated by sensors integrated in home devices or in vehicles and facilities, makes the control of the management and use of data a priority.

Another regulatory challenge comes from the rapid growth of what are now large technology companies (bigtech or techgiants), indisputable protagonists of the digital transformation and provoking both admiration and suspicion (Ayyagari et al., 2018). The concentration of market power and the enormous global relevance of their operations, with undefined regulatory spheres, is leading them to star in some controversies and, on occasions, scandals, resulting in high economic sanctions with great reputational effect.

It is beginning to be seen that the regulation proposed with the objective of controlling or attenuating the market power of these companies is becoming more of an entry barrier for new smaller companies (Autor, et al., 2019) than in a system of guarantees for users. And this is so because it is precisely the large corporations that have the most material and professional resources to meet these regulatory requirements, being able to exercise powers of influence or lobbying to promote legal developments that favor or even prevent them. the entry of new competitors who, where appropriate, may be absorbed before they become a threat to your position. Compliance with the regulation has high economic costs that, many times, can only be borne by large companies. From another point of view, a derived effect is that, if the situation is oligopolistic or monopolistic, competition decreases (Gutierrez and Philippon, 2017) and, also, the incentives to continue innovating are reduced.

Excessive or inappropriate regulation can be counterproductive for users or for new companies that want to enter these highly concentrated markets. Regulation is then debated on several fronts: on the one hand, the difficulty of regulating new business models that are so innovative and, at times, disruptive, for which traditional legislation seems outdated and unconditionable; on the other hand, the usual problem of wanting to maintain the

balance between the intention not to curtail efficiency, innovation and economic progress, versus consumer protection (Mantelero, 2014).

The control of anti-competitive practices leads, in some cases, to the relocation of technology companies to other countries, clearly impacting, not only on the creation of domestic wealth, but also on the loss or inability to attract professional and business talent. It is the eternal dilemma between innovation and competition.

Another regulatory problem is the one that concerns the tax issue. The great market power and the size of the large technology companies play in their favor to optimize their international taxation through the optimal geographic location of headquarters and subsidiaries, being able also to use their negotiating capacity and their position of strength to suggest to governments their possible relocation to other countries in the event of not reaching sufficiently satisfactory agreements.

For this reason, it is important to create systems of international legislative coordination that reduce “arbitrage” between different jurisdictions, even when these companies may seek what could be called an optimal tax geolocation (GTO). In this sense, in 2013 the OECD began to develop the so-called BEPS (Base Erosion and Profit Shifting) plan, which contains 15 measures aimed at avoiding these tax problems. The European Commission also developed a document on principles of justice and efficiency in the single European digital market and, in March 2018, proposed a directive for the Tax on Digital Services, which did not advance due to the discrepancy between the Member States on whether it was the opportune moment and if this rule was really necessary; Although, with the commitment to continue in its parallel approach to the OECD and with the objective of concluding in the year 2025.

The correct assignment of the activities carried out by technology companies is also relevant for the purposes of the corresponding legal regulations. Many platforms transact with data instead of prices, giving more importance to the number of users than to the income from their activity, since the market value of these companies is concentrated in the intangible “goodwill” that they create with their penetration. digital, from which derives the capacity for “scalability” of digital businesses with a minimal marginal cost and its extraordinary market value.

In many cases there is ambiguity even between different national jurisdictions and also globally. For this reason, it is necessary to understand business models to determine how they should be normatively conceptualized, without having to curtail innovation and the creation of new business models. From this angle, it is not easy to determine whether a company is developing anti-competitive practices by continuing to innovate permanently and, indirectly, by not allowing other potential competitors to enter; or, if, on the contrary, more than a competitive practice, what those dominant companies is, only, implement a disruptive business model, for which there is no competitor.

## **Conclusions**

Technology has transformed society, giving rise to the current digital society that, supported by its new tools, has “empowered” itself towards an incipient intelligent society, intensive in the use of social networks and in the generation and sharing of data.

In an increasingly technological society, two key elements will stand out: trust and values. Trust, especially as a reputational model in a hyper-connected society and, also, trust as a fundamental element for the robustness of distributed networks and of all collaborative economy models. Without trust in the systems and in the actors, a digital world based on intangibility and the absence of a specific location and jurisdiction cannot be built. In this sense, the current international jurisdiction and the preponderant and traditional model of national jurisdictions seems to become obsolete given the potential of digital globalization. One could already ask what would be the jurisdiction of an Internet server located in international waters, or on the Moon.

It is important to develop a legal body, preferably international, to avoid jurisdictional problems, which ensures what can be called the Rights of the Digital Citizen. If until now the actions of some citizens against or against others have been settled in the courts applying the principles of justice of humanity or the Universal Declaration of Human Rights itself, now it will be necessary to contemplate respect for those rights, not only on

the part of humanity, but also on the part of intelligent machines; since their learning and accumulation of experiences may derive differently from how they were initially created, leaving their creator or original programmer no longer responsible.

In this context of vertiginous change, the possible difficulty to understand the operation and implications of some new technologies by broad layers of society, various levels of the administration or some companies, the lack of permeability to innovation in some cases and the erroneous perception that the speed of changes is less than announced, have led to procrastination of many actions aimed at digital transformation, and even to the absence or poor emission of positive signals to promote changes technological. However, these processes differ considerably from one country to another.

Without a doubt, there are many challenges and challenges that the current technological revolution brings. Regulatory solutions will never be perfect or complete, but they will have to be dynamic and transnational. The zero risk society does not exist, so it is necessary to learn to live with an increasingly powerful technology. You cannot do catastrophic demagoguery about technological development. The battle between techno-optimism and techno-pessimism continues and regulation must be able to offer answers and solutions.

### References

- Arner, D. W., Barberis, J., & Buckley, R. P. (2015). *The evolution of Fintech: A new post-crisis paradigm*. *Geo. J. Int'l L.*, 47, 1271.
- Atzori, M. (2015). *Blockchain technology and decentralized governance: Is the state still necessary?*. Available at SSRN 2709713.
- Autor, D., Dorn, D., Katz, L. F., Patterson, C., & Van Reenen, J. (2019). The fall of the labor share and the rise of superstar firms. *The Quarterly Journal of Economics*, 135(2), 645-709.
- Ayyagari, M., Demircuc-Kunt, A. & Maksimovic, V. (2018). *Who are America's star firms?*. *The World Bank*.
- BBVA Research (2017). *De Alan Turing al "ciberpunk: la historia de Blockchain*; (<https://www.bbva.com/es/historia-origen-blockchain-bitcoin/>).
- Caixabank Research (2019). *Superempresas: un fenomeno global*, Informe Mensual, n° 432, marzo, pp. 29-36.
- Fernández Torres, Y., Gutiérrez Fernández, M., & Palomo Zurdo, R. J. (2019). *Cómo percibe la banca cooperativa el impacto de la transformación digital?*.
- Frey, C. B., & Osborne, M. A. (2016). The future of employment: How susceptible are jobs to computerisation?. *Technological forecasting and social change*, 114, 254-280.
- Gartner, (2017). *Predicts 2018: AI and the future of work*, Gartner.
- Gutierrez, G. & Philippon, T. (2017). *Declining Competition and Investment in the US*. National Bureau of Economic Research, N. w23583.
- Hariri, Y.N. (2016). *Homo Deus. Breve historia del mañana*. Barcelona, Debate.
- Hileman, G. & Rauchs, M. (2017). *Global Blockchain Benchmarking Study*, SSRN: <http://dx.doi.org/10.2139/ssrn.3040224>.
- Lerida, J. & Mora, J. J. (2016). La economía de blockchain: Los modelos de negocios de la nueva web. *Kolokium*, Madrid.
- Mantelero, A. (2014). The future of consumer data protection in the E.U. Rethinking the notice and consent paradigm in the new era of predictive analytics, *Computer Law and Security Review*, 30 (6), pp. 643-660.
- McKinsey Global Institute (2017). *Jobs Lost, Jobs Gained: workforce transitions in a time of automation*.
- Palomo, R.; Fernández, Y. Y & Gutierrez, M. (2018). *Banca cooperativa y transformación digital: Hacia un nuevo modelo de relación con sus socios y clientes*, Revesco. Revista de Estudios Cooperativos, Tercer cuatrimestre, pp. 161-189.
- Palomo Zurdo, R. (2018a). "La disrupción monetaria de las criptomonedas", en *Blockchain: La cuarta revolución industrial*, Editorial Lefebvre-El Derecho, pp. 48-51.
- Palomo Zurdo, R. (2018b). "Blockchain: La descentralización del poder y su aplicación en la defensa", Revista del Instituto Español de Estudios Estratégicos (Revista IEEE), n°70, 12 de junio de 2018, pp. 1-20.

- Pilkington, M. (2016). *Blockchain technology: Principles and applications*, en *olleros, x; Zhe- gu, m.; elgar, E., (Coord.)*, Research Handbook on Digital Transformations.
- Preukschat, A. (2017). *Blockchain: La revolucion industrial de internet*, Grupo Planeta, Madrid, Espana, pp. 23-27.
- Quadra-Salcedo, T. y Pinar Manas, J. L. (Dir.). (2018). *Sociedad Digital y Derecho*, Ediciones del BOE, Madrid.
- Rey Paredes, V (2019). *Las criptomonedas y su fiscalidad*,
- Salazar, I. (2019). *La revolucion de los robots: Como la inteligencia artificial y la robotica afectan a nuestro futuro*, Ediciones Trea.
- Sebastian, J. (2017). *El asombroso fenomeno de las ICOs*, BBVA Research, Editorial Deusto, Nueva York, 2017.
- Tapscott, D. (1996). *The digital economy: Promise and peril in the age of networked intelligence*, Mc- Graw-Hill, New York.
- Tapscott, D. & Tapscott, A. (2016). *Blockchain Revolution*, Penguin Publisher Group, Nueva York, pp. 27-29.
- Workie, H. y Jain, K. (2017). Distributed ledger technology: Implications of blockchain for the securities industry, *Journal of Securities Operations & Custody*, V. 9, n° 4, pp. 437-355.