

Varazdin Development and Entrepreneurship Agency and University North
in cooperation with
University of Aveiro
Faculty of Management University of Warsaw
Faculty of Law, Economics and Social Sciences Sale - Mohammed V University in Rabat
Polytechnic of Medimurje in Cakovec



Economic and Social Development

56th International Scientific Conference on Economic and Social Development Development

Book of Proceedings

Editors:

Humberto Nuno Rito Ribeiro, Marco Andre da Silva Costa, Ivan Cehok



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LEGAL IMPACT OF ROBOTS IN CIVIL LIABILITY AND TAXATION: WHAT WE KNOW, TRENDS AND CHALLENGES

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ABSTRACT

Robotics is an unavoidable reality in today's global society. Nevertheless, issues relating to the civil liability and taxation of robots still represent an important field of scientific research. According to the International Robotics Federation, 420,870 units of industrial robots were sold in 2019 and in Europe the average density of robots in industry was 14% per 10,000 employees in 2018. This study aims to analyse the legal concerns of robotization (introduction of robots in organizations) at civil and tax liability level. To this end, will be made a compilation of legal prescriptions which may undergo changes due to the progressive robotization in Portugal. Based on this legal compilation, will be studied which legal changes have to be introduced or if they are necessary, in order to produce a positive balance between the inevitable changes operated by robotization (e.g. reduction of current jobs, tax revenues decrease or responsibility disclaimer for possible damage caused by robots) versus the insurmountable need for tax revenue so that the State can continue to provide quality public services and implement public policies that are fundamental to the country's sustainable development. Legal regulation is the path outlined in the European Commission's White Paper on Artificial Intelligence presented on 19/02/2020, which supports a regulatory approach with a dual objective of promoting robotization and address the risks associated with certain uses of this new technology. Analysing how legislation at civil and tax liability level should serve to compensate and rebalance the impact of robotization in Portugal is the basis of this paper.

Keywords: *Civil liability, Legal Impact, Robots, Taxation*

1. INTRODUCTION

Artificial Intelligence (AI) has evolved to enable robots with decision-making capacity (even with ethical content) and machine learning systems have given way to deep learning systems, such as those currently used in Google Translate or Alexa's Amazon (Matthias, 2004). This evolution has raised the fear of the progressive robotization of society, with some considering that robots will end up destroying humans, and others defending that robots will allow humanity to reach a new evolutionary stage (Cabral, 2018). The 2020 European Commission's White Paper on Artificial Intelligence points out several advantages of robotics such as the improvement of healthcare or the increase of Europeans safety.

However, since most tax and social security systems are based on a strong contribution from work-related taxes, and if robotics causes a reduction of workplaces, then countries face a double problem when social benefits have to increase (e.g. due to unemployment) and tax revenues decrease. It is, therefore, necessary to build a scenario in which a right balance between the positive effects and the negative impact of robotization is created, as proposed by the Sustainable Development Goals of the UN 2030 Agenda. The key to build this balance lays in legal regulation. In this sense the European Parliament's Civil Law Resolution on Robotics states that the European industry could benefit from an efficient, coherent and transparent approach to regulation at Union level, providing predictable and sufficiently clear conditions under which enterprises could develop applications and plan their business models on a European scale while ensuring that the Union and Member States maintain control over the regulatory standards to be set, so as not to be forced to adopt and live with standards set by third countries. Bearing in mind this context, this paper aims to analyse the current Portuguese legal framework regarding civil liability and taxation laws in order to understand if robotization and the inherent problems are solved by it or if it is necessary to create new and specific regulations in this field.

This analysis will allow to develop legal guidelines to be considered by Portugal, regarding the regulation of robotization in the area of civil liability and taxation. In general, existing studies focus on the impact of robots on employment (Carbonero *et al.*, 2018). This paper does not aim to be a merely descriptive study of robotics impact at legal level, but instead proposes to study how legislation can be a tool to convert the potential negative effects of robotization into positive results, supporting the improvement of the population's quality of life and of essential public services. Accordingly, it aims to answer the question of whether the current legal framework is prepared to respond to the implications that arise from robotization or whether it is necessary to adapt national legislation to this new scenario. The paper's analysis is restricted to civil liability and taxation of robots. The first one answers the question of damage compensation caused by robots, thus promoting social confidence and admission that robots are able to perform tasks increasingly linked to the life of each citizen (e.g. at the health level). The second topic addresses the potential negative effects of robotization and the need to compensate for the loss of tax revenue by countries as a result of labour taxation decrease. In addition, both civil liability regulation and tax policies at robotics level have not yet been assessed (Abbott & Bogenschneider, 2018). The main goal of this paper is, therefore, mapping the general problems raised by robots using, regarding civil liability and taxation having in mind the Portuguese framework.

2. ROBOTIZATION CIVIL LIABILITY

In a legal perspective, robotics analysis is more phenomenological than dogmatic since an aspect of social life is studied from a legal and a propaedeutic point of view (Silva, 2017). Based on Asimov's Laws (1950) and in order to ensure a safe coexistence between robots and humans, studying the civil liability of robots is imperative. The precautionary principle and the inherent duty to seek and take the necessary measures to avoid damage in the face of an unknown event with harmful potential must be taken into account (Silva, 2017). The paradigm may be to assume an acceptable risk margin in a cost-benefit perspective, which is compensated through objective or risk liability rules (Marques, 2007; Barbosa, 2020). Regarding non contractual civil liability two alternatives can be discussed: in one hand, the possible liability of the robot itself; and, on the other hand, the liability of someone for damages caused by robots (Silva, ANO; Cabral, 2018). In what terms the current Portuguese framework covers damages compensation caused by robots is then analysed.

2.1. The liability of the robot

The liability of the robot itself is excluded by Portuguese law, since robots are not granted legal personality. This formal qualification as a “person” is essential for the attribution of rights and obligations and without it the robot cannot be subject to liability [for further development, see Schirmer (2016)].

2.2. Responsibility for the robot: liability of the robots’ user or beneficiary

Once the possibility of apportioning damages directly to robots is *lege lata* removed, it is important to assess in what terms the common civil liability regime allows the attribution of the damage caused by the robot to someone who may be subject to liability. Roughly speaking, we can distinguish two typical groups of persons: those who use the robot, sometimes using it themselves and other times benefiting from its activity, giving way to the possible application of the common non-contractual civil liability regime (“tort law”); those who program or produce the robot, and may eventually respond under the regime of the producer liability. It is necessary to start by asking the possible liability of the user or beneficiary of the robot's activity. A distinction will be made between the non-contractual liability regime and the contractual liability regime.

2.2.1. Non-contractual liability

At this level it is important to determine the possible liability for the use of robots under the common liability regime (Articles 483 et seq. of the Portuguese Civil Code). We can distinguish between strict liability and liability for wrongful acts.

Strict liability could only take place if the robot fell into one of the forms of responsibility specifically provided for, which is not the case [Article 483(2)]. On the one hand, liability for the acts of an agent under the principal's responsibility is to be excluded, since it would presuppose the agent’s own liability [Article 500(1)]. On the other hand, a possible strict liability in the proper sense (Articles 502 et seq.) is also to be excluded, since the robot is not framed in any of the categories mentioned there: “animals” (Article 503), “vehicles” (Articles 503 et seq.) or “electric energy or gas” (Articles 509 and 510).

Therefore the allocation of damage can only take place under the common civil liability regime. Thus, imputation of responsibility can only take place if, in one way or another, it can be considered that the damage caused by a robot is still causally attributable to someone's behavior. The two main difficulties arising may be measuring a “human behavior”, namely when the user or the beneficiary of the robot's activity cannot easily predict the direction of its activity (and, thus, the robot is more viewed as an agent of the harmful conduct, rather than as an instrument available for a person to use); and the possible lack of reprehensibility of the user's conduct (“fault”). However, the non-contractual liability regime opens up some framing possibilities:

- a) With regard to the existence of human behavior on the part of the user or beneficiary of the robot, the respective responsibility for omission must be considered, pursuant to Article 486, for not having performed the necessary acts to prevent damage by the robot. Some relevant portuguese lawyers apply therefore the german concept of “*Verkehrssicherungspflichten*” [see Cordeiro (2010)].
- b) With regard to the assumption of personal fault, it should be noted that, in the common terms of civil liability, reprehensibility of the agent's behavior is measured by a general standard of a *bonus pater familias* in the circumstances of the case (Article 487(2)) [see Prata, 2000].

In addition, the use of a robot may, in certain cases, lead to the fulfillment of the provisions of Article 493, paragraph 1 (presumption of fault, when the damage results from the thing under the person's guard) or paragraph 2 (presumption of fault in the event of dangerous activities). In the common non-contractual civil liability regime, there is no limitation on damages eligible for compensation. The great weakness of the general non-contractual civil liability regime stems, however, from the fact that it is not associated with any system of guarantee of liability that makes it possible to tackle the eventual under-capitalization of the debtor.

2.2.2. Contractual liability

It is also possible to consider the contractual liability (Articles 798 et seq.), which can only take place when there is an obligation already constituted, namely by contract. In this case, the relevant criterion for the formulation of a liability regime is the fulfillment or non-fulfillment of the obligation. Thus, in the event that the debtor, in the course of performing the debt, causes damage in the sphere of a third party ("positive breach of contract"; "breach of protection duties"), even if such damage has been caused by a robot used in the performance of the contract, the debtor will answer for them. It should be stressed that in contractual liability, the fault of the debtor is presumed, pursuant to Article 799(1). In common contractual civil liability regime there is also no limitation on eligible for compensation damages (Costa, 2009).

2.3. Liability of the robots' producer: can the robot be a defective product?

Council Directive 85/374/CEE, of 25 July 1985 concerning liability for defective products was transposed in Portugal by the Decree Law 383/89, of 6 November (amended by Decree Law 131/2001, of 24 April). Under this framework, the producers are liable and should compensate for damages caused by the defect in a product they have put into circulation for economic purposes, regardless of fault. Consequently, the injured person only have to prove the damage, the defect and the causal relationship between defect and damage. Considering a robot as a product, is possible that several situations of damage caused by defective robots can have solution in this legal regimen. Nevertheless, the legal requirements demanded by the Directive 85/374/CEE and by the Decree Law 383/89 can let some damages without compensation, as the Report from the European Expert Group on Liability and New Technologies Group identified (European Union, 2019). In first place both legal documents only apply to movable objects, even when incorporated into another movable or immovable object. So, damages caused by defective services, such as software updates, are excluded (Cabral, 2018). In addition, no duty of monitoring the products after putting them into circulation is established and the producer' control may be limited in self-learning robots or when damages were caused by a lack of upgrades that the injured person should have made. These limitations reveal that a specific legal regime should be approved in order to overcome unaccountability cases. This was the solution already adopted regarding active implantable medical devices in Directive 2007/47/EC and in the Portuguese Decree Law 145/2009, of 17 June. One of the main innovations of this Law was the implementation of a National System of Surveillance of medical device after putting it in circulation in order to reduce possible future damages (Raposo, 2013). This highlight the need for out of the box solutions and specific legal regimes to overcome specific problems raised by robotics.

2.4. Regulation Proposals regarding Civil Liability of Robots

In conclusion, it should be noted that the legal solutions put to the Commission by European Parliament (paragraph 59 of European Parliament's Resolution of 16 February 2017 with Recommendations to the Commission on civil law provisions relating to robotics [2015/2103(INL)]) would always require a legislative amendment and could not be obtained by interpreting the current Portuguese law.

The Portuguese legal framework in force in general covers damage situations caused by robots. Nevertheless, in some situations a corrective or extensive interpretation may be necessary in order to cover certain situations such as the robot defects discovered after it was placed on the market. This leads to undesirable legal uncertainty and insecurity. Thus, regulation will be the way forward to ensure higher levels of legal protection and foster the use of robots. New solutions to new problems should be thought. Establishing an obligatory insurance to robot users is the solution proposed by many (see points 57 et seq. of the EP Resolution). But insurers will surely try to find reasons to disclaim liability and in this situations a “robots’ compensation fund” to unidentified or uninsured technology, like the one that exists in the vehicle sector, is the solution suggested to redress damage caused. Who and how will finance this compensation fund is not yet answered. Creating a special tax on the robot industry that finances the mentioned fund may be the solution.

3. TAX PERSPECTIVES OF ROBOTIZATION

Existing research, data and forecasts point to a high degree of uncertainty about the impact of massive implementation of AI and robots in the economy. However there is a certain unanimity in the fact that the specific characteristics of each country will have a significant influence on the mode, intensity and speed at which the AI will be introduced in each economy. The fact is that the entry of AI and robots in our life is a reality and it will generate relevant changes in legal, economic and social systems. Robots (as well as several other technologies based on AI) are increasingly becoming a reality in organizations and, in many cases, replacing people in traditional human activities that, for a long time, were considered “safe” in terms of substitution by automation. A set of factors may favour or hinder the spread introduction of different technologies. Market forces driving the relative prices of capital and labour play an important role in determining the profitability of investing in labour-replacing technologies. Countries with relatively low labour costs, for instance, have witnessed a slower process of automation and, also for that reason, do not display a similar pattern of job polarization as higher industrialized countries. Institutional norms and regulations – for example, product and labour market regulations as well as safety, medical and ethical standards – may prevent certain technologies from becoming prominent in certain countries (OECD, 2017; OECD, 2019). Consumer and societal preferences, as well as ethical norms, will play a crucial role in determining the diffusion of labour-replacing technology.

3.1. Robotization: potential benefits

The intensification of automation brings with it a set of potential benefits for organizations. We can highlight: automation of manual and repetitive tasks (this automation of tasks allows employees to focus on tasks with greater added value); reduction of human error; processing tasks and creating information more quickly; improvement in the end user experience in the use of data and information; improvement in forecasts on activities related to productivity; high potential of robotics in terms of improving safety at work, by transferring dangerous and harmful tasks from humans to robots; possibility to incorporate the principles of circular economy in robotics policies; possibility of having a positive impact on the environment, especially in some sectors of activity, through process optimization and precision activities. (IFR, 2018; Ferreira, 2018).

3.2. Robotization: increased concerns

However, the mass application of AI also causes increased concerns in several domains like: job stability (specifically for unskilled labour) and wages; issues related to economic equality and income redistribution; impact on tax revenue (and, if taxation is introduced in robots, it may create restrictions on innovation); potential to create a set of new risks due to the growing

number of interactions between humans and robots in the workplace; responsibility of AI consequences (Abbott & Bogenschneider, 2018; Schwab & Samans, 2016; Guerreiro *et al.*, 2019). Regarding all these increased concerns, Bottone (2018), following the World Economic Forum¹, lists nine points relating to roboethics: 1. Probability of more unemployment (the most discussed topic in the economic literature); and, as a consequence, humans will have more free time if machine are performing productive activities; 2. Inequality (using AI, increased wealth will be created thanks to machines, raising the question how this wealth is redistributed); 3. Humanity (AI is already modelling, and will continue to affect the way humans interact); 4. Artificial stupidity (mistakes are always possible by a machine); 5. Incapacity of AI to distinguish between a simple task and human rights (for example, in predicting future human criminal behaviour, machine could discriminate and act against people selected as probable criminal); 6. Security (possibility to use robots for malicious activities, such as war or terrorist attacks); 7. Evil genies (how do we defend against unintended consequences?); 8. Singularity of humans (we must consider what to do at the point in time when human beings are no longer the most intelligent beings on earth); 9. Robots rights (once we consider machines as entities that can perceive, feel and act, the next natural step is to consider their legal status. Should they be treated like animals of comparable intelligence?). As demonstrated, it is a fact that the intensification of automation, particularly robotization, has increased concerns in various domains. In this work we highlight the consequences on employment and on tax revenues. Regarding to employment there are concerns about: the number of jobs that will be lost, referred as “technological unemployment” (expression popularized by John Maynard Keynes in the 1930s), as well as the number that will be created, which worker skills will be deemed necessary or redundant, and how humans and robots will interact in the workplace are some of the challenges associated with robots (Abbott & Bogenschneider, 2018; Schwab & Samans, 2016; Guerreiro *et al.*, 2019; Carbonero, *et al.*, 2018). The fear of technological unemployment is real, but is it rational? The answer to this question is not unanimous (Ferreira, 2018; Cabral, 2018). Despite the public increasing concern, this fear is overstated, and it is not likely that we will assist an overall job loss, because the technology will also create several opportunities, creating new and additional jobs (Mazur, 2019; Kletzer, 2018; IFR, 2017).

3.3. Robotics: taxation perspective

Taxation and the effect on tax revenues is the second area of concern that is addressed in this work. It is a fact that taxation influences the allocation of resources in the economy, affecting the way these resources would be allocated in the absence of taxation, transferring resources from people and companies to the State. In turn, the State uses these resources in the society. Robotics raises issues related with economic equality, income redistribution and tax revenues. Currently, robotics is an issue of great discussion in the taxation domain and there is also no consensual opinion about it. For example, Abbott & Bogenschneider (2018:150) state that “Robots are simply not taxpayers, at least not to the same extent as human workers”. Auerbach (2006) considers that taxation of labour income is more efficient than the taxation of capital income. Several authors consider that robot taxation will have a negative impact in innovation (Mazur, 2019). Various solutions can be embraced and are under discussion at international level. According to Abbott & Bogenschneider (2018:151) «Tax “neutrality” between human and automated workers could be achieved through some combination of disallowing corporate tax deductions for automated workers, creating an “automation tax”». In fact, in the search for answers for the presented problems (some already present, others possible), there have already been several calls at the global level to consider taxing robots (this trend has already led to the submission of tax proposals on robots – for example Delvaux (2016), Draft Report with Recommendations to the Commission on Civil Law Rules on Robotics). With this framework,

¹ Available at: <https://www.weforum.org/agenda/2016/10/top-10-ethical-issues-in-artificial-intelligence/>

there is an urgent need to evaluate the arguments for and against the taxation of robots, defining the best way to deal with the possible design and the effects of the introduction of a robot tax. This possible taxation should be taken into account when considering the previously mentioned “robots’ compensation fund”. Regarding taxation policies, if robots are replacing the labour force, a fall in tax revenue should be expected, as labour taxes represent a significant portion of tax revenue. In addition, if robotization seems to put at risks mainly routine and low skilled workers, governments will need growing public resources to invest in educational and training system. Also social security systems must be reinforced (Floridi, 2017; Abbott & Bogenschneider, 2018; Ionescu, 2019). Oberson (2017) argues that, as a consequence of automation introduction, granting a legal personality to robots is a possibility. This way, the potential implications of a tax on robots, or on the use of such robots, must be considered (of course, this would require a clear definition of robots, which could be based on the use of artificial intelligence, combined with a sufficient level of autonomy). Regarding Portugal, there is still no legislation to framework this “new” reality.

3.3.1. Taxation: arguments in favour

Despite the growth of AI being an issue for discussion in the taxation perspective, there is no consensual opinion if they should pay taxes or not. Ryan Abbott² states that taxing robots is not a crazy idea! At the Emtech NEXT 2019 conference³, put on by MIT Technology Review, he presented a long list of arguments in favour of robots taxation: all jobs, including complex jobs, have a lot of routine tasks included, and if automation technologies free up the time of these workers on some tasks, it may not be need as many of them; if robots and humans cost the same amount, tax policies make robots cheaper to employ (they have no payroll tax - this argument is of interest in countries where the labour cost is high); robots don’t pay income or sales taxes either (income tax revenues is one of the higher source of tax revenues for in several countries); even if we do find a new job for everyone who loses one to automation, the “disruption” in the meantime may be very painful, and governments will have to spend money retraining and providing social benefits; since the greatest risks of automation are to the middle-class jobholder, we need to do something ambitious to help this vulnerable group; tax revenue we will lose from automation has to be made up somewhere; tax revenue from robot taxes could also fund guaranteed minimum incomes; automation will generate lots of wealth, but it shouldn’t come at the expense of the most vulnerable.

3.3.2. Taxation: arguments against

Also at the Emtech NEXT 2019 conference, Ryan Avent⁴ presented a long list of arguments against robots’ taxation: jobs aren’t being lost at the rate hoped or expected - so perhaps a tax on robots isn’t needed at all; robots are primarily used in manufacturing, and not that much in the services sector; total factor productivity has been growing slowly, so it’s hard to see that robots are a problem; employment percentages are very high in many industrialized countries which are intense users of robots; if we discourage robots, it’s not clear that jobs will stay in those countries anyway, as they may be outsourced to countries with lower wage rates; we also have to consider difficulties of implementation in robot taxation - it would require lots of work by people to ensure robots are taxed appropriately; rather than tax a specific kind of capital that improves productivity, why not institute a wealth tax; if robots, autonomy, and AI could do great things for humans, potentially bringing about more leisure, fewer accidents, and so forth, we risk losing these benefits if we tax robots.

² Ryan Abbott, professor of law and health sciences at the University of Surrey in the UK.

³ Available at: <https://events.technologyreview.com/video/watch/robot-tax-debate-abbott-avent-lichfield/>

⁴ Ryan Avent, economics columnist for the Economist.

4. CONCLUSION

AI advances is a reality with strong impact in all countries. The real impact it will generate is still unknown. However, it is certain that on a civil liability level and regarding to taxation rules the existing framework may not have appropriate answers. Public tax revenues in Portugal, as well as in other countries, are very dependent of the labour taxes and contributions. The hypothesis that robots will replace thousand of jobs and generate unemployment is a matter of interest and a domain under discussion in institutions like EU and OECD. There is a long list of arguments in favour and against taxation and until now there is no consensual opinion. For example, in 2017, South Korea has introduced the world's first tax on robot. It is not a direct tax on robots but is a reduction on the tax deduction benefits for investment in automation. Tax issues related to robots taxation goes beyond the borders of any particular country, there it should be analysed in an international perspective. On an international level it should be established a generalized definition of robots. Also an appropriate treaty allocation rule should be defined. In terms of civil liability, the Portuguese current legal regime is adaptable to the damage compensation caused by robots, but not perfectly. The possibility that an extensive or corrective legal interpretation may be necessary or that some civil liability situations may go unanswered justifies the provision of a specific legal regime for compensation of damages caused by robots. Legal regulation is, moreover, the path indicated by the European Union in the various recommendations in this field. Specific and suitable solutions are needed and should be considered. Compensation funds is a remedy proposed by the **European Expert Group on Liability and New Technologies Group of the European Union. How to finance this fund is still unclear, but also shows how integrated solutions between various areas are relevant. Therefore this paper integrates an analysis in terms of civil liability and taxation. Financing the compensation fund with the creation of a specific tax for the robots use is a proposal.** The reflection presented in this paper raises the importance of the debate and analysis, but also the relevance of integrated solutions since robotization is general (in all fields) and global (in all countries).

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