Artificial Intelligence and Civil Liability: Juridical Prospects and Legal Challenges

Paula Casadesus Ripoll
University of the Balearic Islands

The benefits to individuals from the implementation and use of robots and other artificial intelligence applications are widely known. However, although the use of intelligent robots is not yet fully widespread, it is possible to anticipate that the introduction of these robots into society will present numerous moral, ethical and legal challenges. Currently, robots are considered products and they fall under Council Directive 85/374/EEC of 25 July 1985 on the approximation of the laws, regulations and administrative provisions of the Member States concerning liability for defective products. The European Union itself has expressed skepticism regarding the applicability of this directive to civil liability for damages that these autonomous and intelligent robotic systems may cause. The aim of this article is to identify and analyze what these challenges may be.

Keywords: civil liability, tort law, damages, robots, artificial intelligence, European Union, defective products

INTRODUCTION

Approach to the Concept of "Robot": Characteristic Features and Definition

One of the first obstacles in the study of civil liability for damages derived from robots is the difficulty in establishing a single definition that covers the diversity of robots and intelligent software applications on the market today and that, at the same time, does not quickly become obsolete due to the fast pace at which science and technology are advancing. Authors such as BERTOLINI[1] defend the uselessness of striving to find a definition adequate to the different types of intelligent robots and applications, while others are in favor of elaborating a definition based on the most characteristic and differential features of this latest generation of robots. In any case, it seems clear that it is important for the law to develop a sufficiently clear definition to delimit the field in which we move when studying the possible limits of the current regime of civil liability of the manufacturer or producer for damage caused by defective products and, at the same time, to determine the need for a new legislative framework.

According to the Royal Spanish Academy (RAE), a robot is a programmable electronic machine or device capable of manipulating objects and performing various operations. According to this definition, only machines or devices, i.e., entities with a physical support, are considered robots. In addition, the use of the adjective "programmable" in this definition causes it to include only those machines that are programmable or programmed by human beings to perform specific tasks already determined and that are recognized as products by Council Directive 85/374 on the approximation of the laws, regulations and administrative provisions of the Member States concerning civil liability for defective products, according

to which manufacturers are liable in the event that a defect in their operation causes damage to consumers. However, such a definition seems difficult to apply to the new generation of robots that are currently being developed: autonomous and intelligent robots capable of learning from their own experience, taking decisions and adapting their behavior according to what they have learned independently of any human control and without the need to have been expressly programmed.

In the same vein, BERTOLINI[2] shows his refusal to establish an adequate definition for this new generation of robots. Although this author recognizes that the lack of a clear definition that delimits the object of analysis can be most detrimental to the task of determining the most appropriate civil liability regime, he emphasizes the uselessness of developing a definition common to the diversity of existing robots and intelligent applications and defends the need to study them separately as the best way to determine the civil liability regime applicable to each one of them.

The European Union, on the other hand, in the Resolution containing recommendations to the Commission on civil law rules and robotics recognizes in the introduction[3] the need to develop a generally accepted definition of robot and artificial intelligence that is sufficiently flexible so as not to undermine scientific and technological research in this field. It therefore calls on the Commission to propose common definitions within the European Union of cyber-physical systems, autonomous systems and intelligent autonomous robots and their corresponding subcategories based on the following common characteristics of intelligent robots:

a) the autonomy acquisition through sensors and/or through the exchange of data with its environment,
b) the capacity for self-learning based on their experience and interaction,
c) a minimum physical support,
d) the adaptation of their behavior and actions to the environment in which they operate; and
e) the lack of life in the biological sense.

In any case, it is worth mentioning here that the potentially disruptive features of this new generation of robots are the result of the incorporation of artificial intelligence programs in their systems. For this reason, the definition of robots must include reference to this technology, whose operation is based on the use of algorithms and the processing of large amounts of data. Thus, artificial intelligence can be defined as "the ability of a system to correctly interpret external data, to learn from that data and to use that knowledge to achieve specific tasks and goals through flexible adaptation"[4].

ANALYSIS OF APPLICABLE LAW. MAIN CHALLENGES AND QUESTIONS.

Nowadays, robots, including autonomous and intelligent robots, are considered products and, within the European Union, the damages they may cause are regulated by Directive 85/374/ dated July 25, 1985 on the approximation of the laws, regulations and administrative provisions of the member states concerning liability for defective products and their respective transpositions to the different national legislations.

The European Union itself has expressed some doubts as to the effectiveness of this directive when it comes to regulating civil liability for damages that these autonomous and intelligent robotic systems may cause. The European Parliament Resolution with recommendations to the Commission on Civil Law rules and Robotics recognizes[5] that the development by robots of autonomy and some cognitive traits such as the ability to learn from experience and make decisions virtually independently may mean that they should not be considered as mere objects in human hands[6]. Therefore, it proposes that they should be included in the category of "agents" capable of interacting with their environment, which in turn would imply the need to update the current regulations as they are not adequate to the new technological reality.

Before reaching any conclusion regarding the adaptability or otherwise of this directive to the new legal reality brought about by these robots, it is first necessary to identify and then analyze the different challenges that will have to be faced in order to cover the damages caused by autonomous and intelligent robots.

Product Concept

One of the main challenges for the application of current regulations has to do with the notion of product, as robots are nowadays considered products. For the purposes of the applicability of the directive, the product concept is defined in Article 2 as:

> any movable property, except agricultural raw materials and hunting products, even if it is incorporated into other movable or immovable property. The term "agricultural raw materials" refers to the products obtained from land, livestock and fisheries, with the exception of those products that have undergone an initial transformation. The term "product" also refers to electricity.

This raises important doubts regarding the inclusion in this software concept with which this latest generation of intelligent robots is equipped. This is a matter that, although it has been widely debated[7], currently offers no certain answer. In the Evaluation document of Directive 85/374/eec[8], it is stated that software plays a "key role" in the development of these new technologies. Consequently, it is necessary to clarify whether or not the software can be considered a product in relation to Directive 85/374/EEC. This document is based on the software definition as "programs and other information systems used by a computer". Accordingly, by considering software as intangible information, it concludes that it cannot be considered a product under the terms of the Directive in question.

However, the software appears as a product in different European regulations. More specifically, Article 2 of Regulation (EU) 2017/745 of the European Parliament and of the Council dated April 5, 2017, on medical devices defines "medical device" as "any instrument, device, equipment, software, implant, reagent, material or other article intended by the manufacturer to be used on persons, separately or in combination, for any of the following specific medical purposes." In turn, Regulation (EU) 2017/746 of the European Parliament and of the Council dated April 5, 2017, on in vitro diagnostic medical devices adopts the same definition, which would support the consideration of software as a product for the sake of consistency between the different European standards.

Defect Concept

According to the current civil liability regime regulated by Directive 85/374/EEC, the producer shall be liable for damages caused by defects in its products[9]. According to article 6 of the European directive:

> A product is defective when it does not offer the safety to which a person is legitimately entitled, taking into consideration all the circumstances, including: a) the product's presentation; b) the use that could reasonably be expected of the product; c) the time when the product was placed in circulation, and a product should not be considered defective for the sole reason that, subsequently, a more improved product has been placed in circulation.

In this context, it is unavoidable to analyze what these safety conditions are in relation to these autonomous and intelligent robots since the lack of observance of these conditions is decisive for the current notion of "defect" contemplated in the directive. This is a recurrent concern within the European institutions. The European Consumer Consultative Group (ECCG) urges the European institutions to update the defect concept in order to reflect the complexities generated by the inclusion of software and algorithms for decision making in movable goods[10].

Similarly, the very concept of "security", closely linked to the defect concept, must also be reconsidered, since the potential risks that may arise from the use of this technology are multiple and have the capacity to affect areas as diverse as the digital environment, the fundamental rights[11] and freedoms of individuals or their physical integrity, and may in turn be due to several factors[12].

As TABERNERO DE PAZ[13] states, it is necessary to analyze whether damages caused by robots can be included in the same category as damages caused by defective products, since the normal operation of a

robot or software application can also cause damages to consumers and/or third parties due to the processing of erroneous or inadequate data. However, they would not be covered by these regulations. A concern also reflected in the May 16, 2018 opinion of the European Consumer Consultative Group in which it calls on the institutions to address this issue.

Damage Concept

In the field of civil liability, the concept of damage acquires special relevance due to the dual role attributed to it. In the first place, the damage is an essential requirement to establish the obligation of the tortfeasor to compensate the victim and, in the second place, the damage and its entity become in turn the reference for the compensation calculation, in accordance with the principle of full restitution and the prohibition of enrichment. The purpose of this is to return the injured party to the moment before the damage was caused.

Article 9 of the directive specifies what is to be understood as damage for the purposes of applying this regulation. According to the aforementioned article,

> "damage" means: a) damage caused by death or bodily injury; b) damage caused to a thing or the destruction of a thing, other than the defective product itself, after deduction of an excess of 500 ECU, provided that such thing: i) is of a kind normally intended for private use or consumption and ii) has been used by the injured party principally for his/her private use or consumption. And it adds that this article is without prejudice to national provisions relating to immaterial damages.

It is not surprising that the European Consumer Consultative Group (ECCG)[14] urges the European institutions to update the concept of damage, as the current legislation does not seem to include immaterial damage that may occur not only in digital environments, but also damage that directly affects the fundamental rights and freedoms of individuals. Thus, it is necessary to update the concept of damage in order to reflect the complexities generated by these software applications and algorithms designed for decision making in digital environments.

Burden of Proof

Article 4 of the directive establishes that the injured party must prove the damage, the defect and the causal relationship between the defect and the damage, a task that becomes practically impossible when dealing with extremely complex technological applications, due to the opacity that characterizes the decision-making procedure carried out by algorithms, whose non-transparent nature has earned them the name of "black box". This problem generated by the difficulty of proving the existence of a defect and the causal relationship between such defect and the damage produced has already been the subject of criticism as a result of some cases involving the Da Vinci Robot[15]. These have highlighted how providing an adequate technical explanation for the malfunction of a robot or robotic system can become an insurmountable obstacle for the injured party. In this context, it is necessary for the civil liability system to take into account the complexity, lack of transparency and the unclear nature of the decisions made by these robots and the algorithms in charge of data processing. These characteristics are also unknown to the majority of consumers and possible affected parties, whose knowledge on the subject is, if not null, very limited, which makes it difficult to recognize and prove the causality between the defect and the damage[16]. This unequal information between the parties would justify, according to the opinion of May 16, 2018 of the European Consumer Consultative Group, adapting the legislation, requiring suppliers to bear the burden of proof.

Grounds for Exoneration of the Manufacturer's Liability

Article 7 of the directive lists the grounds for exoneration of the manufacturer's liability. Therefore,

> the producer shall not be liable if he proves: a) that he did not place the product in circulation; b) or that, taking into consideration the circumstances, it is probable that the

> defect that caused the damage did not exist at the time he placed the product in circulation or that this defect appeared later; c) or that he did not manufacture the product to sell it or distribute it in any way for economic purposes, and that he did not manufacture or distribute it in the scope of his professional activity; d) or that the defect is caused by the fact that the product meets mandatory standards issued by the public authorities; e) or that, at the time the product was placed in circulation, the state of scientific and technical knowledge did not allow the existence of the defect to be discovered; f) or that, in the case of the manufacturer of an integral part, the defect is attributable to the design of the product in which it has been incorporated or to the instructions given by the product's manufacturer.

One of the main problems regarding the application of this article to artificial intelligence robots and robotic systems is the assumption in Article 7 that the products are static and remain unchanged over time, whereas one of the characteristic features of these robots is precisely the ability to learn, storing and processing more and more data and information and, consequently, the ability to evolve and transform as a consequence of system updates. Specifically, three of the grounds for exoneration from liability seem particularly problematic.

Firstly, the cause contained in letter a) relating to the lack of putting into circulation of the product and in relation to letter b) of said article according to which the producer would be exonerated from any liability if he proves that the defect that caused the damage did not exist at the time he placed the product into circulation or that this defect appeared later. The evaluation of these grounds for exoneration of the manufacturer or producer seem totally inadequate if we take into consideration that this new generation of robots and intelligent software applications, once placed into circulation in the market, base their functioning and operability on the permanent and continuous processing of new information and data that were not available at the time when these new products were introduced in the market[17]. Similarly, the continuous updates to which these systems are subjected pose numerous additional risks in relation to the exemptions from liability provided for in the Directive, since the continuous software updates to which these systems are subjected during their operating life may introduce attributes that were not present when they were first put on the market[18].

Secondly, according to Article 7 (e), the producer shall not be liable if he proves that the state of scientific and technical knowledge at the time the product was placed into circulation did not make it possible to discover the existence of the defect. The application of this ground for exoneration from liability in the case of autonomous and intelligent robots also raises serious doubts. Specifically, and as established in article 7e, that defects that were not known or recognizable at the time of developing the product or service and starting to market it could not generate liability for the manufacturer.

The main problem in relation to this ground for exoneration has to do with the difficulty of testing, prior to marketing, the robotic product in question in all the different situations in which it may be encountered. If we take the car without a driver as an example, it seems evident that the possibility of testing the car in each and every one of the scenarios in which the car may be involved is practically impossible, without being able to appreciate this ground for exoneration of liability in the event of an accident because the defect was not known at the time it was placed on the market.

It is important to briefly mention here the debate between two schools of thought within the field of artificial intelligence: the so-called "knowledge engineers" and the advocates of machine learning.[19] According to the first group of experts, the knowledge cannot be learnt automatically by these robots, but must be expressly introduced into the robotic system and programmed by humans. On the other hand, for the defenders of machine learning, it is possible to develop algorithms capable of being trained from a first set of data, called training data, from which they will learn certain patterns or behaviors that they will be able to apply to the data and information they acquire and process, without the need to have been previously programmed.

Let's take the car without a driver as an example: according to the current of thought of knowledge engineers, in order for the car to start operating automatically, the knowledge necessary for driving must have been introduced beforehand. However, it seems evident that the possibility of testing the car in each

and every scenario in which the car may be involved is practically impossible, without being able to appreciate this ground for exoneration of liability in the event of an accident.

For the defenders of machine learning, on the other hand, it is a matter of developing algorithms capable of relating the new data generated by each new situation with data already learnt and processed in order to be able to act in the same way in very similar or equivalent situations.

The learning of these robots and robotic applications through the collection of new data and information is part of the very nature of the product so the continuous processing of new data and information that was not known at the time the robot started to be marketed represents an added risk. It should also be noted that the traditional scheme of submitting products to different tests before they are marketed to ensure their safety conditions seems to be difficult to apply to this new generation of robots equipped with artificial intelligence systems. This is because testing software programs only allows to detect the presence of bugs in the system but not to prove their absence.[20]

EUROPEAN PARLIAMENT RESOLUTION. MAIN PROPOSALS.

The European Union, aware of the possible limitations analyzed regarding the application of the Directive to autonomous and intelligent robots, adopted in February 2017 a resolution of the European Parliament with recommendations to the European Commission on civil law rules and robotics in which it recognizes the need to regulate the matter and urges the Commission to adopt one or more legislative instruments in this regard. In the same resolution, the European Parliament proposes some possible solutions for regulating civil liability for damage caused by robots and asks the Commission to study and evaluate them with a view to adopting those it considers most appropriate. These proposals are as follows: mandatory insurance, the establishment of a compensation fund, a registration identification number and the creation of a specific legal status for the most advanced robots.

a) Contracting a Mandatory Insurance Policy

The European Parliament Resolution, in paragraph 59a, mentions the possibility of establishing a mandatory insurance for certain categories of robots. However, the Resolution clarifies very little about this proposal. It is not specified, for example, on whom the obligation to contract such insurance falls, although, when compared with the mandatory insurance for automobiles subscribed by both producers and owners, it is understood that the obligation would also fall on them in the case of autonomous vehicles. In the United States, authors such as KARNOW[21] defend the contracting of mandatory insurance as the best way to regulate liability for damages caused by these robots and artificial intelligence applications. In the same way that insurance companies grant policies in relation to an automobile or home, the producers of these robots seeking a policy for their products should also submit their products to an evaluation process by the insurance company to set the price and premium for the relevant policy. According to this author, the evaluation of the risks generated should be carried out in relation to the degree of autonomy and intelligence. Indeed, contracting a mandatory insurance could work for certain robots such as the autonomous car as it would mean extending the existing policy to situations where the vehicle is in autonomous mode. This has been regulated in the United Kingdom with the UK Automated and Electric Vehicles Act 2018, approved in July 2018, and according to which the mandatory insurance that traditional vehicles have is extended to autonomous vehicles[22].

TURNER maintains that one of the advantages of mandatory insurance could be found in the very nature of the concept of insurance, designed to deal with unpredictable situations, which would facilitate the attribution of liability in the event of damage caused by these autonomous and intelligent robots. The author defends as another positive point the fact that the contracting of insurance can encourage better behavior on the part of the person who contracts the policy, since on numerous occasions insurers demand a certain behavior in order to cover damages in the event that they occur. Thus, insurance companies could require

producers wishing to contract insurance for their autonomous and intelligent robots to adhere to a code of good practice in the manufacture of their products.

Regarding the possible disadvantages of contracting mandatory insurance, this author identifies as one of them the fact that liability is not recognized and attributed to the person who should really be liable, but that by contracting mandatory insurance, the obligation to pay compensation is redirected to another person totally unrelated to the production of the damage. Another disadvantage according to this author, probably the most evident, is the possibility that insurance companies reserve for themselves to exclude certain facts and circumstances from the policy coverage. It seems easy to imagine that in the case of autonomous and intelligent robots, whose nature seems to be unpredictable in itself, insurers will adopt a series of exclusions and reservations to the coverage of damages caused by these robots.

b) Compensation Fund

Another proposal of the European Parliament Resolution is the creation of a compensation fund[23], whose main function seems to be to cover the damages caused by the robot in those cases where the robot is not insured or in those cases where the damages caused are not covered by insurance[24]. TURNER provides as an example the strict liability compensation fund for accident damage in New Zealand, according to which personal injuries resulting from an accident will be covered by this fund, regardless of the cause of the accident[25]. Concerning the compensation fund proposed by the European Union, it is worth specifying the damages that would be covered by this fund.

In relation to the compensation fund, the Resolution also addresses the question of whether a single compensation fund should be created for all intelligent autonomous robots or whether, instead, a specific fund should be created for each category of robot.

The way the payment of contributions should be structured is another of the aspects raised in the Resolution, with the possibility of establishing a single payment when the robot is placed on the market or periodic contributions throughout the robot's useful life.

European Robot Registry

The European Parliament resolution proposes in paragraph 59 e) the assignment to each robot of an individual identification number to be included in a European register of robots. This would allow anyone interacting with the robot to get access to robot-specific information regarding the compensation fund, the coverage limits in the event of property damage, the identity and roles of contributors to the compensation fund, and other relevant details regarding the robot. This is a proposal that has been criticized by the European Robotics Association[26] for involving excessive red tape in relation to the benefits that such a registration would bring.

Creation of a Specific Legal Status

Paragraph 59 f) of the European Parliament Resolution contains the proposal that has been most widely publicized in the media and has generated the most legal discussion: the long-term creation of a specific legal status that would imply granting an electronic personality to the most sophisticated autonomous robots so that they can be held liable in their own right for the damages they cause when interacting with humans. This is a proposal that was already analyzed in 1992 by SOLUM[27] in an article in which it is analyzed whether an algorithm used to carry out operations in the stock exchange could be considered as a trustee with its own legal personality. The conclusion is that such a scenario would be possible, provided that the algorithm had an insurance policy to cover the possible economic damages it could cause to third parties as a result of its movements and operations in the stock market. However, the Resolution's proposal does not specify how such an electronic personality should be structured for more sophisticated robots.

SOME CONSIDERATIONS REGARDING THE IMMINENT APPROVAL OF A REGULATION WITHIN THE EUROPEAN UNION

Since the adoption by the European Parliament in February 2017 of a European Parliament resolution with recommendations to the European Commission on civil law rules and robotics, numerous texts have been adopted within several European Union institutions[28]. It is important to note the change in the Union's own analysis of this problematic issue. Thus, the initial line was abandoned and another path was initiated, giving way to a different debate focused now on the concept of algorithm and artificial intelligence technology. In this way, there is a paradigm shift away from the idea of the robot as a product and its fit with product liability regulations to focus on the concept of an artificial intelligence algorithm and its ability to process data and make automated decisions. As a result, data protection regulations, the General Data Protection Regulation, becomes of paramount importance in the study of this subject, since the development of artificial intelligence is impossible without data.

In connection with civil liability, the Resolution of the European Parliament of October 20, 2020, containing recommendations to the Commission on a civil liability regime for artificial intelligence (2020/2014(INL)) stands out, which represented a new step in the process of regulating robotics and artificial intelligence and, more specifically, the regulation of the civil liability regime that should operate in those cases in which an artificial intelligence system causes damage and harm. The purpose of this document is, ex Article 1, to establish the rules in relation to civil liability claims of natural and legal persons against operators of artificial intelligence systems. It introduces as a novelty the operator's liability and makes a distinction between the final operator and[29] the initial operator[30].

In addition, the adoption of a proposal for a Regulation of the European Parliament and of the Council establishing harmonized rules in the field of artificial intelligence (Artificial Intelligence Act) and amending certain legislative acts of the Union is also noteworthy. However, nothing is regulated in this Artificial Intelligence Law on the civil liability regime applicable to damages caused by artificial intelligence systems.

CONCLUSION

The challenges facing European regulations to meet this new technological reality are many and varied, which is why it may not be sufficient to adapt the existing Directive. Thus, it seems that the European institutions consider it more appropriate to draw up a specific European regulation for artificial intelligence that takes into account the different characteristics of this technology from the outset. This regulation would cover both non-physical artificial intelligence programs and applications designed to operate in a digital environment and more advanced robots created to interact with people in a physical environment. In addition, given the multitude and diversity of risks that the use of this technology represents for the fundamental rights and freedoms of individuals, it is important to highlight the need to ensure respect for existing regulations on this issue.

ENDNOTES

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6. Considering AB European Parliament. Committee on Legal Affairs, *op. cit.*

7. As JACOB TURNER explains in the book *Robot Rules*, this issue has been studied in other jurisdictions as well. In the United States, in 1991, the Court of Appeals in the case of Winter v. G.P. Putnam's Sons, concerning erroneous information obtained in a mushroom book that a poisonous mushroom was edible, decided that the information contained in a book could not be considered a product under the product liability regime. The judgment stated in one paragraph that a computer software that does not fulfill the function for which it was designed must be treated as a product and is therefore subject to the product liability regime. According to JACOB TURNER in the book Robot Rules, the court was thinking in terms of traditional software at the time and not artificial intelligence software. However, as described in the White Paper On Artificial Intelligence - a European approach to excellence and trust recently published by the European Commission, these softwares with the capacity to learn and evolve have also been designed to develop one or more functions previously determined by their programmers or developers.
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23. Paragraph 59 b, c and d European Parliament. Committee on Legal Affairs, *op. cit.*
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29. Article 3e. *Any natural or legal person that exercises a degree of control over a risk associated with the operation and functioning of the AI system and benefits from its operation.*
30. Article 3f. *Any natural or legal person who defines, on an ongoing basis, the characteristics of the technology and provides data and an essential end support service and therefore also exercises a degree of control over a risk associated with the operation and functioning of the AI system.*

ACKNOWLEDGEMENT

Translated & edited by American Publishing Services (https://americanpublishingservices.com/).

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