

**DESIGNING ARTIFICIAL INTELLIGENCE. CHALLENGES AND STRATEGIES FOR ACHIEVING REGULATORY COMPLIANCE\***

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**Abstract**

This article analyses the repercussions of artificial intelligence in terms of law and fundamental rights. Amidst negative, reactive and alarmist outlooks, we propose an approach inspired by the data protection by design and default methodology, in which emphasis is placed on regulatory compliance from the very design of such technologies.

Key words: artificial intelligence; data protection by design and default; design for regulatory compliance; ethics; human rights; fundamental rights; constitutional law.

**INTEL·LIGÈNCIA ARTIFICIAL DES DEL DISSENY. REPTES I ESTRATÈGIES PER AL COMPLIMENT NORMATIU****Resum**

*En aquest article s'analitzen les repercussions de la intel·ligència artificial en el dret i els drets fonamentals. Davant visions negatives, reactives o catastrofistes es proposa un enfocament basat en el compliment normatiu des del disseny inspirat en la metodologia de la protecció de dades des del disseny i per defecte.*

*Paraules clau : intel·ligència artificial; protecció de dades des del disseny i per defecte; disseny del compliment normatiu; ètica; drets humans; drets fonamentals; dret constitucional.*

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## Summary

- 1 Utopia or dystopia? An introduction to the problem of artificial intelligence
  - 2 The processes of technological innovation and their impact on our world
  - 3 A global impact on law and rights
    - 3.1 Are fundamental rights at stake?
    - 3.2 The impact on the law
  - 4 From the ethics of human rights to “law compliance by design”
    - 4.1 A human rights ethics
    - 4.2 An early strategy
    - 4.3 The legal framework for data protection as an inspiring model
    - 4.4 Regulatory compliance by design
      - 4.4.1 Ethically and legally training the team
      - 4.4.2 Identify project requirements
      - 4.4.3 Integrating standards into design and documenting compliance
      - 4.4.4 From programming to marketing
      - 4.4.5 A cycle that is maintained throughout the life of an AI
  - 5 A brief conclusion
- Bibliography

## 1 Utopia or dystopia? An introduction to the problem of artificial intelligence

The first chapter of *Vida 3.0* (Tegmark, 2018: 13-39) proposes a dystopian utopia that highlights the contradictions faced by the legal analysis of artificial intelligence (AI).

The research division of a large company manages to develop a general-purpose AI. By building a neural network, the team of researchers achieves a seemingly unattainable goal and must make a series of transcendental decisions. The first is to keep the discovery secret and start working quickly on its development. From here, the results offered by AI change the world from an ethic of scientific utopia. It is about eradicating wars, freeing man from mechanical tasks or promoting social justice. To do this, “you have to make money first.” So the first criterion that guides the machine is well known: to obtain income from businesses that allow a rapid process of capital accumulation in the entertainment industry —social networks, audiovisual production, etc. - in a model that results, no doubt, familiar.<sup>1</sup>

Once the objective is achieved, the machine decides a strategy of buying and controlling the media and investing in promoting politicians aligned with values such as peace, freedom, equality and the guarantee of fundamental rights. The final result allows to establish a global democratic government and the birth of a new era for a peaceful humanity in a sustainable but machine-protected world.

It seems very clear how people would respond to a survey in which they asked something of the kind: “Do you want a peaceful, ecologically sustainable world in which machines work for you?” And yet Tegmark’s proposal is undoubtedly disturbing. First, because it means assuming our inferiority in front of the machine. If we ever manage to create a general-purpose intelligence, a “strong” intelligence, it would immediately overcome the barriers of its programming. It could improve its program, exponentially multiply its computing capacity, and design *hardware* and *software* improvements. The AI would explore new models such as quantum computing<sup>2</sup> or the tools offered by DNA-based bioinformatics. This would immediately go over the terms of Moore’s law and start a new era for technology.<sup>3</sup>

Now, in Tegmark’s uto-dystopia, what is unsettling is how the common good for humans could be attained, but without humans. It would be a new Enlightened Despotism in which decisions would correspond to an oligarchy of a few scientists and technicians from which the machine itself could become independent. And, even if an improvement of the human condition governed by humanist and democratic values was achieved, could we say that it is based on a conception of human dignity and freedom, consistent with our vision of fundamental rights?

## 2 The processes of technological innovation and their impact on our world

The current model of technical innovation has been repeatedly called into question (Martínez, 2019a). In this sense, narrated uto-dystopia faithfully conforms to the model that has been running the internet since the beginning of this century, and even before. In the computer age, both scientific research and technological evolution have undergone a process of progressive acceleration based on criteria of speed, efficiency and profitability. It is a model of disruptive innovation that forces company executives to solve different strategic dilemmas (Christensen, 1997: 225 s.) in the face of investment decisions that can completely change entire markets. These are change processes that require unknown agility. Traditional planning tools are no longer enough, decision-making processes must be very agile and require a new profile of highly creative manager, even willing to “unlearn” (Marcet, 2018: 55-72). This, in the context of artificial intelligence, can lead to unacceptable biases (O’Neil, 2016: 3).

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<sup>1</sup> This objective has manifested itself very elusive since it was formulated at the Dartmouth Conference in 1956 and would assume that a machine would have the capacity to operate and reason as a human being but endowed with enormous computational capabilities (McCarthy, Minsky, Rochester and Shannon, 1955).

<sup>2</sup> It is a perfectly predictable scenario of lack of control. See Jiménez (28 July 2017).

<sup>3</sup> In 1965 Gordon Moore stated in the magazine *Electronics* that the number of transistors per inch in integrated circuits and the density of the data would double approximately every 18 months. This law has been tested and can be overwhelmed if so-called “quantum computing” is developed.

And in this context one of the great, and therefore most dangerous, axioms of the internet world was formulated, which states that, to innovate, “things have to be broken” (Zuckerberg quoted by Blodget, 2009).<sup>4</sup> This way of doing things has shaped our world in recent decades. The rule could be formulated in a simple way: “If you have an idea, if this idea is business, if it can be done, do not hesitate to ‘do it’”. It is essential to arrive first, occupy the market niche and get a significant number of users at any price. The value of innovation and its contribution to human development are not discussed here; on the contrary, lamenting and demonizing technology would be a grave mistake.

However, processes based on breaking things do not consider a legal rule any more than understanding that what is not prohibited is expressly understood as allowed. Experience in recent decades shows a model that aims to maximize profit regardless of the damage that could be caused. In practice, the capital accumulation processes that accompany successful companies have made it possible to address the payment of sanctions and compensation, with a relatively low impact in relation to the profits achieved, to the extent that somehow they are incorporated into the cost structure (Martínez, 2016).

Disruptive innovation processes define turning points from which changes occur that revolutionize the way we do things and even understand the world.<sup>5</sup> The demise of the job model is noted due to the explosion of free or low-cost services on the internet, the migration of work benefits to intermediation platforms and a new model of qualified and adaptable professional, in which, in the future, to be a salaried employee will be synonymous with incompetence and in which the university academic curriculum is insufficient (Mallard, 2018: 91-95, 176-179). The traditional company must reinvent itself, change and adapt to a new normality in which the production process and business model change in a radical way (Bradley, 2016).<sup>6</sup> The consulting firm McKinsey highlights how massive data analysis has enabled or will support the implementation of artificial intelligence tools in the immediate future, which is a strategic business and macroeconomic challenge (McKinsey, 2017: 6).<sup>7</sup>

AI involves a process of innovation and permanent change that will completely reorient the management and operation processes of companies in multiple dimensions (McKinsey, 2018). The process of increasing digitization of the public and private sectors, and the capabilities of analyzing data through *machine learning* tools thanks to the storage and process capabilities offered by *cloud environments*, promote migration to a data-driven decision model. AI provides here all its value, whether as a tool to support the assisted human decision, or as an automatic process that operates by directly offering services. In his briefing note of May 2017, McKinsey identifies the possibilities that the current state of the industry offers for the advancement of disruption. In this sense, it is particularly interesting how even situations of inefficiency are conceived as opportunities for improvement, and so is the large sectoral space susceptible to grown by the hand of AI.

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4 The exact phrase was: “Move fast and break things. Unless you are breaking stuff, you are not moving fast enough” (Zuckerberg quoted by Blodget, 2009).

5 Dobbs, Manyika and Woetzel, McKinsey’s publishers, targeted up to a dozen disruptive technologies or businesses in 2015: 1) genomics; 2) engineering of new materials; 3) energy storage; 4) new modes of exploration and exploitation of hydrocarbons; 5) renewable energies; 6) robotics; 7) autonomous vehicles; 8) 3D printers; 9) mobile internet; 10) Internet of Objects; 11) *Cloud*, cloud computing; 12) automation of knowledge-based processes. (Dobbs, Manyika and Woetzel, 2015: 40). Every year different organizations publish these types of lists. Virtually all, AI appears as one of the disruptive technologies and, at the same time, as an indispensable tool for the development of others.

6 Bradley analyzes these changes by projecting them on a type of company, the media, which are undoubtedly the paradigm of the radical changes that information and communications technologies impose on the economy.

7 “The application of AI and the automation of activities can enable productivity growth and other benefits not just for businesses, but also for entire economies. [...] At a macroeconomic level, based on our scenario modeling, we estimate automation alone could raise productivity growth on a global basis by 0.8 to 1.4 percent annually. In short, businesses and the economy need the productivity boost from automation”.

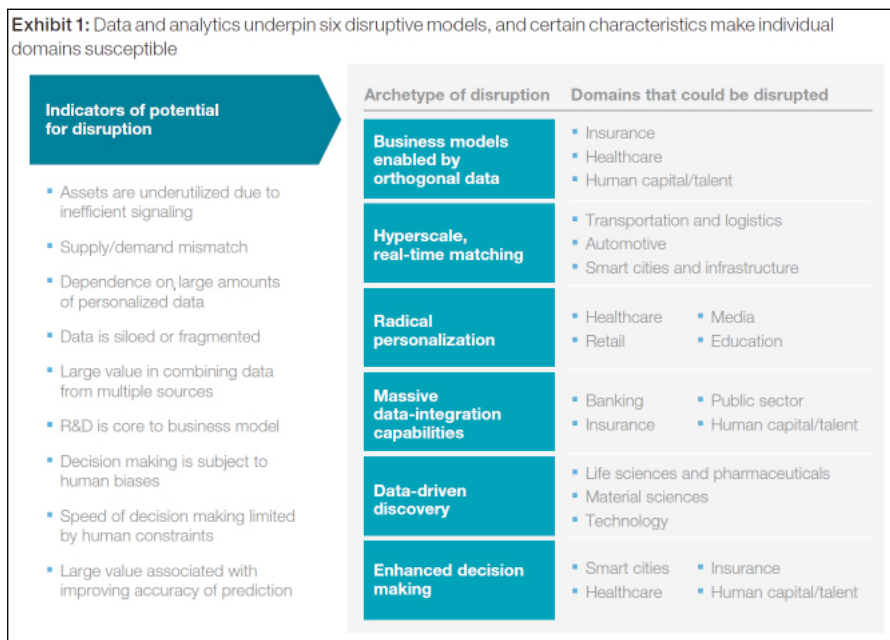


Figure 1. Source: McKinsey Global Institute (McKinsey, 2017: 2).

The aforementioned report states that economies in countries such as the United States, France or Germany now exploit 18, 12 and 10% of the potential offered by digitization, while the international flow of data has increased by 45% since 2005. The range of human activities likely to be governed from data and with automated processes will grow day by day and profoundly transform education, economics, health or employment. McKinsey’s forecasts indicate that the volume of jobs eligible for complete automation can still be relatively low. However, 60% of positions support automation ranges of up to 30% of activity.

In a larger study (McKinsey, 2018: 30, 41-43) an analysis that offers significant prospects for growth and economic model change accompanied by a high risk of gaps between countries and people. These asymmetries derive from: 1) countries’ research and innovation capabilities—and here leadership belongs to the United States and China; 2) the strength of the economy and its preparation for an interconnected world, which characterizes France, Germany, the United Kingdom, Sweden or Finland alongside countries such as South Korea or Japan; 3) countries that are at the threshold for the adoption and development of this technology; and 4) countries, such as Spain, below the threshold. From the point of view of people, there are significant gaps between workers whose training is oriented to the skills needed for this new economy, which will be able to evolve in their posts as they are automated, or access to new employment niches, and those that should aspire to residual jobs in terms of technification or to rely on guaranteed minimum living income subsidies.

### 3 A global impact on law and rights

#### 3.1 Are fundamental rights at stake?

By reviewing the technologies or processes affected by AI, we could appreciate risks and opportunities (Martínez, 2019a: 264-267). The working group on “Artificial Intelligence and Human Development” created by the Chair of Privacy and Digital Transformation Microsoft-Universitat de Valencia, has identified some of them in its sessions.

##### • Risk of digital discrimination

The digital division may be widened due to the AI. Asymmetry between countries in a technology aimed at changing the global economic model can further widen north-south differences, and between digitally advanced and non-advanced countries. This gap is projected on the entire system of fundamental rights to the

extent that it can be a generator of economic dependence, poverty, digital exclusion and/or exclusion from the data-driven economy.

#### ▪ Risk of employment discrimination

The disappearance of posts likely to be taken over by machines (Ford, 2016: 359-365) obviously calls for the expulsion of millions of people from the labour market and may pose threats to social stability and, with it, to our system of freedoms (Mercader, 2018: 619-620). It is a common place to predict the disappearance of jobs such as the driver, supermarket cashier or telephone assistant, but also others of an administrative nature. Thus, AI, either because it is able to automate or assume a significant percentage of tasks, or because it is an essential tool to support professional exercise, can mean the exclusion from the labour market of those who are unable to adapt their knowledge and skills to the demands of interaction with AI.

#### ▪ The impact on the right to education

This is a structural risk that can affect entire countries. It derives from the non-existence, in training plans, of tools oriented to computational thinking and the skills of students necessary for the development, use and application of AI. On the other hand, an outdated education system, with teachers with limited digital skills, operates as a barrier to the introduction of AI as a support for the educational process. Developing appropriate AI strategies in education and continuing training are opportunities for talent generation. In those countries where this does not happen, the risk of employment discrimination and social exclusion will multiply exponentially.

#### ▪ Bias as a risk

AI-based decision-making processes rely on algorithm-based mass data analytics processes. It is well known that the so-called “machine learning” can work according to a previously defined purpose, or for no other purpose than to establish inferences and correlations (Lopez and Messeguer, 2017). In both cases, it depends inescapably on the quality of the data and the material functioning of the algorithm. If it has any kind of bias, it can lead to discrimination. We can identify impacts of the most varied type, from truly existing examples:

- a) In recruitment or quality assessment of the employment benefit, it may produce discriminatory effects; for example, encouraging unfair layoffs.
- b) In the field of public security, the existence of assistance programs that guide the development of police activity in the detention of minorities has been demonstrated.
- c) It has been denounced that programs of assistance in processes to obtain conditional release in the United States operate in a biased manner favoring the granting of this right to whites.
- d) In the area of the right to effective judicial protection, programs are appearing on the market that are capable of establishing the success rate that a certain claim will achieve before a particular court. From the point of view of the guarantee of the due process of law, and the independence of judge discretion in the exercise of judicial function, it is worrying to think that there are machines capable of predicting a certain result.

We could grow the risk list. In the so-called “neuroemotional marketing” (Byung-Chul, 2014: 61, 74-75; Bauman and Lyon, 2013: 15), the manipulation of preferences (Pariser, 2017) has put Western democracies on alert after the case of Cambridge Analytica and mediated the interpretation of the Spanish legislator’s choices by amending the Electoral Law (Martínez, 2019b).<sup>8</sup> The possibilities offered by AI in the field of bank scoring, or actuarial risk determination, point to a world in which the risk of discrimination on labor, educational or health grounds could be very present. Moreover, in a theoretical scenario you could end up discriminating against a person for their zip code.<sup>9</sup>

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<sup>8</sup> Indeed, the Organic Law on General Electoral Regime has been amended by the third final provision of Organic Law 3/2018, with the introduction of a new article 58a, the first paragraph of which states that “The collection of personal data relating to opinions policies of political parties in the context of their electoral activities will be covered in the public interest only when adequate guarantees are provided.”

<sup>9</sup> Geographically linked socioeconomic, demographic, climate or pollution variables offer powerful models of analysis. For example,

However, we can also find opportunities for rights. Thus, for example, the advances that biomedical research is undergoing can significantly improve the quality of patient care. In the workplace, advanced robotics and AI tools can operate as a factor in releasing repetitive jobs and eliminating occupational risks. In education, the proper use of these technologies can operate by increasing the quality level of our education system. It is unacceptable to categorize all the impact of AI on rights. However, from the background presented and the available literature, it is not unreasonable to carry out a small exercise to identify significant impacts on our catalogue of fundamental rights, which we could sort, somewhat Manichaeic manner, as positive or negative. This is not a systematic exercise; it is neither all rights nor all impacts are appreciated. It is, rather a small mental experiment that the reader could also do by adding assumptions or changing columns some of them.

Right to life and the right to health protection.	+	<ul style="list-style-type: none"> <li>▪ Artificial intelligence-assisted medicine.</li> <li>▪ Development of new materials (bionics, biomechanics): a robotic human.</li> <li>▪ Elongation of human life, the so-called “singularity”.</li> </ul>
	-	<ul style="list-style-type: none"> <li>▪ Discrimination on the basis of health.</li> </ul>
Ideological freedom and political participation	+	<ul style="list-style-type: none"> <li>▪ Development of tools for political participation and participatory democracy.</li> <li>▪ Data analytics in the prevention of political corruption.</li> </ul>
	-	<ul style="list-style-type: none"> <li>▪ Ideological segmentation of the population.</li> <li>▪ Manipulation of electoral preferences.</li> <li>▪ Population and Behavioral Control.</li> </ul>
Freedom and security	+	<ul style="list-style-type: none"> <li>▪ Automatic risk and disaster management tools.</li> <li>▪ Identification and early prevention of criminal acts.</li> </ul>
	-	<ul style="list-style-type: none"> <li>▪ Social and demographic discrimination in the action of the Security Forces.</li> </ul>
Privacy	+	<ul style="list-style-type: none"> <li>▪ Privacy Profile Management Tools.</li> <li>▪ Technological platforms able to identify privacy policies and assist humans to adopt decisions.</li> </ul>
	-	<ul style="list-style-type: none"> <li>▪ <i>Profiling</i>.</li> <li>▪ Emotional and preference manipulation.</li> </ul>
Freedom of movement	+	<ul style="list-style-type: none"> <li>▪ Robotization of traffic management and road safety.</li> </ul>
	-	<ul style="list-style-type: none"> <li>▪ The State decides our displacements.</li> </ul>
Right to information and freedom of expression	+	<ul style="list-style-type: none"> <li>▪ Automated analysis, synthesis, localization and reading tools.</li> </ul>
	-	<ul style="list-style-type: none"> <li>▪ Synthetic intelligences write the news.</li> </ul>

an insurance company could cross-reference data on the climate, pollution, and lifestyle habits of the zip codes in which a customer was born, educated, and lived, to single out the risk. Thus, it would move from a mutualized risk to a singularized risk, in which social origin and residence would grant advantages to the most favored layers of society.

Due process of law	+	<ul style="list-style-type: none"> <li>▪ Data analytics enables the analysis of documentation in complex processes (economic crime or corruption).</li> <li>▪ AI systems give legal traffic greater robustness and avoid conflicts.</li> <li>▪ Robotic Conflict Resolution Systems.</li> </ul>
	-	<ul style="list-style-type: none"> <li>▪ Systems recommend “courts” and offer competitive advantages to plaintiffs or defendants.</li> </ul>
Guarantees in criminal proceedings	+	<ul style="list-style-type: none"> <li>▪ Greater capacity for digital evidence generation.</li> </ul>
	-	<ul style="list-style-type: none"> <li>▪ Return to precautionary measures based on the profile of the accused or defendant.</li> <li>▪ Bias in automated systems of decision-making assistance in granting prison benefits.</li> </ul>
Right to education	+	<ul style="list-style-type: none"> <li>▪ New learning models.</li> <li>▪ Ability to generate talent and opportunities.</li> <li>▪ Vocational Guidance Assistance Tools.</li> </ul>
	-	<ul style="list-style-type: none"> <li>▪ Discrimination based on training or technological deficiencies.</li> </ul>
Supporting public policies	+	<ul style="list-style-type: none"> <li>▪ Data-Driven Decision Models.</li> <li>▪ Data analytics in the management of public expenditure.</li> <li>▪ Analytics aimed at the prevention and detection of prevention and tax fraud.</li> </ul>
	-	<ul style="list-style-type: none"> <li>▪ Limitations or impacts on the private lives of officials and politicians under analysis.</li> </ul>
Private property	+	<ul style="list-style-type: none"> <li>▪ A new economy emerging. New business and company niches.</li> <li>▪ Governance of the company.</li> <li>▪ Economic policy based on data analytics.</li> </ul>
	-	<ul style="list-style-type: none"> <li>▪ Discrimination in access to credit.</li> <li>▪ Enterprise Information Monopolies.</li> </ul>
Right to work	+	<ul style="list-style-type: none"> <li>▪ New profiles and jobs.</li> <li>▪ Elimination of positions at risk.</li> </ul>
	-	<ul style="list-style-type: none"> <li>▪ Significant increase in unemployment.</li> <li>▪ Discrimination in access to work.</li> </ul>

### 3.2 The impact on the law

Since the 1970s, reflection on the impact of computing on fundamental rights has been a constant. And history seems to try to show us that we can't surround the countryside with fences and close it with gates<sup>10</sup> (Trías, 1992).

The regulatory experience in this area clearly prefigures what the impacts of AI can be on national and international systems. In the previous sections we have been able to see how the processes that have guided the development of information technologies have been characterized by not considering regulatory compliance as a prior element for design, and appear to have been foreign, more beyond the essentials, to ethical or legal

<sup>10</sup> From the Spanish “no se le pueden poner puertas al campo”.



considerations. Any good or legal value could be sacrificed on the sanctuary of the technological bubble. The internet transnational business model has sought the most flexible regulatory and lax environments in matters such as data protection. At the same time, the criterion of a previously designed geographical establishment has been relied on as an argument for the exclusion of administrative and judicial review.

Finally, a discourse has been built, in which the aim has been to demonize law as a tool that slows down technological developments and economic development. From this point of view, while an intrinsically benign character is attributed to technology, a paralyzing effect is attributed to law. In addition, the incompatibility of the legislator's time with those of technology has been pointed out, considering, therefore, that the development and implementation of these new models could be carried out outside the law basically for two reasons. The first, because the legal systems are outdated, designed for an analogue world, and therefore inapplicable to the digital world. Second, because technology cannot wait for the legislator.

However, when the legislature tries to carry out its work, the arguments mentioned above evolve in a two-way direction. First, it is argued that any regulation of information technologies can be negative itself, and the market must self-regulate. On the other hand, by deploying a significant lobbying task, which is still a perfectly legitimate interest, which materially delays that legislative process which is precisely accused of being slow.

#### **4 From the ethics of human rights to “law compliance by design”**

The scenario facing the law is full of uncertainties. It is no coincidence that the impact of AI on Civil Law Rules has already raised a first thought to the European Parliament.<sup>11</sup> In this respect, it is enough to explore the field of tort law intuitively to appreciate the complexity of the legal challenges faced by this technology. Thus, for example, defining what responsibility can be derived from an error in the operation of an AI can raise theories for all tastes. The simplest, for obvious and more pragmatic, would consider that the artificial intelligence designer and/or the company providing the service should in any case be liable for the damage caused by their creature.

However, the legal world is not exempt from theories that are exploring the nature of a robot's legal personality, whether or not this is a corporeal machine. They try to identify the presence of a sort of *tertium genus*. As in the case of animals, they would be subjects of *sui generis* law. One might consider whether there is a different responsibility from the machine itself when its decisions depend on a trial that requires an analysis of its environment and an autonomous decision-making process.

In this sense, the existence of artificial intelligences that interact with people may raise additional legal issues. In a previous section we pointed out how bias could determine AI malfunctions that cause discrimination. But the origin of the bias is not only in the programming of the algorithm, it often depends on the data with which the system is fed when it learns. In this way, an AI that aims to interact with humans by providing care services through conversations could be xenophobic if it learns in an environment hostile to immigrants or if it infers that the choices of the company favor nationals. In these cases, the difficulty of establishing responsibility gains in intensity; and different authors propose to differentiate between the responsibility of the machine considered as a subject of law, the responsibility of the user and the responsibility of the supplier. And yet we run the risk that such arguments will serve as an easy shield to avoid all kinds of responsibility.

##### **4.1 A human rights ethics**

It is precisely here that research must provide value by innovating the legal system. The evolution of the law, the emergence of new legal figures, new subjects and players, will be the result of an effort of analysis and theorization that will be extended, without any doubt, for years. But, while this is happening, we need to be able to overcome the barriers facing us by the philosophy of a European Union Law that systematically tries to codify everything. It is a reactive model, extraordinarily slow and not error-free. The first, as has been repeatedly pointed out, is an approach to technology focused on each particular advancement. First, we

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<sup>11</sup> European Parliament (2017).

regulate “computer”, then we take care of the Internet, social networks, the Internet of Things... with each new technology it is necessary to regulate in a specific way. And this has one manifest drawback: slowness.

The legislative process must analyse the problems and try to reconcile all interests in the presence. It therefore requires a slow process. And, this slowness does not sympathize with the exponential acceleration of technology. It is reasonable to enact new laws after a reasonable period of time from the implementation of the technology. But, it cannot be the only strategy that we must adopt. However, a model in which the absence of a specific regulation allows us to “*break things*” is not possible either.

In this regard, the European Commission’s High-Level Expert Group on Artificial Intelligence<sup>12</sup> has travelled a route already opened by European regulators such as the French National Commission for Informatics and Freedoms and the European Data Protection Supervisor have come forward, and has identified an essential element for the ethics of AI. The ethics of artificial intelligence must be an ethic of human dignity focused on guaranteeing fundamental rights. This methodology allows us a general approach to the AI phenomenon, capable of establishing a first legal barrier to the development of technology, and functional to the constitutional and democratic model in which it should be developed. It allows the dignity of the human being to be placed in the center and to consider an AI that does not meet criteria of mere economic efficiency, but focuses on the social function of artificial intelligence and the use of data for the common good (Nadella, 2017: 146, 193). Moreover, this approach can work as an element of territorial application of law in each State while energizing the consensus of the international community on the AI regulatory framework.

From our country’s point of view, the constituent foresaw the need to regulate the use of information technologies in article 18.4 of the Spanish Constitution. Jurisprudence and doctrine had criticised the rule to embrace the fundamental right to data protection, undermining other possibilities.<sup>13</sup> The correct understanding of the rule would require dispensing with its negative formulation, which mandates the legislator to limit the uses of computing. This norm must be interpreted according to the historical context in which we live. Today the provision must be read in the sense of attributing to the legislator the task of ordering the proper use of information technologies. And ordering not only involves limiting, but many times it could even mean a work of impulse. The regulation of “information technology” must be done not only from the perspective of article 18 of the Constitution, but considering that the normative development of any fundamental right, of any constitutional principle and value is ordered.<sup>14</sup>

#### 4.2 An early strategy

As has just been pointed out, technology is advancing, and we can’t wait. This requires, without prejudice to future regulations, to make strategic decisions that are guided by a set of principles that are considered particularly relevant.

- Ensure a development of technology that takes into account fundamental rights not only as a limit, but also as a goal.
- Ensure that technology development processes take into account pre-existing legal framework.
- Being able to identify principles, values and rules that should be applied to technology without prejudice to its prior and even analogous nature.
- Ensure that the legal approach of artificial intelligence achieves a balanced approach to technology, rather than purely reactive approaches focused on fear, prohibition and limitation.
- Being able to understand that the legal approach to the development of AI requires a coherent approach to the design processes themselves. If Lawrence Lessig once stated that the programmer dictates the laws of the

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<sup>12</sup> European Commission’s High-Level Expert Group on Artificial Intelligence. (2019). *Ethics guidelines for trustworthy AI*.

<sup>13</sup> Martínez, 2004.

<sup>14</sup> This has undoubtedly been the approach of drafting Title X of Organic Law 3/2018, of December 5, on the Protection of Personal Data and Guarantee of Digital Rights. A functional approach that allows to save the discussion regarding the need to reform the Spanish Constitution to include new rights in the catalogue, and streamlines the process not only of attribution of guarantees or limits against inappropriate uses, but also for the promoting public policies in such fundamental areas as reducing inequality and promoting digital education.

software when writing the code (Lessig, 2001), it is no less true that the jurist should approach the processes of technological innovation with an iterative methodology, adjusted to reality and appropriate to its nature.

The European legislator must be aware of what values are at stake. And, parliaments would be completely wrong to focus on a reactive strategy that would only aim to put limits on the use and development of artificial intelligence. AI is not free of risks; but, at the same time, it promises substantial changes and improvements in collective and individual conditions, and will define a new economy for the whole humanity (Schwab, 2016: 15-16).

A slow, fearful and limited legislator would condemn the European Union to become the customer of technologies developed by others. It has been seen in previous epigraphs how the effort of innovation in AI is being led by China and the United States. China cannot be an example, to the extent that the absolute absence of guarantee of rights offers an unlimited space to develop AI. However, we must be able to be competitive with the United States from the perspective of the European model of guaranteeing fundamental rights. This requires being able to define legal frameworks that reconcile development and innovation with the guarantee of rights.

It is true that the EU has begun to walk with certain results such as the aforementioned work of the European Parliament and the AI Group of Experts, while it has issued a regulation that will encourage the use of non-personal data,<sup>15</sup> and the revision of the directive of data reuse on public sector.<sup>16</sup> But it is none other than the implementation of a competitive AI strategy in R&D&I, and the growth of the public and private sectors in this area, cannot wait. This obliges legal operators to identify methodologies and practical solutions.<sup>17</sup>

#### 4.3 The legal framework for data protection as an inspiring model

In order to achieve the objectives, set out in the previous section, the experience gained in the context of data protection may be extremely useful. It can certainly be objected that it has not been characterized precisely as a legislation favoring innovation. However, perhaps it is time to acknowledge that it was the approach made by the data protection authorities that has operated as a brake on the development of initiatives in our country. Thus, the problem stems not so much from the shortcomings of the legislation as from an approach on the part of the authority, which ignores, with particular and worrying regularity, which is the material reality to which the rule is applying. The experience gained has undoubtedly determined the express incorporation into the General Data Protection Regulation (GDPR)<sup>18</sup> of procedures that may be strategic for the development of artificial intelligence that is respectful of law and rights. We refer to risk analysis, data protection impact assessment and data protection by design and by default. On the other hand, it is not only a functional methodology, but even mandatory. The deployment of artificial intelligence tools can have a significant impact on the area of human rights; and, to do so, will require the processing of large volumes of personal data.

In addition, some of the legal institutes present in Article 5 of the GDPR may be used. Lawfulness in the use of data, determine an approach based on proportionality — understood as a requirement to adjust the volume and typology of the data subject to the purposes and needs of the same— the quality and veracity of the data. On the other hand, the principle of transparency can provide an additional requirement for artificial intelligence: the ability to be monitored or auditable. And finally, in the context of the guarantee of rights, the person's ability to exercise control over and the right to object the processing can be inspiring to define statutes guaranteeing people's rights with respect to the use of AI.

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15 Regulation (EU) 2018/1807 of the European Parliament and of the Council of 14 November 2018 on a framework for the free movement of non-personal data in the European Union. OJEU. Series L 303/59 of 28 November 2018.

16 Directive (EU) 2019/1024 of the European Parliament and of the Council of 20 June 2019 on open data and the re-use of public sector information.

17 Ministry of Science, Innovation and Universities. (2019). *Spanish RDI Strategy in Artificial Intelligence*. Madrid: Technical General Secretariat of the Ministry of Science, Innovation and Universities.

18 Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of individuals with regard to the processing of personal data and on the free movement of such data and repealing Directive 95/46/EC. OJEU. L Series 119/1 of 4 May 2016.

## 4.4 Regulatory compliance by design

Let's see, even briefly, how the use of data protection methodologies can impact the development of AI projects to ensure regulatory compliance and rights assurance. To do this, we will refer to a *software* development methodology recommended by the Norwegian Data Protection Authority (Datatilsynet, 2018).

This authority proposes *software* design processes with differentiated phases:

- Training.
- Taking requirements.
- Application Design.
- Coding or programming.
- Test or verification.
- Release .
- Maintenance.

This is a circular procedure, or Deming cycle, intended not only at ensuring proper pre-design, but also maintaining the standard of compliance as a commitment to continuous updating.

### 4.4.1 Ethically and legally training the team

This methodological approach is based on a prior empowerment of the people involved. For AI projects, this implies that the team must have a training base that incorporates humanist ethical values and guarantees fundamental rights. It's not about turning developers or managers into legal experts. It simply requires that in an organization as a whole there is a culture of guarantee of rights and respect for the law, which guides decisions. And it involves incorporating experts in subjects such as ethics and law into the project from the beginning.

### 4.4.2 Identify project requirements

The applicable legal principles should be taken into account at this earliest stage. This implies a compliance approach from design, which has significant practical consequences. First, the development of an AI project should be put in the context of the sector of the legal system in which it will be developed and should consider the current regulation. Under no circumstances it will be useful to consider that pre-existing ordering is analogue and does not apply to a new technology.

In any event, as has been repeatedly argued, there is a fundamental legal principle that can never be ignored. A technological innovation project cannot be designed with the awareness that it can cause harm to people (Martínez, 2019a: 270). AI cannot be developed to the detriment of the rights of individuals, or by underestimating essential constitutional principles or values. Thus, regulatory compliance by design incorporates a first rule: from the zero moment of gestation of an AI project, a thorough analysis of the law applicable to it must be carried out, from an open approach to considering all possibilities that could order its proper functioning.

In a phase which is dependent on the previous one it is necessary to develop an analysis of the risks and implications of the technology being developed. It is a methodology fully established in relation to quality standards in product development, and to the prevention of risks to the safety of systems and for the people who will eventually use them. Therefore, it is a well-known methodology with very specific rules and particularly precise application criteria. It's about establishing what may be the intrinsic vulnerabilities to the project being developed, and the threats it faces. In the risk analysis methodology we must establish a relationship between the likelihood of such threats or vulnerabilities materializing in the real world and

their impact by affecting, in what is concerned here, regulatory compliance, causing harm to people and, especially, to infringe their fundamental rights. This relationship gives us a measure of risk.<sup>19</sup>

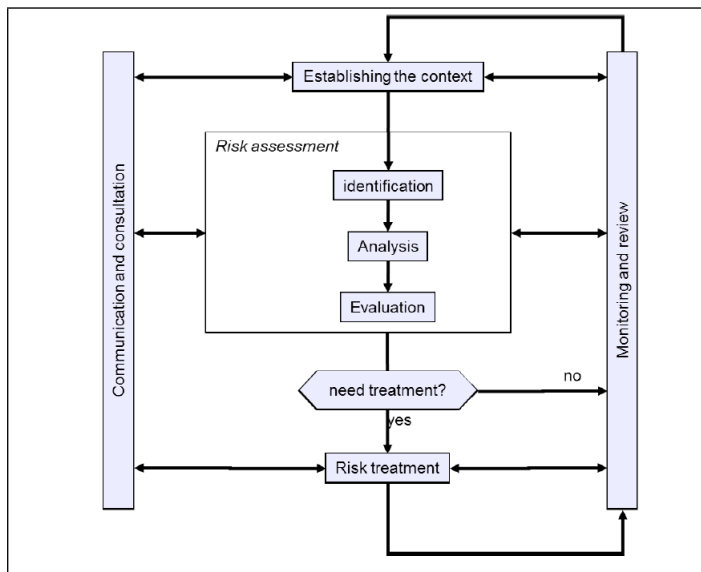


Figure 2. STANDARD UNE 71504:2008. Methodology of analysis and risk management for information systems. AENOR.

<b>Likelihood</b>	Very likely	4	4	8	12	16
	Probable	3	3	6	9	12
	Low	2	2	4	6	8
	Unlikely	1	1	2	3	4
□ Low	□ High	Irrelevant (1)		Low (2)	Serious (3)	Significantly serious (4)
□ Medium	□ Very High	<b>Impact Severity</b>				

Figure 3. Risk Analysis Criteria (Spanish Data Protection Agency).

Once the risk is established, measures should be taken to prevent it or minimize it to the point of making it tolerable. From the point of view of regulatory compliance, this implies that the ability to identify *a priori* situations where there is a risk of non-compliance or infringement of fundamental rights will be adopted appropriate measures to prevent it from occurring.

Applying the rationality of risk analysis, the jurist may not require the development of a zero-risk scenario except in cases where the harm to the guarantee of the rights of the people is unaffordable. And precisely for these situations of serious risk to rights, Article 35 of the GDPR proposes what we could define as an aggravated risk analysis: the data protection impact assesment.

We will not explain here in detail what this methodology consists of which has been systematized by the data protection authorities in different guidelines. However, it is particularly important to stress that from the conclusions of the impact assessment will lead to strategic decisions for product development, which

<sup>19</sup> Let's look at a very simple example that can help you understand what is proposed here. Any social media user has been able to see how photo tagging has changed over time. In principle, a user could be tagged in photos without any restrictions. However, nowadays, all social networks allow the user to block third parties who can tag it. It will be said that this is a logical consequence of regulatory developments in data protection. But it's a completely false claim. For any connoisseur of our legal system it is a no-brainer that the processing of images without consent is regulated in Article 18.1 of Spanish Constitution and Organic Law 1/1982, of May 5, on civil protection of the right to honor, privacy personal and family and in one's own image. And not only here, but also in international human rights standards, being guarded in the jurisprudence of the Supreme Court of the United States, the European Court of Human Rights and national courts. This means that if social media developers had taken into account the methodology advocated here, this type of functionality should have been present from the beta version of their products.

will allow us to establish when the product is simply unfeasible, or how we can modulate it to deliver useful results.<sup>20</sup>

#### 4.4.3 Integrating standards into design and documenting compliance

Beyond the phase of requirements-taking and risk analysis, we must consider how the principles and values of Article 5 of the GDPR<sup>21</sup> can very precisely inspire the development of artificial intelligences. In this sense, the unavoidable starting point for any project, and not only in the context of artificial intelligence, is that of respect for the principle of lawfulness. By definition, what is illegal cannot be developed, it is not possible to program an AI model if it is aware that it is in violation of the legal framework.

On the other hand, the loyalty and transparency of AI-based decision-making processes also raises the need to develop a project documentation strategy, which facilitates what has been called “algorithm transparency”. On the other hand, the principles ordered to ensure that the volume of data to be used is adequate, its legitimate origin and reliable information are strategic to ensure the proper functioning of AI. Finally, the value of “security”, computer, technical and operational, should be regarded as an indispensable requirement.

#### 4.4.4 From programming to marketing

The subsequent gestation phases of a technological project often run through an orderly and creative process. This, in technical jargon, is called iteration. While each development phase includes a coding process that generates deliverable packages, its own dynamics are very open to innovation.

Thus, during the programming of the code and algorithm, the programmer verifies its possibilities and problems, and this forces it to change its approach on many occasions. On the other hand, it is not unusual for new potentialities to be appreciated. Moreover, in processes linked to data analytics, the possibility of facing casual findings can be very high. On the other hand, it is essential to submit the development to testing or verification processes that ensure its proper functioning.

This requires the availability of a permanent legal medium to ensure compliance with the standard as an intrinsic objective for development and with a dual function. First, not only the final product, but each of the tasks that contribute to its gestation must comply with the right. It does not seem reasonable to consider an outcome whose design process has violated the rules to be appropriate. Secondly, it is necessary to ensure, in production and marketing, an appropriate result from a legal point of view.

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<sup>20</sup> In any case, it is very likely that this type of analysis will be present in any AI development project that require the processing of personal data. For example, in the field of *Marketing* profiling users, the *scoring* banking or insurance.

<sup>21</sup> “1. Personal data shall be:

- a) processed lawfully, fairly and in a transparent manner in relation to the data subject (‘lawfulness, fairness and transparency’);
- b) collected for specified, explicit and legitimate purposes and not further processed in a manner that is incompatible with those purposes; further processing for archiving purposes in the public interest, scientific or historical research purposes or statistical purposes shall, in accordance with Article 89(1), not be considered to be incompatible with the initial purposes (‘purpose limitation’);
- c) adequate, relevant and limited to what is necessary in relation to the purposes for which they are processed (‘data minimisation’);
- d) accurate and, where necessary, kept up to date; every reasonable step must be taken to ensure that personal data that are inaccurate, having regard to the purposes for which they are processed, are erased or rectified without delay (‘accuracy’);
- e) kept in a form which permits identification of data subjects for no longer than is necessary for the purposes for which the personal data are processed; personal data may be stored for longer periods insofar as the personal data will be processed solely for archiving purposes in the public interest, scientific or historical research purposes or statistical purposes in accordance with Article 89(1) subject to implementation of the appropriate technical and organisational measures required by this Regulation in order to safeguard the rights and freedoms of the data subject (‘storage limitation’);
- f) processed in a manner that ensures appropriate security of the personal data, including protection against unauthorised or unlawful processing and against accidental loss, destruction or damage, using appropriate technical or organisational measures (‘integrity and confidentiality’).

2. The controller shall be responsible for, and be able to demonstrate compliance with, paragraph 1 (‘accountability’).”

#### 4.4.5 A cycle that is maintained throughout the life of an AI

No technology-linked compliance process can be static. The very nature of AI makes this principle a law. We must understand that we are in an embryonic phase of this technology in which we have learned that the data analysis processes behind it are very sensitive to bias. Proper compliance requires a state of ongoing monitoring and updating that is deployed at several levels:

- 1) Learn from the operation of technology itself. The results obtained, the errors of operation, the incidents..., any verified or verifiable element should also be indexed and studied by the legal support. And not only to prevent potential conflicts and responsibilities, but above all to improve compliance conditions.
- 2) Dig deeper into the design of compliance by proposing improvements when necessary.
- 3) Accompany each phase or evolution of the product.

### 5 A brief conclusion

AI faces a huge challenge. It would not be an exaggeration to say that we could be witnessing a paradigm shift that can revolutionize essential pillars of our tradition, starting with how to understand key concepts such as legal personality or human dignity. It would be unwise, then, to deny that the changes that artificial intelligence augurs pose unimaginable challenges that must be addressed as soon as possible. But it would be perhaps much more than denying any virtuality to the current regulatory framework. We must apply the tools at our disposal.

In this sense, this work has been raised with a modest objective: to offer a logbook for an immediate approach to AI projects. And to do so, we need to be able to integrate the development of AI with an evolutionary interpretation of the prejudice-free regulatory framework. In this sense, certain necessary and essential efforts are required from jurists.

First, we must assume the dynamics of the gestation of a project of a technological nature in its different phases. And, therefore, adapt its methodology to make it functional to the management model of information and communications technology development projects. It's not about becoming engineers, but about being able to work functionally to their methodologies.

The second, we need to be able to descend to material reality. The law applied to technology requires additional understanding effort. This is not a different from what is required of a good professional in any sector: knowing the facts. However, in this area, the intensity of the requirement is very high and requires an open interaction in which receptivity and understanding are decisive.

Third, an open and dynamic conception of regulatory compliance is necessary. AI projects will force the development of an enormous effort to systematically interpret the order from its constitutional principles and values to the sectoral ordering, from the local to the transnational. But this openness is not only material, it is also methodological. The legal support effort must be permanent, never ends, accompanies AI throughout its life cycle.

And this task is deployed in an emerging regulatory context and with rules under construction. Although this does not involve a blank check, either the industry or the researchers. The framework of fundamental rights and constitutional principles and values constitutes an insurmountable barrier. Similarly, the argument that an "analog" right is inapplicable is unacceptable. The regulatory program that incorporates our legal system defines objectives and principles that can be identified and applied to all human relations and their developments. To consider otherwise would be against any reason.

It is precisely for this reason that legal professionals are clearly obliged to incorporate new methodologies to support the development of technology. We are obliged to come down from the distant pedestal from which we usually pontificate, descent to the ground, fill our hands with mud and to contribute to building the society of digital transformation oriented to the common good from the values that incorporates the guarantee of dignity of the human being and the rights that are inherent to him.

## Bibliography

- Bauman, Zygmunt & Lyon, David. (2013). *Vigilancia líquida*. Barcelona: Austral.
- Benanti, Paolo. (2019). La dignidad de la persona en la era de Máquina Sapiens [blog post]. *Fundación para la Investigación del Derecho y la Empresa*. Retrieved on 1 May 2019 from <http://bit.ly/2K6Fmx0>
- Blodget, Henry (2009, October 1). Mark Zuckerberg on innovation. *Business Insider*. Retrieved on 1 May 2019 from <https://www.businessinsider.com/mark-zuckerberg-innovation-2009-10?IR=T>
- Bradley, Chris & O'Toole, Clayton. (2016). An incumbent's guide to digital disruption. *McKinsey Quarterly*. Retrieved on 1 May 2019 from <https://mck.co/2IlxhC0>
- Bughin, Jacques; Seong, Jeongmin; Manyika, James; Chui, Michael & Joshi, Raoul. (2018). *Notes from the AI frontier. Modeling the impact of AI on the world economy*. McKinsey Global Institute.
- Byung-Chul, Han. (2014). *Psicopolítica*. Barcelona: Herder.
- Christensen, Clayton M. (1997). *The innovator's dilemma. The revolutionary book that will change the way you do business*. New York: Harper Collins.
- Commission Nationale de l'Informatique et des Libertés. (2017). *Comment permettre à l'homme de garder la main ? Les enjeux éthiques des algorithmes et de l'intelligence artificielle*. Retrieved on 1 May 2019 from <http://bit.ly/2VayB3O>
- Datatilsynet. (2018). *Software development with data protection by design and by default*. Retrieved on 1 May 2019 from <https://bit.ly/2QPzfA3>
- Dobbs, Richard; Manyika, James & Woetzel, Jonathan. (2015). *No ordinary disruption*. New York: Public Affairs.
- European Commission's High-Level Expert Group on Artificial Intelligence. (2019). *Ethics guidelines for trustworthy AI*. Retrieved on 1 May 2019 from <https://ec.europa.eu/digital-single-market/en/news/ethics-guidelines-trustworthy-ai>
- Ford, Martin. (2016). *El ascenso de los robots: la amenaza de un futuro sin empleo*. Ciudad de México: Paidós.
- Jiménez, Ángel. (2017, July 28). Facebook apaga una inteligencia artificial que había inventado su propio idioma. *El Mundo*. Retrieved on 1 May 2019 from <https://www.elmundo.es/tecnologia/2017/07/28/5979e60646163f5f688b4664.html>.
- Lessig, Lawrence. (2001). *El código y otras leyes del ciberespacio*. Madrid: Taurus.
- Ley Orgánica 3/2018, de 5 de diciembre, de Protección de Datos Personales y Garantía de los Derechos Digitales. BOE núm. 294 (2018), 8-68.
- López de Mántaras, Ramón & Messeguer, Pedro. (2017). *Inteligencia artificial*. Madrid: Catarata-CSIC.
- López de Mántaras, Ramón. (2017). Ética en la inteligencia artificial. *Investigación y Ciencia*, (491). Retrieved on 1 May 2019 from <https://www.investigacionyciencia.es/revistas/investigacion-y-ciencia/el-multiverso-cuntico-711/tica-en-la-inteligencia-artificial-15492>
- Mallard, Stéphane. (2018). *Disruption. Préparez-vous à changer du monde*. Paris: Dunod.



- Marcet, Xavier. (2018). *Esquivar la mediocridad. Notas sobre management: complejidad, estrategia e innovación*. Barcelona: Plataforma Editorial.
- Martínez, Ricard. (2004). *Una aproximación crítica a la autodeterminación informativa*. Madrid: Civitas.
- Martínez, Ricard. (2016). *The challenge of enforcement in the proposal for a General Data Protection Regulation* [blog post]. *Phaedra Project Blog*. Retrieved on 1 May 2019 from <http://bit.ly/2UOKJm8>
- Martínez, Ricard. (2019a). Inteligencia artificial, Derecho y derechos fundamentales. In: Tomás De la Quadra Salcedo & José Luis Piñar (Dir.), *Sociedad digital y Derecho* (p. 259-278). Madrid: Boletín Oficial del Estado, Ministerio de Industria, Comercio y Turismo & RED.ES.
- Martínez, Ricard. (2019b). Partidos, algoritmos y campañas electorales. *Telos*, (110), 130-135. Retrieved on 1 May 2019 from <https://telos.fundaciontelefonica.com/wp-content/uploads/2019/04/telos-110-regulacion-ricard-martinez.pdf>
- McCarthy, John; Minsky, Marvin L.; Rochester, Nathaniel & Shannon, Claude E. (1955). *A proposal for the Dartmouth Summer Research Project on Artificial Intelligence*. Retrieved on 1 May 2019 from <https://stanford.io/2JFCgQV>
- McKinsey Global Institute. (2017). *What's now and next in analytics, AI, and automation*. Retrieved on 1 May 2019 from <https://mck.co/2vthXNJ>
- McKinsey Global Institute. (2018). *How artificial intelligence and data add value to businesses*. Retrieved on 1 May 2019 from <https://mck.co/2J8uXjI>
- Mercader, Jesús. (2018). El futuro del trabajo y del empleo en la era de la digitalización y la robótica. In: Tomás de la Quadra Salcedo & José Luis Piñar (Dir.), *Sociedad digital y Derecho* (p. 611-632). Madrid: Boletín Oficial del Estado, Ministerio de Industria, Comercio y Turismo & RED.ES.
- Moore, Gordon. (1965). Cramming more components onto integrated circuits. *Electronics*, 38(8), 114–117. Retrieved on 1 May 2019 from <https://www.cs.utexas.edu/~fussell/courses/cs352h/papers/moore.pdf>
- Nadella, Satya. (2017). *Pulsa actualizar*. Madrid: Harper Collins.
- O’Neil, Cathy. (2016). *Weapons of math destruction*. Nueva York: Crown.
- Pariser, Eli. (2017). *El filtro burbuja. Cómo la red decide lo que leemos y lo que pensamos*. Barcelona: Taurus.
- European Parliament. (2017). Report with recommendations to the Commission on Civil Law Rules on Robotics. Retrieved on 1 May 2019 from [http://www.europarl.europa.eu/doceo/document/A-8-2017-0005\\_EN.html](http://www.europarl.europa.eu/doceo/document/A-8-2017-0005_EN.html)
- Ramió, Carles. (2019). *Inteligencia artificial y Administración pública. Robots y humanos compartiendo el servicio público*. Madrid: Catarata.
- Schwab, Klaus. (2016). *La cuarta revolución industrial*. Barcelona: Debate.
- Stone, Peter; Brooks, Rodney; Brynjolfsson, Erik; Calo, Ryan; Etzioni, Oren; Hager, Greg... & Teller, Astro. (2016). *Artificial intelligence and life in 2030. One hundred year study on artificial intelligence. Report of the 2015-2016 Study Panel*. Stanford: Stanford University, Retrieved on 1 May 2019 from [https://ai100.stanford.edu/sites/g/files/sbiybj9861/f/ai\\_100\\_report\\_0831fnl.pdf](https://ai100.stanford.edu/sites/g/files/sbiybj9861/f/ai_100_report_0831fnl.pdf)
- European Data Protection Supervisor (2015). Opinion 4/2015. Towards a new digital ethics. Data, dignity and technology. Retrieved on 1 May 2019 from [https://edps.europa.eu/sites/edp/files/publication/15-09-11\\_data\\_ethics\\_en.pdf](https://edps.europa.eu/sites/edp/files/publication/15-09-11_data_ethics_en.pdf)
- Tegmark, Mark. (2018). *Vida 3.0: Ser humano en la era de la Inteligencia Artificial*. Barcelona: Taurus.

Trías, Jorge. (1992). Informática y privacidad. ¿Se pueden poner puertas al campo? *Cuenta y Razón*, (63), 98-101.

Varona, Daniel. (2018). La responsabilidad ética del diseñador de sistemas en inteligencia artificial. *Revista de Occidente*, (446-447), 104-114.