The Emergence of 4.0. Employment Contracts: on the Need to Redefine Employment in the Context of Automated Labour*

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1. Introduction

1.1. New Challenges for Labour and Labour Law

1. Turner (2019) wrote: "*the biggest question in the next ten to twenty years is not going to be how to stop AI from destroying humanity, but how humanity should live alongside it*."[1] The 4th industrial revolution is said to differ from the previous industrial revolutions[2]. We are now witnessing intelligent systems able to simulate Human intelligence to a point where they surpass Humans, in efficiency and in speed, in the performance of certain tasks. AIs are expected to have an unprecedented impact on labour, given the risk that they replace humans in intellectual and creative tasks and occupations, that were thought to be out of machines' reach. There is, however, an ambient uncertainty as regards the extent of AI's impact on labour. Depending on whether one is a technology optimist, pragmatist or pessimist,[3] AI's 'invasion' of the labour market is viewed differently: pessimists warn against the negative economic effects of abrupt, quasi-total automation[4] while pragmatists and optimists view automation as being economically beneficial in the long run.

2. The 4th industrial revolution raises thorny issues in most of the branches of law. It remains difficult, however, to pinpoint the ways in which labour law may be affected conceptually. Indeed, a number of peculiar questions arise when it comes to the preservation of the conceptual uniformity of the constitutive elements of employment, namely, the status of employee, the roles and functions of the employer and the functions of remuneration. Should labour law apply to agents that are Non-Human, but are – or may become – sufficiently similar to Humans that they may be assimilated to the latter? Should a specific type of legal personality be created in favour of intelligent systems, enabling them to enter into agreements, enjoy the benefit from workers' rights and be subject to employer scrutiny? Will remuneration continue to be a defining element of employment, in an entirely automated, future labour market?…

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1   Turner (2019), p. 37.

2   Industrialization (1st revolution), Mass Production (2nd revolution) and Automation and Digitalization (3rd revolution).

3   Berg, Buffie, Zanna (2018), p. 118.

4   *Idem*, p. 119.

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3. Our experience with non-standard work[5] shows that there is a tendency for new technologies to 'fissure' the traditional labour law concepts, thus reinforcing the need for enhanced protection of the workers. Deakin (2013) refers to a segmentation of the labour market, given that the latter "*is divided or structured in a way which is reflected in the forms taken by the employment relationship or contract. It is associated with the division between 'core' and 'atypical' employment in some context, and that between 'formal' and 'informal' employment in others*."[6] In this segmented labour market, labour law's protective function is challenged because, due to the blurred dividing line between salaried and independent work, there is increasing uncertainty on the classes of workers who can make a claim for statutory protection.[7] Atypical work rebutted the Fordist assumption that the notion of employment is homogenous.[8] It did not, however, eliminate the assumption that, however atypical the work arrangement, the workers are invariably Human.[9] Thus far, new technologies have managed to dehumanize aspects related to the work organization (e.g., platforms do not exercise direct and personal scrutiny over the platform workers). AIs go a step further: the dehumanization stems, not from the absence of human control in the organization of tasks, but from the fact that the task-performers are non-human. In this context, if the answer to the question 'what is labour law for?' is 'workers' protection', the ever-growing AI 'invasion' of labour triggers the question '*who* is labour law supposed to protect?' Algorithms and robots?…

4. These are relevant questions, given the pace at which technological progress unfolds. If one imagines that all of the countries experience same-speed AI-induced labour replacement, the consequences for some developing countries may be catastrophic: automation's 'take over' of occupations will be 69% in India, 72% in Thailand, 77% in China and an alarming 85% in Ethiopia![10] On a global scale, not all markets are prepared

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5   As this study focuses mainly on salaried as opposed to independent work, non-standard work will be understood as designating non-standard forms of employment, defined as a "*grouping of employment arrangements that deviate from standard employment. They include temporary employment, part-time work, temporary agency work and other multi-party employment relationships, disguised relationships and dependent self-employment*". See ILO REPORT (2016), p. 2.

6   DEAKIN (2013), p. 1.

7   DAVIDOV (2014), pp. 10-11. See also WAAS (2010), p. 53.

8   LUDERA-RUSZEL refers to the Fordist model as implying the standardization of production resulting in a homogenous workforce. See LUDERA-RUSZEL (2016), pp. 409-410.

9   See HENDRICKX (2012), p. 114.

10   Technology at Work v2.0. The Future is Not What It Used to Be, Citi GPS: Global Perspectives & Solutions, 2016, available at: https://www.oxfordmartin.ox.ac.uk/downloads/reports/Citi_GPS_Technology_Work_2.pdf (10.05.2019).

to integrate AI and not all countries have the capacity (adequate Social Security Schemes) to deal with a drastic rise in technological unemployment. For the purpose of the present study however, we shall focus on labour law issues that may arise in countries that do present some level of readiness to begin – or increase – AI use on a business level.

5. The rapid take-over of AIs in various market sectors inevitably gives rise to the issue of regulation in the field of labour: should the labour market self-regulate AIs or should there be some form of public regulation? Here again, the priorities vary between different countries and world regions. In Europe, the main concern is ethics. The Europeans (mainly the EU) do not seem favorable to an overly detailed AI regulation, the focus being put on the establishment of a common ethical standard applied in AI inception and use.[11] Alternatively, in the US, AI is viewed as a component of commerce. In the American view, AI is as a market phenomenon,[12] that, albeit original does not require specific regulation. Existing legal provisions (Commercial law, Intellectual Property Law, Contract Law, Labour Law) would apply, should there be a need for some form of legal protection. Although regulating AI is not the primary issue in this study, it is a point that needs to be raised. It is likely that, at some point in the future, national, regional and international regulators will be encouraged to consider the enforcement of either general or sector-specific regulatory frameworks. For the time-being, however, there seems to be a wait-and-see approach, which we already witnessed with platform work:[13] regulators are more keen on defining principles (like those on ethics or on liability[14]) and applying existing regulations to specific AI-related legal issues that may arise.

6. Although the notion of labour evolved, modern-day labour law still preserves a historic legacy in that it "*draw*[s] *the lines between public regulation; private ordering, and various forms of collective and autonomous self-regulation*."[15] Labour law thus "*prescribes a 'division of labour'*

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11   In this sense, there seems to be a principle-based approach in determining the regulatory methods that should be used for the time-being as regards AI use. In the EU, a High-Level Expert Group on Artificial Intelligence was set up by the European Commission for the purpose of drafting Ethics Guidelines for Trustworthy AI. The Guidelines are available at: https://ec.europa.eu/digital-single-market/en/news/ethics-guidelines-trustworthy-ai (10.05.2019).

12   In the US, in the Future of AI Act submitted to Congress in 2017, Section 4 deals with the establishment of a Federal Advisory Committee on the Development and Implementation of Artificial Intelligence. See https://www.congress.gov/bill/115th-congress/house-bill/4625?q=%7B%22search%22%3A%5B%22the%22%5D%7D (10.05.2019).

13   The wait-and-see approach is the expression used in Hatzopoulos, Roma (2017), pp. 81-127.

14   See for example, European Parliament Resolution, Civil Law Rules on Robotics, TA (2017)51.

15   Mundlak (2011), p. 316.

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between different forms of governance and the method of interests' representation in each."[16] As AI gradually pushes Humans out of the labour market, it becomes increasingly important that future regulators attempt to strike a balance between market efficiency (which favors AI entry in the labour market[17]) and statutory protection (aimed at the Human workers threatened by AI replacement). The purpose of the present study is to assess if, like non-standard work, automation of labour will trigger the need to rethink and redefine the constitutive elements of employment, ultimately answering the question of who – and how – should labour law protect, as intelligent systems gradually creep in various sectors of the labour market.

7. Section 2 focuses on the AI-induced labour replacement. Indeed, in order to consider the legal apprehension of AI, its economic effects must be defined. We shall, therefore, focus on the main schools of thought relating to the occupations that are most threatened by AIs (2.1.), the extent to which Humans may be replaced in those occupations (2.2.) and the market and regulatory contexts that may encourage or hinder the evolution of the AI-induced labour replacement (2.3).

8. Section 3 focuses on the notion of Artificial Employees, as a possible future category of workers. Aimed at determining whether non-human agents can be considered as salaried workers, this section includes an analysis of the possibility for AIs to be considered employees (3.1.) and the prospect of recognizing AI legal personhood (3.2.).

9. Section 4 provides an analysis of the ways in which intelligent systems affect the control and assessment techniques, used by employers, in the monitoring of their employees. We shall inquire, in this context, if the features traditionally associated with subordination should change or should, rather, be 'updated' when AIs are the object of control (4.1.) and when they are the instrument of control (4.2.).

10. Finally, the study will raise the issue of remuneration and the risk it may become obsolete as we get closer to a post-work society (Section 5).

11. Section 6 includes the main conclusions on the possible future alterations of labour law, considering the analysis provided in the previous sections.

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16   *Ibidem*. See also Hepple (2011), p. 31.

17   In economic theory, market efficiency essentially implies an optimal distribution of resources. From a Coasian perspective, an efficient market is characterized by a well-defined assignment of property rights. See Kuechle, Rios (2012), p. 130.

1.2. Relevant Definitions

12. The term 'artificial' is intuitively perceived as the opposite to 'natural'. Based on the distinction between *physis* (nature or reality)[18] and *logos* (intellect and/or consciousness),[19] Romportl (2015) suggests that artificiality, as a static quality of AI, resides in the *physis*-realm since the agent – material or immaterial – is not natural *per se*. The simulation of Humans, as a dynamic process, occurs in the *logos*-realm, given that non-natural agents are increasingly able to possess and develop the Human skills of seeing, recognizing and manipulating an object, speech recognition, etc. Romportl (2019) uses the expression "*artificially built naturalness*"[20] to refer to the basic feature artificial systems:[21] they are non-natural agents capable of replicating cognitive processes qualified as natural.

13. The term 'intelligence' is a "*joined capacity to comprehend and anticipate how the things may plausibly behave or change now or in one step forward, and encountering these intuitions to decide the necessary actions/modes to make*."[22] Natural or artificial agents can be considered intelligent if they succeed in navigating in, and manipulating an environment that remains entirely or partially unfamiliar to them.[23]

14. The term 'AI' can be defined as a system that displays intelligent behavior by analyzing its environment and taking actions – with some degree of autonomy – directed at achieving specific goals.[24] It can be inferred from this definition that the key AI feature is that of autonomy,[25] as expressed in three interdependent aspects: a so-called reactive autonomy, implying the capacity to mobilize a set of skills in reaction to external stimuli; a so-called cognitive autonomy, implying the ability to analyse, reason and learn in unfamiliar circumstances, and a so-called teleological autonomy, implying the ability to problem-solve and achieve a specific goal, even if the exogenous factors are not fully known. The concept of autonomy is crucial for the purpose of determining whether AIs can

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18 Romportl (2015), p. 212.

19 *Ibidem*.

20 *Idem*, pp. 215-216.

21 In its most developed form, an artificially built system would succeed in displaying the same 'naturalness' as a Human being. This is one of the features of the so-called Turing test. See Turing (1950). For a brief comment of the Turing test, see Pennachin, Goertzel (2007), p. 8.

22 Zadeh, Power, Zadeh, (2019), p. 6.

23 Pennachin, Goertzel (2007), p. 14.

24 European Commission, *Artificial Intelligence for Europe*, COM(2018) 237 *final*, p. 1.

25 Nof (2009), pp. 16-17.

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be fully autonomous agents, deserving – perhaps – of being considered as legal subjects. Our analysis in Section 2 aims at elucidating this issue.

15. From the perspective of the typology of intelligent systems, they are generally classified in three categories. On a scale crescendo going from specialized to general and/or super-human cognitive abilities, AI can be Narrow (ANI), including systems that are specialized in a specific area such as IBM's Deep Blue or the supercomputer that beat Gary Kasparov at chess in 1997;[26] General (AGI), comprising systems able to perform most, if not all, intellectual tasks like humans[27] and Superintelligence (ASI), consisting of smarter-than-humans systems across the board.[28] Presently, we are – perhaps luckily – still in the so-called functional, ANI stage, given that most of the currently used AIs are hyper-specialized for the performance of certain tasks and lack general intelligence.

2. AI-induced Labour Replacement

2.1. The Extent of Labour Replacement

16. In the context of the labour-capital divide, AI (*prima facie* classified as capital, i.e., means of production[29]) will replace labour, the million-dollar question being: to what extent? There are two opposing schools of thought in this regard: a so-called occupation-based approach and a so-called task-based approach. Frey and Osborne are partisans of the former. In a study including 706 occupations from the Occupational Information Network (O*NET),[30] Frey and Osborne predicted that 47% of these professions run the risk of total automation. However pivotal, this study was criticized because the authors seem to hold a monolithic view of occupations, perceiving them as blocks of homogenous tasks rather than aggregates of tasks, with various degrees of AI-vulnerability. In subsequent studies we find a subtler approach, as focus is put on the possibility that certain tasks, as opposed to entire occupations, be exposed to AI-invasion. Estimates associated with the so-called task-based approach are less dramatic

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26   GURKAYNAK, YIMAZ, HAKSEVER, (2016), p. 751.

27   *Ibidem*.

28   *Idem*, p. 752. The remarkable progress made in AI triggered predictions that superintelligence may come about as soon as 2075. See MÜLLER, BOSTROM, (2016), pp. 553-571.

29   See, for example, TEINOSUKE (2018), pp. 8.

30   O*NET is a free online database of occupations classified according to a variety of criteria, available at: www.onetonline.org (10.05.2019).

than those of the adherents to the occupation-based approach:[31] 14% of current occupations run a high risk of automation (between 50 and 70%)[32] with only a 5%[33] risk of total automation.

17. In light of these findings, agreement is reached on the point that total labour replacement will occur in routine-intensive occupations, which require minimal human adaptability and little in the way of formal training.[34] This is not very surprising. In previous industrial revolutions, new technologies have consistently contracted the demand for unqualified workers and increased the demand for qualified ones.[35] The occupations arguably most threatened by labour replacement are, thus, restaurant (fast-food) work, factory work and agriculture.[36] Alternatively, five groups of occupations are – also arguably – the least threatened by automation: care providers (doctors, nurses, etc.), professionals (engineers and scientists), technology professionals (IT), builders (architects, surveyors), managers and executives, educators (childcare workers) and creatives (artists, performers).[37]

18. As negative as it may *prima facie* seem, AI-induced labour replacement is expected to produce two positive indirect effects: first, when a sector is automated, it will create strong, offsetting employment gains amongst downstream customer industries; second, the total factor productivity (TFP) growth in automated sectors will contribute to the aggregate growth in real value added, raising final demand, which in turn will contribute to further employment growth across all sectors.[38] This was the case in Europe: labour demand decreased by 9.6 million jobs as routine-replacing technologies were implemented in routine tasks.[39] The product demand and local demand spillover effects, however, were positive and larger in absolute value, implying an increase in labour demand of 8.7 and 12.4 million jobs across Europe.[40]

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31 See Nedelkoska, Quintini (2018), McKinsey Global Institute (2017).

32 Nedelkoska, Quintini (2018), p. 12.

33 McKinsey Global Institute (2017), p. 5.

34 Wisskirchen *et al*. (2017), pp. 15-17.

35 Autor, Salomons, (2018), p. 11, Autor, Dorn (2009), p. 50.

36 Frey, Osborne (2017), p. 261. In a study on the use of industrial robots, Graetz and Michaels found that the substitution effect on overall employment stemming from the use of industrial robots is fairly minimal, affecting mostly low-skilled and, to a lesser extent, middle-skilled workers. See Graetz, Michaels (2015), p. 21.

37 McKinsey Global Institute (2017).

38 *Idem*, p. 11.

39 Gregory, Salomons, Zierahn (2016), p. 23.

40 *Ibidem*.

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19. It should, however, be mentioned that the pace of automation will largely depend on two factors. First, businesses must be willing to integrate AIs in production and distribution processes: AIs will rapidly replace Human labour, only if the labour market, and the operators therein, are open to substituting labour with capital. Second, the shields raised by regulation should not be disregarded: national, regional and global regulators are already pondering on the types of regulation that are best fitted for AI's inception and reasonable and ethical use. These are, essentially, the contexts in which AI-induced labour displacement should be examined: the market context and the regulatory context.

2.2. The Context of Labour Replacement

20. From a market perspective, there is little doubt that businesses will find intelligent systems to be attractive substitutes to Humans. The obvious reason is that the use of, say, robots is less expensive[41] in comparison to the cost of Human workforce. One working hour costs the German automotive industry more than 40 euros, whereas the use of a robot, in the same industry, costs between 5 and 8 euros per hour, with the added advantage that a robot is able to work 24/7, does not require sick leave, will not get married and have children and will not ask for annual leave.[42] Drawing on this and other such experiences, regulators in developed countries have drafted AI Strategies which are generally favorable to an increased use of intelligent systems. Investments in the AI sector are a good indicator in this regard. In 2016, around 66% of all AI investments were made in the United States.[43] In the EU, investments in robotics increased up to EUR 700 million between 2014 and 2020 and around EUR 1.1 billion were invested in AI-related research and innovation.[44]

21. It should be stressed, however, that most studies on AI focus on developed countries.[45] The global market for intelligent systems is far from being homogenous. For example, highly digitalized societies like South

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41   AUTOR (2015), p. 11.

42   WISSKIRCHEN *et al*. (2017), p. 4.

43   *Finland's Age of Artificial Intelligence. Turning Finland into a leading country in the application of artificial intelligence. Objective and recommendations for measures*. Publications of the Ministry of Economic Affairs and Employment, 47/2017, available at: https://julkaisut.valtioneuvosto.fi/bitstream/handle/10024/160391/TEMrap_47_2017_verkkojulkaisu.pdf (10.05.2019), p. 19.

44   COM(2018) 237 *final*, p. 1.

45   WISSKIRCHEN *et al*. refer to the winners in the AI game. Referring to a 2016 World Economic Forum Report, technically highly equipped countries like Switzerland, the Netherlands, Singapore, Qatar and the US are considered to be well prepared for the 4th industrial revolution. See WISSKIRCHEN *et al*. (2017), pp. 15-17.

Korea and Japan will deal with AI-related labour replacement sooner than most developing countries, where industrialization – let alone automation – has not yet come to full bloom. Moreover, the demographic factors across world regions are different. Developed countries are likely to see a rise in aging workers whereas in developing countries, aging population in the labour market will decrease.[46]

22. Given that, for the time being, a regulatory *statu quo* is preferred, one must wonder if the basic employment concepts (employee, subordination and remuneration) are adaptable enough so that their scopes of application extend to non-Human agents. The fundamental inquiry is: how comparable are AIs to Humans? The concept of autonomy, as a precondition for intelligence, seems to play a key role, because it is the level of autonomy that determines how akin AI is or can be to a 'real' person. It is precisely through the prism of this concept that the possibility for a specific form of AI personhood and the extension of the *ratione personae* scope of the employee status to AIs will be considered hereafter.

3. Non-Human Agents as Employees

3.1. AIs as Persons

3.1.1. The Lack of Full Autonomy…

23. Autonomy essentially translates as self-governance.[47] In labour law, autonomy is understood as *power*[48] expressed in the worker's decisional discretion. Indeed, the type and degree of workers' autonomy is key in drawing the line between salaried and independent work. Independent workers enjoy greater freedom to 'give their own law', as they decide on the personal, substantial and temporal aspects of their work. With regard to employment, aspects such as the time, the place and the content of work are decided by the employer and are accepted by the employee, through the entering in an employment agreement.

24. In the context of AI, autonomy translates into an agent's *capacity* to be autonomous, the main issue being if artificial agents can develop the

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46   See McKinsey Global Institute (2017), p. 59.

47   Etymologically, autonomy means to give oneself one's own law. See Thórisson, Helgasson (2012), p. 3.

48   In political theory (which can be *mutatis mutandis* transposed to other social sciences), power can be defined as the capacity of an individual agent to secure preferences over those of others, or a structure of relations beyond the control of individuals. See Rye (2015), p. 304.

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ability to attain a desired result without Human intervention. If AIs do, one day, achieve full autonomy, they will not fundamentally differ from Human workers, thus justifying a plea in favour of extending the personal scope of the employee status to non-Human agents.

25. Autonomy is a sign of intelligence. An agent is intelligent if she displays high levels of autonomy in situational awareness, cognition and independent assessment.[49] A washing machine has the autonomous capacity to wash a person's clothes. Yet, it has never been suggested to view it as intelligent, due to its lack of broader awareness of its surroundings. It is not the mere presence of autonomy, but the kind of autonomy that distinguishes intelligent from automated systems. Thórisson & Helgasson (2012) consider that the term 'AI' is "*often used to refer to a system's ability to operate without external (human) control. A washing machine, after started by a human operator, is clearly automatic from that point on* (…) *The meaning of autonomy in everyday language seems to require something above and beyond sophisticated automation*."[50] Automata "*execute preprogrammed commands without any functionality for choosing or making decisions*."[51] Intelligent systems' autonomy resides in their capacity to recognize various circumstances and make a decision respectively.[52]

26. An artificial agent with general intelligence would possess full autonomy because she could rely on the available data for the purpose of taking action in a context not included in her initial programming.[53] Such an agent would, indeed, possess four main attributes: real-time,[54] referring to the ability to time-manage and strategize; learning,[55] referring to the capacity to improve performance over time; resource management,[56] referring to the strategies required to deal with information overload; and meta-learning,[57] referring to the ability to make changes.[58]

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49 Zadeh *et al*. (2014), pp. 4ff.

50 Thórisson, Helgasson (2012), p. 3. See also Huang (2008), p. 15.

51 Zadeh *et al*. (2014), p. 4.

52 *Ibidem*.

53 Pennachin, Goertzel (2007), p. 9.

54 Thórisson, Helgasson (2012), p. 5.

55 *Ibidem*. AI can learn in a supervised, unsupervised or reinforced manner, depending on the labelling of the data used at the programming stage. See Wall (2018), p. 56.

56 Wall (2018), p. 6.

57 *Ibidem*.

58 Our explanation of cognitive autonomy and the ability for assessment is voluntarily simplistic. The greater, underlying debate is that of knowledge construction which is a complex, multi-facetted debate. See Di Iorio (2015).

27. In light of the above, a chat-bot is different from a washing machine because it has some situational awareness (presupposing the ability for real-time language processing), but it remains limited to the scope of its labeled data. As AIs approach the AGI and Superintelligence stages, they may develop full autonomy as they will choose their own goals and the manner in which to achieve them.[59] In the current, ANI stage of AI development, intelligent systems – albeit more sophisticated than their automatic cousins – display levels of autonomy that are still far behind those associated with fully self-governing agents such as Humans. It is, precisely, in relation to the degree of self-governance that some scholars have reflected on the issue of AI legal personhood.

3.1.2. … An Obstacle for the Recognition of AI Personhood

28. For Kelsen (1967), *"'to be a person' or 'to have legal personality' is identical with having legal obligations and subjective rights."*[60] Legal personality is a fiction,[61] the result of a normative choice of groups of subjects who are, in the eye of the law, capable of bearing various rights and duties. In this sense, a legal person is whoever the law designates as such:[62] enterprises and corporations are not creatures found in nature; they are constructs with Human, technical and economic resources employed for the purpose of attaining certain goals.[63] Consequently, the attribution of a legal personality is a matter of a legislator's discretion, which is not necessarily required to reflect the natural order of things: companies (artificial creatures) are considered legal persons, whereas dogs (living beings) are assimilated to objects, namely from the viewpoint of liability.

29. AI personhood is a controversial issue. Economists agree that intelligent systems are means of production and should, as such, fall in the category of capital. Available national case law on robots confirms this. For example, the issue in the *Louis Marx & Co. and Gehrig Hoban & Co., Inc. v. United States* case[64] was whether an imported robot could be

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59   Saripan *et al*. (2016), p. 824.

60   Kelsen (1967), p. 172. See also Beran (2013), p. 30.

61   This is the so-called fiction theory. See, [XXX – ed. Comments] (1982), pp. 1645-1646. See also Simmler, Markwalder (2019), p. 17.

62   Smith (1928), p. 284.

63   In EU Competition law, for example, the term 'undertaking' is understood as designating an economic unit for the purpose of the subject-matter of the agreement in question even if in law that economic unit consists of several persons, natural or legal. See ECJ, 12 July 1984, *Hydrotherm*, 170/83, EU:C:1984:271.

64   40 Cust. Ct. 610, 610 (1958) *cit.* in Calo (2016), p. 14.

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viewed as an animate object. It was suggested, by the claimants, that the robot was "*a synthetic man. It is something imitating men.*"[65] The court, however, disagreed and held that "*a robot is a mechanical device or apparatus, a mere automation, that operates through scientific or mechanical media.*"[66] Since *Louis Marx*, the American Courts' stance on robots has been consistent: they are devices, although they bear some likeness to Humans.[67] A similar view seems to be upheld by the Europeans. In a *HERON Robotunits* case,[68] the notion of robot was defined as "*any automated machine programmed to perform specific mechanical functions* in the manner of a man.*" The verdict is clear: robots are devices that resemble Humans functionally, not ontologically.

30. Classifying AIs as objects (capital) presents the additional advantage of maintaining consistency with the 'labour is not a commodity' principle.[69] Indeed, to qualify AI as capital is to accept the latter's commoditization, analogous to that of people in the context of slavery.[70] In pre-industrial times, Human commoditization meant that entire economic systems depended on "*multiple, simultaneous and overlapping forms of inequality*"[71] which labour law has sought to combat for the sake of Human dignity. AI commoditization does not *prima facie* violate the principle of Human dignity, if AIs are viewed as commodities, deprived, as such, of any individuality and subjects to public or private ownership. In this sense, there is an advantage to classifying AIs as means of production because, in the context of standard economy, AIs fall in the category of *financial* rather than that of *Human* capital: the former is permissive to the exercise of ownership rights, the latter is not. As Merriman (2017) explains: "*since the abolition of slavery, individuals are not owned assets*

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65   *Ibidem*.

66   *Idem*, p. 15.

67   Similarly, in the *Comptroller of the Treasury v. Family Entertainment Centres* case, a Maryland special appeals court had to decide whether life-sized, animatronic puppets that dance and sing at Chuckie Cheese restaurants trigger a state tax on food 'where there is furnished a performance.' The court found that a "preprogrammed robot can perform a menial task but, because a pre-programmed robot has no 'skill' and therefore leaves no room for spontaneous human flaw in an exhibition, it cannot 'perform' a piece of music." See *Family Entertainment Centres of Essex, Inc. V. Comptroller of Treasury*, 554 A.2d453 *cit.* in CALO (2016), p. 12.

68   Gen. Court, 26 November 2003, *HERON Robotunits*, T-222/02, EU:T:2003:315 (emphasis added).

69   In 19th-century political economy, markets were essentially seen as things of nature, determining success, failure, wealth and poverty. Polanyi was critical of this view, arguing that "*no society could stand the effects of such a system of crude fictions…unless its human…substance was protected*." See PATON (2010), p. 82. See also SUPIOT (1994), p. 27.

70   BLACKETT (2011), p. 422.

71   *Ibidem*.

in the traditional sense. Human assets are not controlled by the organization beyond the basic transactional exchange of services for pay. Human capital resides within and is owned by – and ultimately controlled by – the employee. Even when organizations invest in their employees to develop employee human capital, the employer is simply 'renting' the use of this human capital via the compensation paid to employees."[72]

31. Tackling the issue of AI personhood from the perspective of legal theory dictates a more nuanced approach. First, the inanimate nature of an entity does not preclude it from being a legal person. Enterprises, and even natural parks,[73] have been attributed legal personalities, although they do not display any Human features. As already mentioned, Nature has very little to do with who is a legal person and who is not. According to Smith, no being or entity is inherently – or naturally – capable of having and exercising rights. Legal personality is, therefore, not an issue of natural capacity, but an issue of interest-preservation.[74]

32. Second, legal personhood includes several types of legal persons in terms of rights and duties. For example, non-emancipated minors are legal persons who, by virtue of a presumption of reduced capacity, cannot exercise the right to enter into agreements, vote, get married, etc. One can imagine a legal status of AIs similar to that of children, implying that, should an AI cause a damage without Human involvement, it would be the person exercising a right of guardianship (owner, user or inceptor of the intelligent system) who would be held to repair it.[75] It follows that: 1. law does not *a priori* preclude AIs from having a legal personality on the grounds of their inanimate nature; 2. law does not *a priori* preclude AIs from benefitting from certain rights and duties, if it is necessary to safeguard some of their interests.[76]

33. There is, however, one capacity that may be of some importance when examining the issue of AI personhood: consciousness, understood as an agent's awareness of the ethical consequences of her conduct.[77]

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72   Merriman (2017), p. 60.

73   Sanders (2018), pp. 207-234.

74   Smith (1928), p. 284.

75   TA (2017)51, pt AD.

76   The 'protection of interests' theory on legal personhood has been confirmed in relation to certain procedural rights of animals. In 2015, a New York judge issued an order to show cause and writ of *habeas corpus* in favour of two chimpanzees who had been subject to biomedical experimentation. New York Supreme Court, 20 April 2015, *The Nonhuman Rights Project INC vs Stony Brook University*, Index N.º: 152736/15.

77   This is the so-called missing-something argument. See Solum (1992), p. 1264.

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34. Ethical assessment as a prerequisite for the possession of legal person-ality is debatable. From the viewpoint of positive law, ethics is not impor-tant. However, ethical assessment is linked to the notion of autonomy in so far as it relates to the agent's capacity for independent reasoning. This is why we have the *doli incapax* exception in criminal law, based on the presumption that minors below a certain age do not have a full capacity to fully grasp the consequences of their actions.[78] The estab-lishment of causation in criminal matters presupposes that if an agent committed a free, deliberate and informed action or omission, she knew, or should have known, of the potential consequences of her actions and that there were no other factors intervening in the occurrence of those consequences.[79] Intention is key in criminal law. It presupposes that there be an agent capable of independently exercising her will in accordance (or not) with a basic ethical code of conduct. This is not yet the case with AIs.

35. An example cited by Turner (2019)[80] is interesting in this regard: in ancient Athens, a statue was pushed off its pedestal and, as it fell, it crushed one person. The statue was then tried, found guilty and, as punishment, pushed into the sea.[81] This case is comical because the defendant was entirely unaware of the damage caused, the trial itself and the gravity of the punishment. A similar comical sentiment would be triggered in a case where a Tesla car, having caused the death of a person,[82] was put on trial and burnt as punishment, if an algorithm, having caused millions of dollars' worth of losses through algo-trading, was shut down or if Amazon's HR algorithm was found guilty of gender discrimination and was also shut down.[83]

36. Alternatively, should we consider that sexbots not having consented to intercourse with Humans are victims of rape?[84] Should those Humans be tried and, if found guilty, punished?… The ethical choices this and other such issues imply are not easy. Suffice it to say that, for the time be-ing, intelligent systems essentially follow orders and do not exercise fully

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78   SARIPAN *et al*. (2016), p. 827.

79   TURNER (2019), p. 60.

80   *Ibidem*.

81   *Idem*, p. 50.

82   See   https://www.theguardian.com/technology/2018/mar/31/tesla-car-crash-autopilot-moun-tain-view (10.05.2019).

83   See   https://mashable.com/article/amazon-sexist-recruiting-algorithm-gender-bias-ai/?europe=true (10.05.2019).

84   See GUTIU (2016).

independent bias. Any biases they may display invariably come – or are presumed to come – from the Humans involved in their programming.[85]

37. This being said, if one day, Superintelligent AI comes about, the issue of AI legal personhood may be considered more seriously. It is difficult to predict how new technologies will evolve and how law, society and economy will respond. As Turner (2019) put it, "*whether it is a question of determining liability for harm or responsibility for beneficial events, causation is not simply a question of objective fact but rather of economic, social and legal policy. The analysis encompasses, whether overtly or covertly, judgments about what types of behavior we want to promote or discourage, as well as issues of justice and distribution. Seen in this light, it should become clear that seeking human behind every AI act is just one of many policy responses that could be chosen*."[86]

38. It is interesting to note how, on the issue of legal personhood, AIs raise a mirror on our own misconceptions on the relation between legal and natural capacity. It turns out that intelligence (as an umbrella concept that includes ethics) is, in fact, an implicit and, ultimately decisive, criterion for being a legal subject. To a large extent, AIs cannot be legal persons because they are prisoners of their own hyper-specialization, with a limited ability to make ethical choices or be aware that their choices may have ethical repercussions. The currently usable AIs are, therefore, idiot-savants, "*very good at one narrow task and useless for anything else, even tasks very similar to the one they were designed for*."[87] Their lack of general intelligence – and therefore full autonomy – is precisely what precludes AIs from being included in the employee status because, in their quality of hyper-specialized, idiot-savant devices, they not only lack the ability to assess how their actions affect others, but also the ability to express how they, themselves, wish to be treated; a feature that is recommended when an employee is getting ready to sign an employment contract.

3.2. AIs as Employees

39. In principle, employment should be established willingly. The employment relationship "*conceals the pattern of mutual expectation between the employee and employer that does not (completely) reveal itself*

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85   Hacker (2018), p. 1144.

86   Gutiu (2016), p. 63.

87   Paisner, Cox, Maynord (2014), p. 2085.

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through formal agreements and express contract terms."[88] Although, in an employment agreement, the contracting parties are not on equal footing – the employee being inferior to the employer in terms of power of decision and economic means – it is important that the worker enter in an employment contract voluntarily. The voluntary establishment of employment expresses a basic contract law principle: a party must freely give consent, with clear knowledge of the terms of contract and the obligations that flow from the latter.[89]

40. As already mentioned, the concept of employment was challenged by some recent tendencies in the labour market. Platform economy and, more generally, atypical work, rely on increasingly complex contractual arrangements,[90] making it difficult to maintain the traditional binary view of work as being either salaried or independent.[91] Atypical work is 'atypical' namely because the unitary vision of the employer is no longer sustainable. Modern work-settings do, indeed, include multiple levels of control, making it difficult to determine where the decisional power preponderantly lies. Observing the difficulty to maintain the conceptual uniformity of the notion of employer, Prassl (2016) suggested a five-step test for the purpose of determining if an entity acts as an employer functionally as opposed to formally.[92]

41. It is interesting to note that, notwithstanding the so-called fissuring[93] – as a mantra chanted by contemporary labour lawyers – of fundamental labour law concepts such as that of employer, two things were considered as established: first, online platforms did not eradicate the Human element. Although work may be performed through such platforms, there was never really any doubt that the agents actually doing the work would be Human. Second, the capacity of the atypical workers to enter in contractual relations with platforms and consumers was seldom brought

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88   Van Bever (2012), p. 177.

89   Many national provisions on employment put the emphasis on the voluntary entry in an employment relationship. In Spain, see Real Decreto Legislativo 2/2015, 'BOE' n.º 255, de 24/10/2015, art. 1(1). See also Art. 3 of the Belgian *Loi relative aux contrats de travail* of 3 July 1978, available at: www.ejustice.just.fgov.be/loi/loi.htm (10.05.2019).

90   In the context of crowd work, Prassl and Risak analysed the so-called three-sided contracts, involving the crowdsourcer, the platform and the crowd, in an attempt to identify the contractual relations in such contexts and give them the proper legal classification. See Prassl, Risak (2016), p. 628.

91   See European Commission Green Paper, *Modernising labour law to meet the challenges of the 21st century*, COM(2006) 708 final, p. 10. See also Meier (2014). For the main labour law issues raised in relation to the online platforms, see De Stefano (2016).

92   See Prassl, Risak (2016), p. 636. For an in-depth study of the so-called functional approach in defining the notion of employer, see Prassl (2015).

93   See Estlund (2018), p. 302.

into question: a person who works as an Uber driver is presumed to have voluntarily entered in a contractual relationship with the Uber platform. In other words, the capacity of workers to agree to various work arrangements, as atypical as they may be, was rarely, if ever, cause for doubt.

42. The issue of capacity is central in the context of automated labour because, as already argued, AIs are not fully autonomous agents and cannot, from today's perspective, make a claim for a form of legal personhood. There are, of course, some cases dealing with Humanoid robots treated as Humans. For example, in 2017, the robot Sophia acquired the nationality of Saudi Arabia,[94] thus rebutting – circumstantially rather than universally – the assumption that only Humans can be considered as a country's nationals. In 2018, a headline of a *Finestra* article read "*HSBC hires Pepper the robot*",[95] the key word being "*hires*". Pepper performs the job of a low-level bank clerk. It greets customers and offers basic information relating to ATMs, online apps, self-service and customer support. When presented with more complex demands, Pepper notifies its human colleagues.[96]

43. Pepper is not HSBC's in-house developed robot. HSBC did not *hire* Pepper (the robot didn't interview with the bank's HR nor did it sign a contract); rather, HSBC *purchased* Pepper, thus proving the historically consistent view[97] that robots are objects as opposed to agents. The Pepper example shows that, from a legal point of view, there isn't – formally speaking – a difference between a robot and a printer. Both are seen as means of production. Although the robot is more sophisticated (intelligent) than the printer, it does not yet possess the level of autonomy that would allow it to leave the category of automata and join the category of Human-like (because more generally intelligent) systems.

44. The Pepper example does, however, constitute a prelude to the mixity (AI-Human) that will, most probably, be the dominant work model in the future: intelligent systems' main purpose will be to assist Humans (and therefore be Intelligence Assisting[98]); when they reach the limits of what they are programmed to do, Humans will intervene. The prophecies on

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94 See https://www.dw.com/en/saudi-arabia-grants-citizenship-to-robot-sophia/a-41150856 (10.05.2019).

95 See https://www.finextra.com/newsarticle/32314/hsbc-hires-pepper-the-robot (10.05.2019).

96 *Ibidem*.

97 Calo (2016), p. 27.

98 This is a suggestion in Korinek, Stiglitz (2017), p. 3.

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labour replacement voiced by economists[99] prove to be, if not absolutely accurate, at least highly plausible: Human intervention will be needed in problem solving and creative thinking; simple and repetitive tasks will be left to intelligent systems. The so-called cobots (collaborative robots) are already becoming prominent in sectors like the food industry, the car industry, agriculture and medicine.

45. The same observation can be made for AIs that do not have physical support like robots. In fact, most intelligent systems take the form of applications, web-sites or platforms that do, indeed, perform certain tasks autonomously but are, above all, designed to help Humans. Research is, presently, the activity at which intelligent systems excel because they are faster, more efficient and make less errors than people.[100] International businesses are already using AIs, namely, for the purpose of market research. In the field of algorithmic trading, for example, algorithms make decisions based on market data and programmed orders to achieve certain results. Quantopian[101] is a crowd-sourced investment firm that gives people the possibility to write investment algorithms while providing capital, education, data, research environment and development platform. Blackrock's Aladdin[102] is an operating system that provides businesses with information on investment helping them to make faster and more efficient decisions.[103]

46. These examples illustrate that AIs are, essentially, non-human, high-performing assistants who facilitate the provision of various services; they are the artificial extensions of those who use them. Consequently, while we may expect that AIs change the content and the organization of work, they are not likely to affect the personal scope of application of the employee status. In a sense, AI's impact on labour is not fundamentally different from that of computers:[104] the major changes will concern how work is done, not who is getting paid to do it.

47. Suppose, however, that the robot Pepper is further developed and may, at some point, pass the Turing test.[105] According to some predictions,

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99   See Nedelkoska, Quintini (2018).

100 For example, for the purpose of Legal Research, magistrates, law firms and researchers use ROSS: www.rossintelligence.com (10.05.2019).

101 See www.quantopian.com (10.05.2019).

102 See www.blackrock.com/aladdin/offerings/aladdin-overview (10.05.2019).

103 See https://www.blackrock.com/aladdin/benefits/risk-managers (10.05.2019).

104 See Autor (2015), p. 11.

105 See Danzieg (2018), pp. 158-174.

Superintelligence may come about as soon as 2075.[106] If we do, one day, reach the stage of Superintelligent humanoid robots (i.e., robots that surpass Humans in all areas), we may then reconsider the possibility of a specific category of non-human employees. The time is, alas, not ripe.

4. AIs and the Criterion of Subordination

4.1. Control over AI

48. The *zeitgeist* in recent years included the new ways in which employers could exercise control over their employees.[107] The extensive literature in this regard will not be examined here. Suffice it to say that the troubling aspect, in the context of standard labour law, was the emerging of new types of indirect control that employers could exercise over workers.

49. The operative concept in relation to the notion of subordination is – yet again – that of autonomy. Subordination has been traditionally defined as control and direction of the worker by the employer. This 'hierarchical power' includes the ability to give orders, to control the execution thereof and to sanction cases of non- or ill-execution. Scholars have correlated the extent of scrutiny over the employees with the type (blue-collar or white-collar) of occupation: "*while blue-collar workers usually have low control over the work environment, more skilled workers have significant autonomy on determining the pace and organization of work, particularly as technological advancements and greater specialization have hindered employers from closely supervising the performance of work*."[108]

50. Assuming that most blue-collar occupations will be entirely automated in the upcoming decades, will there still be a need to exercise personal scrutiny over the intelligent systems who will replace the workers? The answer is *prima facie* negative. Although Humans may be in positions of command and control,[109] the Human-AI relationship is not one of hierarchy of one person over another, since AIs are viewed as commodities.

51. Curious scenarios may, however, arise as shown in the *Columbus-America Discovery Group, Inc. v. The Unidentified*, *Wrecked, and Abandoned*

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106 See Müller, Bostrom (2016).

107 See, for example, Prassl, Risak (2016), p. 628.

108 *Ibidem*.

109 See Davidov (2017).

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Vessel, S.S. Central America[110]. In the 1980s, robots were used in the search for a ship sunk in the Atlantic Ocean some 150 years prior. A treasure was found in the ship's remains, raising the issue of whether the explorers from the Columbus-American Discovery Group could gain custody, control and possession of the finds, even though they did not directly make the discovery. The US court found that, sending robots *in lieu* of divers was enough to confirm the presence of Human control and possession, because the robots performed tasks and were "*able to generate live images of the wreck and had the further 'capability to manipulate the environment'* at the direction of people."[111] This case es-tablished what later became known as the test for telepossession which includes four steps for determining if a robot acts in an autonomous or a controlled manner. These steps are: "*(1) locating the wreckage, (2) real-time imaging, (3) placement of a robot near the wreckage with the ability to manipulate objects therein, and* [most importantly] *(4) intent to exercise control*."[112]

52. Human control (or direction) is key. Although the robot involved in the treasure hunt performed some basic activities autonomously, it was di-rected – or irrefutably presumed to have been directed – by people at all times. One may argue that this presumption is a symptom of our collective mental barrier on perceiving intelligent systems as something other than automata. Certainly, the future may push us to go past this mental stalemate:[113] suppose a robot was used for scientific exploration of shipwrecks on the sea floor but it stumbled upon entirely new species of sea flora or fauna. This scenario is interesting because, unlike the *Co-lumbus-America* case, the intention of the Humans-in-control would be one (exploring ship-wrecks) and the discovery made by the robot would be another (e.g., a new species of fish). The robot would not *per se* be directed to make the discovery, implying the absence of direct Human intent to exercise control (i.e., the fourth requirement of the teleposses-sion test).

53. Who would then be entitled to a right of custody, control and posses-sion? The issue of AI legal personhood re-emerges. A pro-AI person-hood argument would be that, in a case where Human intention is clearly absent and a robot makes unexpected gains, the Human-robot relationship should be assimilated to that between an employer and an

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110 1989 A.M.C. 1955 (1989) *cit*. *in* Calo (2016), p. 17.

111 *Idem*, p. 18, emphasis added.

112 *Ibidem*.

113 *Idem*, p. 19.

employee. In research and development companies – depending on world regions – the employers get the intellectual property and future profits from the employees' inventions and innovations. In our example, while the Humans-in-control could ultimately benefit from that discovery, the robot would be entitled to some credit. In other words, there may be circumstances, such as the 'unexpected gains' scenario, that may encourage us to ponder on whether the, today irrefutable, presumption of Human direction, can or should be rebutted. Here again, our inclination is to give a negative response for one, fairly simple reason: while robots may, indeed, accidentally make a groundbreaking discovery, it is the Humans supervising the robot who would *recognize* the magnitude of the discovery made. The consciousness factor thus reappears: unless a robot was programmed to identify that a certain species is new, it will fail to do so; the Humans in charge of the robot, however, will be able to assess the importance of the discovery that the robot would remain unaware of. The implication here is that, from the viewpoint of subordination, in the sense of labour law, the control that people (owners and/or users of AIs) exercise over AIs continues to derive from a right of ownership and/or use, not from an agreed upon, personal relationship between an employer and an employee. In other words, AIs remain commodities and, as such, cannot the object of employers' supervision. This being said, they may be the means through which this supervision is performed.

4.2. Control through AI

54. Some intelligent systems have functionalities that allow for the measuring of one's daily activities and inferring one's levels of productivity. This modern, automated way of scrutinizing employees may be saluted as a step forward and away from the traditional, personal scrutiny of employers. However, modernity is not risk-free as some aspects of the AI-assisted monitoring continue to raise serious questions. How can performance be measured and, more importantly, how can an intelligent system be programmed to measure it? Examples of systems like ISAAC,[114] currently used by international businesses, can provide some clarity in this regard.[115]

114　See www.statustoday.com (10.05.2019). Another example is the 'knowyourday' software (www.knowyourday.ai, 10.05.2019).

115　According to a Gartner survey, more than 50% of companies with a turnover above $750 million use digital data-gathering tools to monitor employee activities and performance. See: https://www.forbes.com/sites/bernardmarr/2019/05/29/artificial-intelligence-in-the-workplace-how-ai-is-transforming-your-employee-experience/ (10.05.2019).

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55. ISAAC is an intelligent system that, not only measures certain parameters relative to work performance (the most obvious being the time spent in front of a computer) but also builds a comprehensive image of the employees' profile.[116] While ISAAC and other such systems can provide data that may, indeed, be used for the purpose of better employee management, there is an obvious risk of an AI 'going too far' in scrutinizing a worker and, perhaps, misrepresenting her actual performance.

56. On a personal level, AI monitoring may gravely affect the employees' psychological health: "*people are deemed not to be working if they take their hands off the keyboard for five minutes. But they could be thinking, and that doesn't get measured. What is this doing for innovation, which needs creative workers?*"[117] When monitored by AIs, employees feel a constant pressure because they know they are being monitored, but do not know what is the content of the data being processed.

57. From a European perspective, this opaque, Orwellian scrutiny is problematic in relation to privacy and Data protection. The European Court of Human Rights (ECtHR) – having considered that the notion of private life encompasses activities of professional and business nature[118] – ruled that telephone, e-mail and Internet usage at work are covered by Article 8 ECtHR.[119] An employee's electronic communication accessed by the employer cannot be grounds for the former's dismissal[120] and, when the employer is habilitated to verify the employee's private use of a company's item (like a PC), she must not overstep the margin of appreciation available to her.[121]

58. In a context where employees are monitored by an intelligent system without prior indication of the type and content of the monitored data, the issue of reasonable expectations arises. In a work setting, the question is that of the conduct that an employee can reasonably expect to be the object of the employer's monitoring.[122] It was established in the *Halford*

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116 For example, ISAAC identifies the so-called central workers, in charge of holding the network together; the knowledge brokers, perceived as critical connections to external knowledge, and the peripheral workers who present the risk of exiting.

117 Article in The Guardian, 7 August 2019, available at: https://www.theguardian.com/technology/2019/apr/07/uk-businesses-using-artifical-intelligence-to-monitor-staff-activity (10.05.2019).

118 ECtHR, 16 December 1992, *Niemietz v. Germany*, App. N.º 13710/88, § 29.

119 ECtHR, 25 June 1997, *Halford v. UK*, Appp. N.º 20605/92, ECtHR, 3 April 2007, *Copland v. UK*, App. N.º 62617/00.

120 ECTHR, 5 September 2017, *Barbulescu v. Romania*, App. N.º 61496/08.

121 ECtHR, 22 February 2018, *Libert v. France*, App. N.º 588/13.

122 In the US, the reasonable expectations doctrine originated in the Katz v US case. See, Katz v US, n.º 35 (1967), p. 361.

case[123] that, without a warning that calls are intercepted, a person may have reasonable expectation as to the privacy of such calls.[124] In the *Copland* case,[125] the same expectation extended to e-mail and Internet usage.[126] In light of this case law, an employer would be precluded from using ISACC to process, say, e-mails exchanged between co-workers in which they criticize their superiors. If there is no warning from the employer that communications between colleagues are scrutinized, the employees could reasonably expect that their private exchange in the workplace remains private.

59. The reasonable expectations doctrine expresses a traditional conundrum in privacy matters i.e., the tracing of the limits on the intrusions in a person's private life. Under the ECtHR, any access to, and processing of, personal data must comply with three main requirements, namely: legality, meaning that a domestic law must indicate with reasonable clarity the scope and manner of exercise of the relevant discretion conferred on the public authorities;[127] the pursuit of legitimate aims, such as the prevention of crime through the disclosure of certain types of data;[128] and proportionality. Similar requirements are found in EU law. As per Article 52(1) of the Charter of Fundamental Rights (Charter), the limitations on the exercise of the rights and freedoms recognized by the Charter must be provided for by law, respect the essence of the right to data protection, meet the requirements of necessity and proportionality[129] and meet the objectives of general interest recognized by the EU or the need to protect the rights and freedoms of others.[130]

60. One increasingly important aspect, expressed in Art. 52(1) of the Charter, is data protection, governed by the General Data Protection Regulation (GDPR).[131] The use of a system such as ISAAC for the purpose of monitoring a company's employees qualifies as data processing, within

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123 ECtHR, 25 June1997, *Halford v. UK*, App. N.º 20605/92.

124 *Idem*, § 45.

125 ECtHR, 3 April 2007, *Copland v UK*, App. N.º 62617/00, § 42.

126 *Idem*, § 42.

127 ECtHR, 4 May 2000, *Rotaru v. Romania*, App. N.º 28341/95, § 61.

128 ECtHR, 28 January 2003, *Peck v. UK*, App. N.º 44647/98.

129   ECJ, 9 November 2010, *Schecke and Eifert*, C-92/09 and C-93/09, EU:C:2010:662.

130   ECJ, 17 October 2013, *Schwarz*, C-291/12, EU:C:2013:670.

131   There are other regional and international instruments on Data Protection such as the Convention for the Protection of Individuals with Regard to Automatic Processing of Personal Data, 28 January 1981, ETC N.º 108 and UN General Assembly, 18 December 204, The Right to Privacy in a Digital Age, A/73/589/Add.2 DR XVII. In this study, we shall focus on the GDPR.

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the meaning of the GDPR.[132] The company using ISAAC qualifies as a controller, in so far as it determines the purposes and means of the processing of personal data.[133] In this context, the general requirements on data processing, set out in Article 5 GDPR,[134] could apply in the context of AI employee monitoring. We shall not proceed to a detailed study of all said requirements; we shall only focus on two, interrelated aspects: lawfulness and transparency.

61. One of the key requirements for data processing to be considered lawful is the expression of consent from the data subject.[135] Consent should be given freely and explicitly (written declaration)[136] and can be withdrawn at any time.[137] In view of soliciting the subjects' consent, the processor is held to observe the principle of transparency: the data subjects must receive clear and intelligible information on why the data are processed.[138] Any information and communication relating to the processing of personal data should be "*easily accessible and easy to understand, and that clear and plain language be used*."[139]

62. The principle of transparency concerns, in particular, "*information to the data subjects on the identity of the controller and the purposes of the processing and further information to ensure fair and transparent processing in respect of the natural persons concerned and their right to obtain confirmation and communication of personal data concerning them which are being processed*."[140] Moreover, the data subjects "*should be made aware of risks, rules, safeguards and rights in relation to the processing of personal data and how to exercise their rights in relation to such processing. In particular, the specific purposes for which personal data are processed should be explicit and legitimate and determined at the time of the collection of the personal data*."[141]

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132 Art. 4 (2) GDPR.

133   Art. 4(7) GDPR. If a company uses an AI to monitor the employees of another company, it acts as a processor, defined as a natural or legal person, public authority, agency or other body which processes personal data on behalf of the controller (Art. 4(8) GDPR).

134   These principles include lawfulness (art. 5-a), specific, explicit and legitimate purposes to the data collection (art. 5-b), data minimization, essentially translating to the respect of the principle of necessity (art. 5-c), accuracy (art. 5-d), data storage (art. 5-e), security (art. 5-f).

135 Art. 6 GDPR.

136 Art. 7(2) GDPR.

137 Art. 7(4) GDPR.

138 Art. 7(3) GDPR.

139 Rec. 39, GDPR.

140 *Ibidem*.

141 *Ibidem*.

63. It follows that, not only should monitored employees be informed of the content of the intended data processing, but they should also be able to access the data collected and disclosed to their employer.[142]

64. Moreover, the monitored employees could rely on Articles 21 and 22 GDPR.[143] On the grounds of Article 21(1) GDPR, the employee can object, at any time, to automated individual decision-making, forcing the employer to no longer process the personal data unless there is "*compelling legitimate grounds for the processing which override the interests, rights and freedoms of the data subject or for the establishment, exercise or defense of legal claims*." Article 22(1) GDPR stipulates that a data subject has the right not to be subject to a decision based on automated processing, including profiling, "*which produces legal effects concerning him or her or similarly significantly affects him or her*." This provision does not apply when the automated decision "*is necessary for entering into, or performance of, a contract between the data subject and a data controller*."[144] In an employment context, and given the case law of the European Courts on the data that can actually be collected and processed by employers in relation to the right to privacy, it remains to be seen how the exceptions set out in Article 22(2) GDPR will be interpreted in the future. Future case law will hopefully shed more light on what can be considered as a necessary automated decision for the purpose of executing an employment contract.[145]

65. Of course, the inceptors and users of ISAAC may argue that the use of intelligent systems also allows for the enhancement of the employees' well-being and protection. Indeed, ISAAC is able to determine if an employee is overworked through detecting if she is working in the evenings or on weekends, thus giving her employer the possibility to better comply with any legal requirements on working time. However, notwithstanding the uses of AI monitoring that may reinforce employees' protection (against burn out for example), such use must not be done in violation of the basic principles on data processing and data protection.

66. The conclusion that can be drawn here includes an observation on the current state of automated employee monitoring and a remark on its future.

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142 ECJ, 7 May 2009, *Rijkeboer*, C-553/07, EU:C:2009:293. In the context of the ECtHR, see ECtHR, 24 August 2011, *K.H. et al. V. Slovakia*, App. N.º 32881/04, §§ 46 seq.

143 See Otto (2019).

144 Art. 22(2)(b) GDPR.

145 See Hendrickx (2019), p. 384. This is an example of a case of entering in a contract. However, the interpretation of the criterion of necessity within the meaning of Art. 22(2) GDPR is yet to be clarified in legal practice and case law.

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At present, companies that monitor their employees through the use of artificial systems seem to hold their employees in a state of anxiety-provoking ignorance as regards the type of personal data collected and assessed. Merely informing an employee of automated monitoring is not the same as formally acquiring her consent for such monitoring to take place. In the future, improvements are needed regarding transparency, namely for the purpose of determining that the processed employees' data are strictly linked to the work performance and do not include data on the employees' racial or ethnic origin, political opinions, religious or philosophical beliefs, or trade union membership, genetic data, health or the worker's sex life or sexual orientation.[146] Moreover, there are some doubts on the fact of letting an intelligent system be the sole judge of a Human worker's performance. AIs will, no doubt, facilitate the monitoring for employers, but will not discharge them entirely from taking a more personal interest in their employees' performance and well-being.[147] Hopefully, most future employers will view work as being something other than time spent typing: work periods spent in meetings, thinking and brain-storming, interacting with colleagues and superiors and break periods are just as important as the periods when one is glued to one's computer screen.

5. The Obsolescence of Remuneration?

67. Remuneration is a traditional classifier of employment: the entity or agent acting as employer is legally and contractually bound to compensate her workers for their efforts.[148] Remuneration sanctions the economic character of the salaried activity for both the worker and the employer. For the employee, it serves the purpose of subsistence and takes the form of monetary compensation although, in some cases, it may also be in kind.[149] For businesses acting as employers, salary costs are incurred so that the activity they pursue ultimately produces profit.

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146   Art. 9(1) GDPR. Exceptions to the principle set out in this provision are stipulated in art. 9(2) GDPR.

147   HENDRICKX speaks of right to Human interaction. See HENDRICKX (2019), p. 385.

148 See, for example, Spanish Real Decreto Legislativo 2/2015, cit. *supra*, Art. 26-1(1); Articles L3241-1 to L3245-1 of the French Labour Code. In EU law, a person can qualify as a migrant worker within the meaning of Art. 45 TFEU if she provides services, under the supervision of another person and for remuneration. See ECJ, 3 July 1986, *Lawrie Blum*, 66/85, EU:C:1986:284, § 17.

149 In EU law, see, for example,. ECJ, 7 September 2004, *Trojani*, C-456/02, EU:C:2004:488. See also Spanish Real Decreto Legislativo 2/2015, cit. *supra*, Art. 26-1(1), in Belgium, Art. 6 of *Loi concernant la protection de la rémunération des travailleurs,* 12 April 1965, available at: http://www.ejustice.just.fgov.be/cgi_loi/change_lg.pl?cn=1965041204&la=F&language=fr&table_name=loi.

68. In this context, if AIs present the prospect of reducing salary costs (i.e., the number of paid workers) while increasing productivity, businesses will not hesitate in replacing Human workers with intelligent systems. The four Hicks-Marshall Laws of Derived Demand[150] confirm this observation. The AI-to-Human substitution in routine-intensive professions is very likely because: 1. the price elasticity of demand for a product is high; 2. the means of production (the AIs) can be easily substituted for labour; 3. the supply of other means of production is highly elastic and 4. the cost of employing the category of labour is a large share of the total costs of production.[151] In sum, if companies – being the rational economic agents that they are[152] – can substitute human labour with more cost-effective means of production, they will!

69. Notwithstanding the fact that economically, AIs are very attractive commodities for businesses, their increased use will also translate into the fact that the Human workers replaced by AIs will no longer be able to rely on their work for sustenance. Technological unemployment will be on the rise although some economists have sent messages of encouragement in that: 1. said unemployment will be temporary and will reduce as the number of highly qualified workers increases; 2. AI-induced labour replacement will not be total, Humans will continue to be present (and, in some sectors, prevalent) in the labour market and will continue to receive remuneration for their work. As long as there are Human workers in the labour market, remuneration will be maintained, serving its original purpose namely, subsistence.

70. In a future, highly automated labour market, the issue that may arise – and that is already studied by some scholars – is that of compensating robots for their work. The notion of remuneration would then be fundamentally affected because the purpose of subsistence would be out of the equation: robots (and other AIs) do not need remuneration to live, pay rent, buy food, support a family, etc. What would, then, be the point of paying wages? However understandable, this position can be seen as deeply upsetting with regard to the principle of redistribution of resources. In an entirely automated market, companies would maximize profits while bringing salary costs close to zero. Eliminating salary costs in such a way would translate into reducing the employers' social contributions causing Social Security Schemes considerable losses in revenues.

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150 See CHIRINKO, MALLICK (2006).

151 EHRENBERG, SMITH (2006), p. 97.

152   Rationality of economic operators is, indeed, the fundamental assumption in standard economy. See, for example, ROBINSON (1969), p. 15.

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71. In an attempt to reconcile market rationality (businesses should use AIs to realize profits) and social justice (businesses in automated sectors should continue contributing to Social Security Schemes) some have suggested the creation of the so-called robot tax. Oberson (2017) tied the latter to the right of ownership.[153] An enterprise using a robot, as-similated to movable property, would pay a tax, the amount of which would be equivalent to the assumed leasable amount of the robot per month. This would generate a continuous stream of revenues that could then be used by regulators to finance Social Security Schemes such as unemployment benefits. The robot tax is an interesting proposition as it essentially suggests the creation of a specific type of wage that could, indeed, be one of the possible sources for financing Social Security ben-efits, namely unemployment benefits.

72. Of course, in order for the robot tax to be seriously considered, automa-tion of the labour market should attain a relatively high level. If one ima-gines that one day, the labour market will be entirely automated, there would be no human workers left to receive salaries. How should their subsistence be guaranteed then? Some scholars are toying with the idea of Universal Basic Income (UBI).

73. Unlike the robot tax, as a revenue that compensates work, but does not serve subsistence, UBI is a revenue that is not compensatory, but aims at guaranteeing the beneficiaries' subsistence. The creation of UBI implies a major paradigm shift: subsistence would no longer be the pur-pose of labour, it would become a universal right.[154]

74. According to Van Parijs (2017), UBI would be an income paid to all, regardless of their professional status, social status, living situation and place of residence.[155] UBI is tempting because it relies on resource equality, uncoditionality and universality. These traits are, in fact, char-acteristics of the three main allocation modes: UBI would be a resource aimed at ensuring subsistence, allocated universally, i.e., regardless of a person's individual status, and would not be a compensation for efforts made.

75. However attractive, the idea of UBI is – from today's perspective – farfetched for two, very practical reasons. First, how should UBI be financed? A robot tax is one option. However, in order for a Social Se-curity system to support the subsistence of potentially large numbers of persons, there would have to be a more substantial redesigning of

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153 Oberson (2017).

154   See Nicole-Drancourt (2013).

155 See Van Parijs, Vanderborght (2017).

a country's Social Security Scheme and Tax System. UBI adversaries claim that UBI would increase public spending while entailing losses in tax revenue. There are, however, those who suggest that a rob-Peter-to-pay-Paul approach may not be as costly as it may seem. In his study of the Canadian social welfare system, Pereira (2017) argues that a smarter approach in designing already existing Social Security Schemes may actually lead to increased public gains: UBI would present new saving possibilities, it would not require the raising of taxes to unacceptable levels; bureaucratic costs would be reduced and sources other than income would be used for UBI financing, if required.[156]

76. The second practical issue is the amount of UBI. The purpose of resource equality is certainly not to bring people down to the line of poverty, but to ensure a decent lifestyle… Whatever 'decent' means. There is some danger in letting public regulators decide on the amount presumed to ensure people's suitable subsistence which would, at the same time, not dissuade them from seeking employment in view of earning higher revenues.[157] This debate remains open. In Finland, there was a test group of 1.500 people who received a monthly revenue of EUR 550, in addition to other social benefits. If a person found employment, her income was subject to a higher tax (43%) aimed at compensating for the fact that, for a given period of time, that person was a UBI beneficiary.

77. Although scholars and regulators should further reflect on the best means and methods for guaranteeing that the workers of tomorrow will have some level of base-line security,[158] UBI will most probably not be a first-choice solution to automation because, as already mentioned, the labour market will not be entirely automated any time soon; work will continue to be done, in large part, by Human workers. In this context, remuneration will continue: 1. to be perceived by Human workers, 2. to serve the purpose of subsistence, 3. to compensate work performance.

6. Concluding Remarks

78. Two series of conclusions can be drawn from the arguments presented: one dealing with AI's effect on labour law, the other dealing with AI's effect on labour policy.

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156 Pereira (2017).

157 Monti, Federico (2016), p. 104.

158 Estlund (2018), p. 320.

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79. As regards labour law, future statutory changes will depend on the level of automation of the labour market. Since most scholars predict that the latter will remain only partially automated in the upcoming few decades, Human workers will not become extinct and artificial agents will continue to be viewed as means of production, at least until we reach the AGI stage.

80. As means of production, AIs are not likely to benefit from the employee status, namely because they lack the capacity to voluntarily enter in employment relationship. Moreover, the control exercised over AIs cannot be assimilated to that traditionally associated with subordination, given that AIs execute pre-programmed orders and have limited autonomy in deciding on how to attain a preassigned goal. Finally, AIs do not need remuneration for the purpose of subsistence. In sum, from a *ratione materiae* perspective, employment's constitutive elements (work performance, subordination and remuneration) will probably not be conceptually altered due to AI's 'take-over' of labour. This implies, from a *ratione personae* perspective, that Humans will continue to be the exclusive subjects of labour law. It is, in this sense, highly unlikely that the personal scope of application of the latter will extend to non-Human agents any time soon.

81. This being said, several scholars have pointed out that automation will affect labour law's core values. Estlund (2018) wrote: "*we urgently need to reintroduce the discourse related to a human right to work, once again shifting the focus from labour rights to the dignity of the person.*"[159] Human dignity will – yet again – be front and center, given that automation, albeit partial, will polarize the labour market, creating a sharp and deeply felt wage inequality between the qualified and the less qualified workers. This will call for a reinforcement of labour law's protective mission. We felt the need for such reinforcement in the context of non-standard work, which leads to a "*rampant increase of social inequality, the exclusion of some categories of workers from labour rights protection and the need, more generally* (…) *to reinforce those protections.*"[160]

82. Ensuring better protection of the workers is an issue of labour policy (the second series of conclusions mentioned above). Regulators will have to raise defensive shields against the risk that workers be altogether deprived of work and means of subsistence, with little or no possibility to re-enter the automated labour market. Preventing and fighting off

159 *Idem*, p. 708.
160 *Idem*, p. 698.

technological unemployment will, indeed, be one of the main goals of future regulators. As stressed by Nedelkoska *et al*. (2018),[161] education and on-the-job training will be key in attaining this goal. This can be done through adjusting education and training programs in view of allowing the workers to become more AI-literate and/or develop skills that are likely to be high-in-demand in future automated sectors. In entirely automated sectors (essentially concerning blue-collar professions), the challenge will be greater: how can a fast-food restaurant employee diversify her skills if these are very few to begin with? This worker would presumably be obliged to further her training and acquire an altogether new set of skills which will require time and resources. It will, therefore, be imperative for labour policies to set out the guidelines and strategies that will enable a smoother transition from all-Human to partially or entirely dehumanized sectors in the labour market.

83. It follows that, through its effect on labour, automation will affect labour law, not in its concepts but in its values, the reinforcement of which will be triggered by a peculiar labour paradox: the progressive dehumanizing of the labour market will not eliminate, but reaffirm the place of the Human as the ultimate beneficiary of any AI-related, future regulatory choices.

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161 NEDELKOSKA *et al.* (2018).

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