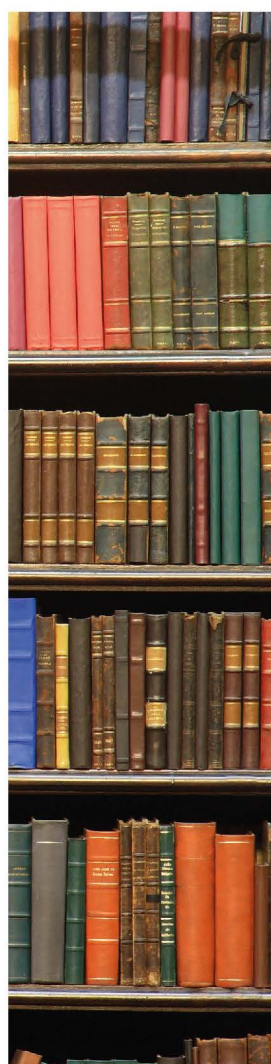


DIRECTORATE-GENERAL FOR INTERNAL POLICIES

**POLICY DEPARTMENT** **C**  
**CITIZENS' RIGHTS AND CONSTITUTIONAL AFFAIRS**



# European Civil Law Rules in Robotics

STUDY for the JURI Committee





**DIRECTORATE-GENERAL FOR INTERNAL POLICIES**  
**POLICY DEPARTMENT C: CITIZENS' RIGHTS AND**  
**CONSTITUTIONAL AFFAIRS**

**LEGAL AFFAIRS**

**EUROPEAN CIVIL LAW RULES IN**  
**ROBOTICS**

**STUDY**

**Abstract**

The European Parliament's Legal Affairs Committee commissioned this study to evaluate and analyse, from a legal and ethical perspective, a number of future European civil law rules in robotics.

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To contact the Policy Department for "Citizens' Rights and Constitutional Affairs" or to subscribe to its newsletter, please write to: [poldep-citizens@europarl.europa.eu](mailto:poldep-citizens@europarl.europa.eu)

## **Research administrator responsible**

Udo Bux  
Policy Department C: Citizens' Rights and Constitutional Affairs  
European Parliament  
B-1047 Brussels  
E-mail: [poldep-citizens@europarl.europa.eu](mailto:poldep-citizens@europarl.europa.eu)

## **AUTHOR**

Nathalie Nevejans, Université d'Artois, Centre de Recherche en Droit Ethique et Procédures (EA n° 2471)

## **EDITORIAL ASSISTANT**

Monika Laura LAZARUK

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## LIST OF ABBREVIATIONS

- Bull. civ.** Bulletin des arrêts des chambres civiles de la Cour de cassation française (= French journal)
- Cass. com.** Commercial division of the French *Cour de cassation*
- chap.** Chapter
- coll.** Collection
- comm.** Comments
- Comm. com.** Communication Commerce électronique (=French journal)
- electr.**
- D.** Recueil Dalloz (=French journal)
- ECHR** European Court of Human Rights
- ed.** Edited by
- NBIC** Nanotechnology (N), biotechnology (B), information technology (I) and cognitive science (C)
- obs.** Observations
- OECD** Organisation for Economic Co-operation and Development
- pub.** Publisher
- req.** Request
- RFID** Radio Frequency Identification
- trad.** Traduction
- Vol.** Volume

## EXECUTIVE SUMMARY

With a view to developments in robotics and artificial intelligence, the Committee on Legal Affairs deemed it time for the European Union to take action in respect of the legal and ethical issues raised by these new technologies. To this end, the JURI Committee set up a working group in 2015 with the primary aim of drawing up “European” civil law rules in this area (*lege ferenda*). While respecting the European Commission’s right of initiative, on 31 May 2016 this group delivered a draft report (Initiative – Article 46 of the EP’s Rules of procedure) setting out a series of recommendations on civil law rules on robotics<sup>1</sup>. This draft includes a motion for a European Parliament resolution, accompanied by an annex containing detailed recommendations for the content of a possible legislative proposal. It also includes an explanatory statement which points out that the aim of the future instrument is to lay down the “general and ethical principles governing the development of robotics and artificial intelligence for civil purposes”.

Scientific research on these emerging technologies seems to imply that they will change the face of society. Therefore, even if robots are not yet commonplace, the time has come to legislate.

Once a new legal and ethical sector surfaces, a general approach to the big theoretical questions needs to be found in the first instance, so as to eliminate any misunderstanding or misconceptions about robotics and artificial intelligence.

When we consider civil liability in robotics, we come up against fanciful visions about robots. Here we must resist calls to establish a legal personality based on science fiction. This will become all the more crucial once the liability law solutions adopted in respect of autonomous robots determine whether this new market booms or busts.

Developments in civil robotics and artificial intelligence also call for reflection on the big ethical questions they raise. This analysis is complicated by the fact that it is difficult to predict what sometimes remains an experiment. In this regard, it is essential that the big ethical principles which will come to govern robotics develop in perfect harmony with Europe’s humanist values. The “Charter on Robotics”, which was introduced in the draft report, moves in this direction.

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<sup>1</sup> PE582.443 2015/2103(INL)

## 1. PRELIMINARY REMARKS

### KEY FINDINGS

The motion for a resolution calls for the immediate creation of a legislative instrument governing robotics and artificial intelligence to anticipate any scientific developments foreseeable over the medium term, and which could be adapted to track progress (paragraph 25). There is a need to draft such a rolling text in certain legal sectors, particularly, it would seem, in response to the big ethical questions facing humanity.

Paragraph 25 of the draft motion for a resolution not only recommends composing a legislative instrument "on legal questions related to the development of robotics and artificial intelligence foreseeable in the next 10-15 years", but also suggests "once technological developments allow the possibility for robots whose degree of autonomy is higher than what is reasonably predictable at present to be developed, [that] an update of the relevant legislation [be proposed] in due time". We therefore need to start asking ourselves whether a legislative instrument on these technologies is truly necessary and, if so, what this future text might look like.

1/ Have we already reached the point where we need to devise a legislative instrument on robotics and artificial intelligence? The classic line of thinking is that legislating becomes necessary once a societal or technological change calls for an adequate legal framework. Once each home and business has an autonomous robot, society will change dramatically. People will work, cooperate, interact, have fun, live, and perhaps even fall in love, with highly sophisticated machines. Society will need to reconsider humanity's place in the face of these technologies. The presence of robots will give rise to unresolved questions and issues. The split between past and future societal models will be such that we cannot expect to take the emergence of information technology, the Internet or mobile phones as a starting point for reflection.

However, new legislation ought to be required particularly in areas where the current legal response would be inappropriate or inexistent.

For the time being, many legal sectors are coping well with the current and impending emergence of autonomous robots since only a few adjustments are needed on a case-by-case basis, as, for example, with literary and artistic property. Here the question that European policymakers might want to consider relates to the status of a robot's own creations, as is rightly said in paragraph 10 of the motion for a resolution. Can an autonomous robot be deemed the author of an intellectual work, entitling it to copyright protection<sup>2</sup>? There is no need to overhaul the whole body of literary and artistic property law, but merely to adjust it in the light of the autonomous robots' new/future abilities.

By contrast, civil liability law, for example, might be less easily applied to developments in autonomous robotics, particularly in a scenario where a machine might cause damage that cannot be easily traced back to human error. Whole chapters on civil liability law might, then, need rethinking, including basic civil liability law, accountability for damage, or its social relevance.

Above all, the ethical questions associated with the complete transformation that robots and artificial intelligence will bring to society need analysing in general terms, in order to

<sup>2</sup> On this question, see our work *Traité de droit et d'éthique de la robotique civile*, LEH édition, Bordeaux, coll. "Science, éthique et société", forthcoming, December 2016, No 297 et seq.



maintain a world rooted in humanist values. In the face of human and societal challenges, in the absence of a binding text setting out the new ethical principles intended to protect humanity, we should at the very least consider developing an ethical response, along the lines of the draft report's Charter on Robotics.

2/ How might we draw up a future legislative instrument considering the changes that are expected to take place in robotics and artificial intelligence? The idea explored in paragraph 25 to adopt an instrument for a 10 to 15-year period is very interesting, since a document concerning a field which advances at the pace of robotics and artificial intelligence would soon become obsolete. Therefore, composing a text that anticipates the changes foreseeable over the next 10 to 15 years is appropriate. However, in highly innovative sectors, a new discovery may throw up entirely unforeseeable prospects. The NBIC convergence, at the intersection of progress in nanotechnology (N), biotechnology (B), information technology (I) and cognitive science (C), could open the door to new avenues of research in robotics. One need only think of the opportunities that would arise from the discovery of a miniature, long-term energy source allowing microrobots and nanorobots to power themselves. Thus, it would be possible for the future instrument to take account of only foreseeable – and not unforeseeable – progress. In this regard, paragraph 25 emphasises the importance of reviewing legislative instruments once technological changes overtake current forecasts.

## 2. GENERAL CONSIDERATIONS ON ROBOTS: THE NOTION OF THE ROBOT, ITS IMPLICATIONS AND THE QUESTION OF CONSCIOUSNESS

### KEY FINDINGS

The motion for a resolution rightly provides a common European definition of the various categories of autonomous robot (paragraph 1). However, it would be worth building upon this definition to better determine the scope of the future text.

Moreover, the terminology used in the future instrument also needs assessing. The notion of the "smart robot" poses the greatest challenge since it could clash with civil society. In the end, only the term "autonomous robot" should be deemed pertinent.

Finally, for scientific and cultural reasons, the draft report is wrong to mention robot consciousness and the role of Asimov's Laws (paragraph L).

This section takes a general look at the notion of the robot and its implications. It deals with the question of consciousness, setting the boundaries of thought in robotics and artificial intelligence.

### 2.1. A common definition of smart autonomous robots

Paragraph 1 of the motion for a resolution suggests that the Commission "propose a common European definition of smart autonomous robots and their subcategories by taking into consideration the following characteristics of an intelligent robot:

- acquires autonomy through sensors and/or by exchanging data with its environment (inter-connectivity) and trades and analyses data;
- is self-learning (optional criterion);
- has a physical support;
- adapts its behaviours and actions to its environment".

A common definition would appear to be essential. Yet defining robots is no easy task<sup>3</sup> in the absence of any real consensus within the global scientific community. Current research believes that a robot, in the broad sense, should fulfil several conditions, and consist of a physical machine which is aware of and able to act upon its surroundings and which can make decisions<sup>4</sup>. Only some robots may also have the ability to learn, communicate and interact, and may even have a degree of autonomy<sup>5</sup>. The proposed definition in paragraph 1 relates solely to smart autonomous — and so not all — robots, as stated in the draft report. However, the cited characteristics warrant further clarification to avoid any uncertainty regarding the future instrument's scope.

We can point to two sensitive issues which illustrate why it is so difficult to come up with a general definition:

<sup>3</sup> Ibid, No 67 et seq. See also our article "Les robots : tentative de définition", in A. Bensamoun, *Les robots*, pub. Mare & Martin, coll. "Presses Universitaires de Sceaux", 2015, pp. 79 to 117.

<sup>4</sup> See the definition proposed in report No 1 from the Commission de réflexion sur l'Éthique de la Recherche en sciences et technologies du Numérique d'Allistene (CERNA), "Éthique de la recherche en robotique", November 2014, p. 12.

<sup>5</sup> CERNA report No 1, "Éthique de la recherche en robotique", *ibid*, p. 12.

- First, while surgical robots (covered, for example, in paragraph 17 of the motion) might fall into the general category of robots, they cannot be assimilated with smart autonomous robots. In fact, surgical robots mostly operate on the basis of a master/slave model, i.e. they are operated remotely by a practitioner, as with the Da Vinci surgical robot. Since a person remains part of the decision-making process, the robot cannot really be said to be autonomous. Nevertheless, the European Union absolutely must consider surgical robots, particularly as regards robot safety and surgeon training in robot use.

- Second, although researchers are developing autonomous drones, most (covered in paragraph 19 of the motion) are remotely piloted by an operator, and do not easily meet requirements to be labelled smart and autonomous. The European Union has begun to take an interest in drones, which raise safety, security, privacy and personal data protection issues in particular.

## 2.2. Terminological limits of the notions of an “autonomous robot” and a “smart robot”

The motion for a resolution specifically relates to smart autonomous robots. Admittedly, this type of robot gives rise to more legal and ethical questions than others.

### 2.2.1. Terminological limit of the notion of an “autonomous robot”

Recital R of the motion for a resolution defines the autonomy of a robot “as the ability to take decisions and implement them in the outside world, independently of external control or influence; whereas this autonomy is of a purely technological nature and its degree depends on how sophisticated a robot’s interaction with its environment has been designed to be”.

Even if the autonomous robot is a complex notion in scientific literature, since robotics engineers use this term to denote a wide variety of approaches<sup>6</sup>, the definition proposed in the draft report would seem coherent. Qualifying the autonomy as “technological” shows that it is not derived from the machine’s consciousness. The notion of technological autonomy can be likened to that of operational autonomy explored in certain studies<sup>7</sup>.

The only words which may need toning down are “independently of **external control or influence**”, since the notion of external influence is very vague and liable to cause confusion since it is on the basis of external stimuli (= external influence) that autonomous robots are able to make decisions. It might be more appropriate to maintain only the words “independently of **external control**”.

In any case, while we approve of the use of the words “autonomous robot”, this is not the case with “smart robot”.

### 2.2.2. Terminological limits of the notion of a “smart robot”

The words “smart robot” require particular thought. In theory, they pose no difficulty, with scientists labelling “smart” the generation of robots which were no longer confined to fixed production lines, and which operated automatically but were able to adapt to changes and instability in their surroundings. Once the robots left the factory, their researchers were

<sup>6</sup> See our aforesaid report, No 120 et seq.

<sup>7</sup> CERN report No 1, “Éthique de la recherche en robotique”, *ibid*, pp. 45-46.

obliged to make adjustments so that they could develop in a highly unpredictable, sophisticated world. As it became impossible to programme in all the situations that the robot would encounter, the idea was then to develop machines that would be capable of anticipating certain situations and adapting to them, mainly through using a range of sensors, thus making them autonomous. All of this research falls under the umbrella of smart robotics<sup>8</sup>.

The term is also used in the 2012 technical standard EN ISO 8373 in relation to "Robots and robotic devices – Vocabulary". Paragraph 2.28 defines the smart robot as a "robot capable of performing tasks by sensing its environment and/or interacting with external sources and adapting its behaviour". As examples, the standard gives an industrial robot with a vision sensor for picking up and positioning an object, mobile robots with collision avoidance and legged robots walking over uneven terrain.

While it is true, as stated in point A of the motion for a resolution, that "people have [always] fantasised about the possibility of building intelligent machines", we nevertheless have some reservations about the use of the term "smart robot" in view of the fear robots instil for two reasons.

#### 1°/ Western fear of the robot

The common cultural heritage which feeds the Western collective conscience could mean that the idea of the "smart robot" prompts a negative reaction, hampering the development of the robotics industry. The influence that ancient Greek or Hebrew tales, particularly the myth of Golem, have had on society must not be underestimated. The romantic works of the 19th and 20th centuries have often reworked these tales in order to illustrate the risks involved should humanity lose control over its own creations. Today, western fear of creations, in its more modern form projected against robots and artificial intelligence, could be exacerbated by a lack of understanding among European citizens and even fuelled by some media outlets.

This fear of robots is not felt in the Far East. After the Second World War, Japan saw the birth of *Astro Boy*, a manga series featuring a robotic creature, which instilled society with a very positive image of robots. Furthermore, according to the Japanese Shintoist vision of robots, they, like everything else, have a soul. Unlike in the West, robots are not seen as dangerous creations and naturally belong among humans. That is why South Korea, for example, thought very early on about developing legal and ethical considerations on robots, ultimately enshrining the "smart robot" in a law, amended most recently in 2016, entitled "Intelligent robots development and distribution promotion act". This defines the smart robot as a mechanical device which perceives its external environment, evaluates situations and moves by itself (Article 2(1))<sup>9</sup>. The motion for a resolution is therefore rooted in a similar scientific context.

This cultural divide manifested in the diverging Far Eastern and Western visions may, though, mean that the European legislator is justified in distancing itself from the legal pathways Asia has followed. Certainly, Asia's solutions would not necessarily be acceptable in Europe. This

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<sup>8</sup> Ray Jarvis, "Intelligent Robotics: Past, Present and Future", *International Journal of Computer Science and Applications*, 2008, Vol. 5, No 3, p. 23.

<sup>9</sup> "The term 'intelligent robot' means a mechanical device that perceives the external environment for itself, discerns circumstances, and moves voluntarily", *Intelligent robots development and distribution promotion act*, Ministry of Trade, Industry and Energy, Act No 13744, 6 January 2016.

is all the more the case today, now that the object of fear is no longer trapped in myths or fiction, but rooted in reality. At least two events restoked these fears, and not without justification. In 2014 and 2015, Bill Gates, Stephen Hawking and Elon Musk warned of the dangers posed by artificial intelligence, which could potentially turn against humanity<sup>10</sup>. As stated in paragraph I of the motion for a resolution, humanity may be at risk of “AI [surpassing] human intellectual capacity”. To avoid this danger, the draft report stresses the importance of humanity maintaining the capacity to control its own creations. This point is worth reiterating. In robotics too, as far back as 2007 the American scientist Bill Joy predicted that smart robots — by which he meant robots whose skills largely surpassed those defined in the motion for a resolution — put humankind at risk of extinction. He recommended at the time that research in potentially dangerous sectors cease, since the implementation of methods for monitoring technology may prove too slow or ineffective<sup>11</sup>. We note that the author explicitly linked smart robots with the destruction of humanity, revealing the apprehension this term invoked in the West.

Against this background, there might be concerns that if European citizens were to discover that there was legislation governing smart robots, this might fuel fantasies liable to either heighten fears of artificial creations or stop new robotics sectors from emerging when a buyer is left deeply disappointed by a machine that turns out not to be smart in the human sense. In any event, enshrining the term “smart robot” could lead civil society to think that conscious, thinking, or almost human, robots are no longer just a thing of science fiction.

Moreover, in an attempt to alleviate the fear surrounding robots, it might be a good idea to put a system in place for maintaining control over robots and artificial intelligence. To this end, the sectors which pose a potential danger to humanity need pinpointing, perhaps not with a view to prohibiting research but at least to regulating it. This responsibility could fall to the future European Agency for robotics and artificial intelligence, called for in paragraphs 8 and 9 of the motion. For example, the self-replication of robots, and especially nanorobots, might prove difficult to control and potentially dangerous for humanity and the environment, thus requiring strict **external** control of research activities.

2°/ The thin line between the advantages and the socio-economic risks brought by robotisation

The Western fear of seeing humanity replaced by robots is compounded by socio-economic concerns — and not for the first time, since this was also the case during the initial uprisings, led by English manual worker Ned Ludd in 1811, against the power of the machine which was wreaking the mechanical professions. The substitution of people with robots could translate into job losses, as the draft report rightly points out in paragraph E. Great attention should be paid to this issue, since two different interest groups require reconciliation.

From an economic perspective, it would appear appropriate to develop robotics in Europe in parallel with increasing aid to businesses, steering young people towards relevant training courses, granting financing to universities, etc. Indeed, robotics would seem to be a component for economic revival. There is already talk of a fourth industrial revolution in connection with the development of the factory of the future<sup>12</sup>, in which robotics would play

<sup>10</sup> Michael Sainato, “Stephen Hawking, Elon Musk, and Bill Gates Warn About Artificial Intelligence”, *Observer* [online], 19 August 2015, <http://observer.com/2015/08/stephen-hawking-elon-musk-and-bill-gates-warn-about-artificial-intelligence/>

<sup>11</sup> Bill Joy, “Why the future doesn’t need us”, in F. Allhoff et al., ed., *Nanoethics. The Ethical and Social Implications of Nanotechnology*, pub. Wiley-Blackwell, 2007, p. 32.

<sup>12</sup> See our document “Les usines connectées”, multidisciplinary symposium on connected objects, coordinated by A. Zollinger, Poitiers Law Faculty, 23 September 2016, forthcoming.

a large role, alongside other emerging technologies, such as connected objects, RFID chips or 3D printers. The economic advantages offered by robotisation might then prompt production, which had been relocated to emerging markets, to return to Europe.

The social advantages to be gained, as described in paragraph D of the draft report, must not occlude the risks associated with robotising industry — and even society in general with the development of domestic robots. If robotisation picks up speed, it could wipe out several million jobs across Europe, and not only low-skilled jobs, but also those in highly intellectual sectors, such as teaching. The robotisation and relocation of industry therefore needs to be planned in such a way as to support — rather than supplant — people in the workplace. It would be unrealistic to believe society capable of reorganising itself to absorb billions of unemployed humans<sup>13</sup>. However, some studies seem to suggest, by contrast, that robotisation is more likely to end up transforming jobs. They claim that, after the initial job losses, new jobs will then emerge, perhaps with no link to those that went before. If this is the case, we risk seeing a “lost generation”, i.e. a generation of people trained for jobs on the verge of extinction, unable to find a job matching their skill set. To avoid this, we should start facing up to this challenge right away, by putting universities on the front line, granting them the means required to anticipate changes and assume an innovative position.

It might be a good idea to entrust the European Agency for robotics and artificial intelligence, mentioned in paragraphs 8 and 9 of the motion for a resolution, with the task of analysing the socio-economic risks associated with the development of robotics.

### **2.3. Matters of consciousness and the role of Asimov's Laws in robotics**

Paragraph L of the motion for a resolution states that “until such time, if ever, that robots become or are made self-aware, Asimov's Laws must be regarded as being directed at the designers, producers and operators of robots, since those laws cannot be converted into machine code”.

The wording is somewhat unclear, since it seems to imply that, until such time as robots develop consciousness, human beings should apply Asimov's Laws of Robotics. There are two important comments to make in respect of this provision, which links two only very loosely related concepts.

1/ First of all, we should take a moment to consider the legal validity of the Laws of Robotics, which the motion for a resolution hopes to enforce among robot designers, producers and users. In literature, the writer Isaac Asimov sought to stamp out the negative Western image of robots in his collection of short stories, published in 1950, entitled “I, Robot”. For the first time, the creations do not rise up against their creator, since they are governed by the Laws of Robotics, to which the robots must strictly adhere:

- “1. A robot may not injure a human being or, through inaction, allow a human being to come to harm.
2. A robot must obey the orders given it by human beings except where such orders would conflict with the First Law.

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<sup>13</sup> In this regard, Moshe Y. Vardi in “The Job Market of 2045. What will we do when machines do all the work?”, *IEEE Spectrum* [online], 22 January 2013, <http://spectrum.ieee.org/podcast/at-work/tech-careers/the-job-market-of-2045>

3. A robot must protect its own existence as long as such protection does not conflict with the First or Second Laws.”

The writer later added a zeroth law, which overrides the others: “0. A robot may not harm humanity, or, by inaction, allow humanity to come to harm.”

Asimov wrote these Laws as a pseudo-legal literary tool that would underpin his work, explaining humanity’s control over robots.

- The Asimov Laws were deliberately made vague to make it more interesting as the plot lines unfold<sup>14</sup>. The author in no way set out to establish anything more than a clever literary construct. Therefore, these Laws cannot be taken as true legal principles, irrespective of whether they can be converted into machine code, as stated in paragraph L.

- These Laws governed only the robots themselves and established a sort of machine ethics. Therefore, the statement in paragraph L of the motive that Asimov’s Laws “must be regarded as being directed at the designers, producers and operators of robots” is based on a misinterpretation of these Laws, which were never intended for humanity.

While the fictional Robotics Laws are unfit to protect humanity, it might be possible to draw up a general ethical framework befitting the problems associated with robotics and artificial intelligence (see 4.1).

2/ Second, it is fundamental that we discuss the issue of robots’ self-awareness. Whether this consciousness comes about more or less spontaneously or following scientific research, paragraph L of the motion for a resolution seems unperturbed by this prospect. Yet, such a development could rock humanity. It is already difficult to prove a human being’s consciousness, so how might we detect its existence in a machine? Moreover, accepting that a machine can be a conscious being would oblige humankind to respect a robot’s basic rights<sup>15</sup>. In particular, if robots were to one day become conscious beings, and so, by extension, were to become more powerful, faster, more intelligent, more perfect and almost immortal, humanity, in its current form, would be doomed to collapse, and perhaps even to destruction brought about through natural selection whereby weaker beings are wiped out as the fittest survive.

It would therefore appear necessary to establish a principle whereby any scientific research intended to instil consciousness in a robot, or indirectly having this effect, would be deemed potentially dangerous to humankind and strictly regulated (see 2.2.2.(1)).

<sup>14</sup> See our aforementioned work, No 917 et seq.

<sup>15</sup> See our article “Le robot qui voulait devenir un homme... ou le statut juridique de l’androïde”, in F. Defferrard, ed., *Le droit saisi par la science-fiction*, pub. Mare & Martin, coll. “Libre Droit”, 2016, p. 156 et seq, No 33 et seq.

## 3. ISSUES SURROUNDING LIABILITY IN ROBOTICS

### KEY FINDINGS

While we commend the motion for a resolution for seeking to put in place a liability regime tailored to autonomous robots (paragraph 24 onwards), assigning robots a legal personality is not the answer.

It should also be questioned whether the future instrument's provisions regarding liability for damage caused by an autonomous robot are consistent with civil liability law as a whole.

Paragraph 24 of the motion for a resolution states that, in view of robots' new abilities, "robots' civil liability is a crucial issue which needs to be addressed at EU level". However, it does not appear appropriate to settle the issue by establishing the robot as a liable legal person. Aside from this, the motion has some blanks to be filled regarding liability for damages caused by an autonomous robot, to bring it in line with civil liability law.

### 3.1. Incongruity of establishing robots as liable legal persons

The motion for a resolution proposes creating a new category of individual, specifically for robots: electronic persons. Paragraph 31(f) calls upon the European Commission to explore the legal consequences of "creating a specific legal status for robots, so that at least the most sophisticated autonomous robots could be established as having the status of electronic persons with specific rights and obligations, including that of making good any damage they may cause [to third parties], and applying electronic personality to cases where robots make smart autonomous decisions or otherwise interact with third parties".

When considering civil law in robotics, we should disregard the idea of autonomous robots having a legal personality, for the idea is as unhelpful as it is inappropriate.

Traditionally, when assigning an entity legal personality, we seek to assimilate it to humankind. This is the case with animal rights, with advocates arguing that animals should be assigned a legal personality since some are conscious beings, capable of suffering, etc., and so of feelings which separate them from things. Yet the motion for a resolution does not tie the acceptance of the robot's legal personality to any potential consciousness. Legal personality is therefore not linked to any regard for the robot's inner being or feelings, avoiding the questionable assumption that the robot is a conscious being. Assigning robots such personality would, then, meet a simple operational objective arising from the need to make robots liable for their actions.

There is one other situation when it may be possible to assign an entity legal personality: when this assignment would grant it a legal life. Thomas Hobbes informs us in *Léviathan* that the word "person" (persona) is derived from the Latin for mask, later coming to represent the self or the other<sup>16</sup>. The "legal person" concept illustrates that the law has already assigned legal personality to a non-human entity. However, it would not be right to assume from this that robots might also benefit from such a personality. Legal personality

<sup>16</sup> Thomas Hobbes, chap. XVI "Of Persons, Authors and Things Personated", *Leviathan or The Matter, Forme and Power of a Common Wealth Ecclesiasticall and Civil*, London, 1651, p. 161 et seq.



is assigned to a natural person as a natural consequence of their being human; by contrast, its assignment to a legal person is based on legal fiction. Legal persons are able to act within the legal sphere solely because there is a human being behind the scenes to represent it. Ultimately, it is, then, a physical person that breathes legal life into a legal person and without which, the latter is a mere empty shell. That being the case, where do we stand with the robot? We have two options: either a physical person is the true legal actor behind the robot, or the robot itself is a legal actor.

On the one hand, if we consider there to be a person behind the autonomous robot, then this person would represent the electronic person, which, legally speaking, would — like the legal person — simply be a fictional intellectual construct. That said though, the idea that one might develop such a sophisticated mechanism to produce such a pointless result shows how incongruous it would be to assign legal personality to what is just a machine.

On the other hand, the motion for a resolution would appear more inclined to fully erase the human presence. In viewing as an electronic person any “robots [which] make smart autonomous decisions or otherwise interact with third parties” (end of paragraph 31(f)), the motion seems to suggest that the robot itself would be liable and become a legal actor. This analysis finds support in paragraph S, which states that “the more autonomous robots are, the less they can be considered simple tools in the hands of other actors [...] [and this] calls for new rules which focus on how a machine can be held — partly or entirely — responsible for its acts or omissions”. Once a robot is no longer controlled by another actor, it becomes the actor itself. Yet how can a mere machine, a carcass devoid of consciousness, feelings, thoughts or its own will, become an autonomous legal actor? How can we even conceive this reality as foreseeable within 10 to 15 years, i.e. within the time frame set in paragraph 25 of the motion for a resolution? From a scientific, legal and even ethical perspective, it is impossible today — and probably will remain so for a long time to come — for a robot to take part in legal life without a human being pulling its strings.

What is more, considering that the main purpose of assigning a robot legal personality would be to make it a liable actor in the event of damage, we should note that other systems would be far more effective at compensating victims; for example, an insurance scheme for autonomous robots, perhaps combined with a compensation fund (paragraphs 31(a) to (e)).

We also have to bear in mind that this status would unavoidably trigger unwanted legal consequences. Paragraph T of the motion states that creating a legal personality would mean that robots’ rights and duties had to be respected. How can we contemplate conferring rights and duties on a mere machine? How could a robot have duties, since this idea is closely linked with human morals? Which rights would we bestow upon a robot: the right to life (i.e. the right to non-destruction), the right to dignity, the right to equality with humankind, the right to retire, the right to receive remuneration (an option explicitly explored in paragraph 31(b) of the motion), etc.? Let us take as an example three types of robot which, in some cases, might already be deemed smart autonomous robots according to the motion. Would assigning rights mean that a robot deployed in a hostile environment could refuse to cross a dangerous zone where it would risk damage or destruction? Could an agricultural robot demand leave, or a health care robot demand a salary before starting to care for an elderly person? If it could, why would we produce or buy robots which we could not put to use? And, more to the point, why not simply continue to use manpower? We can see that assigning rights to a robot would be nonsensical and potentially destroy the emerging robot market.

In reality, advocates of the legal personality option have a fanciful vision of the robot, inspired by science-fiction novels and cinema. They view the robot — particularly if it is

classified as smart and is humanoid — as a genuine thinking artificial creation, humanity's alter ego. We believe it would be inappropriate and out-of-place not only to recognise the existence of an electronic person but to even create any such legal personality. Doing so risks not only assigning rights and obligations to what is just a tool, but also tearing down the boundaries between man and machine, blurring the lines between the living and the inert, the human and the inhuman. Moreover, creating a new type of person – an electronic person – sends a strong signal which could not only reignite the fear of artificial beings but also call into question Europe's humanist foundations. Assigning person status to a non-living, non-conscious entity would therefore be an error since, in the end, humankind would likely be demoted to the rank of a machine. Robots should serve humanity and should have no other role, except in the realms of science-fiction.

### **3.2. Liability for damages caused by an autonomous robot**

Although thorough, this analysis does not allow us the scope to examine the many aspects of the motion for a resolution in any great depth. Yet we should point to a number of points which provide food for thought.

1/ On the subject of civil liability, we should first of all take care with the terms used in the future instrument. The expression "robots' liability" (paragraph 26 of the motion for a resolution) should be banned, since it implies that the robot might itself incur civil liability for any damage caused. Instead we should say "vicarious liability for the robot(s)".

2/ It is difficult to determine liability for damage caused by an autonomous robot. Conventionally, damage caused by an autonomous robot might arise from a machine defect, which would mean that Council Directive 85/374/EEC of 25 July 1985 could be applied subject to fulfilment of the conditions. This is explained perfectly in paragraph Y of the motion for a resolution. This Directive could be applied in several circumstances, particularly if the producer had insufficiently informed the customer of the dangers associated with autonomous robots, or if the robot's safety systems were deficient. We might therefore view some damage related to autonomous robots' new abilities as a defect within the meaning of the Directive, which would go some way towards dealing with the points raised in paragraph Z of the motion.

Damage caused by autonomous robots might also be traced back to user error. In such instances, either strict or fault-based liability may be imposed, depending on the circumstances.

Nevertheless, autonomous robots will bring about further unprecedented difficulties, since it may be more difficult to ascertain what caused the damage in certain situations, particularly if the robot is able to learn new things by itself. However, it is wrong to say that this "calls for new rules which focus on how a machine can be held — partly or entirely — responsible for its acts or omissions" (paragraph S of the motion). Bearing in mind the dangers of assuming a robot has a legal personality (see 3.1), it is out of the question that it might be held — partly or entirely — responsible for its acts or omissions. Only a physical person should be held liable, through various insurance mechanisms.

In terms of the basis for liability, paragraph 27 of the motion is very interesting since it states that "the future legislative instrument should provide for the application of strict liability as a rule, thus requiring only proof that damage has occurred and the establishment of a causal link between the harmful behaviour of the robot and the damage suffered by the injured party". This would, then, be a strict liability regime, which could be labelled "vicarious liability for the robot(s)". Here the double burden of proof falls to the victim of the damage. Yet, even in this specific case, deciding who is the ultimate respondent, i.e. where responsibility truly lies, would remain tricky.

In this regard, paragraph 28 of the motion presents one way of assessing the liability of each party, considering that “in principle, once the ultimately responsible parties have been identified, their liability would be proportionate to the actual level of instructions given to the robot and of its autonomy, so that the greater a robot’s learning capacity or autonomy is, the lower other parties’ responsibility should be, and the longer a robot’s ‘education’ has lasted, the greater the responsibility of its ‘teacher’ should be; notes, in particular, that skills resulting from ‘education’ given to a robot should not be confused with skills depending strictly on its self-learning abilities”. This paragraph leaves many ideas to explore. It must be ensured that the future instrument is more accurate and simpler to implement, since one potential concern is that judges who are little-versed in emerging technologies might have trouble comprehending the subtleties.

Therefore, when the conditions triggering Directive 85/374/EEC of 25 July 1985 are not met, the victim might find other responsible parties. Several options are worth exploring:

- If the robot is sold with open source software, the person liable should, in principle, be the one who programmed the application which led to the robot causing damage. Robots tend increasingly to be sold with (full or partial) open source software, allowing buyers to develop their own applications. In principle, a contract governs relations between the parties. “Open Robot Hardware” is a further trend, where both the robot’s software and hardware are open source.

- If a robot causes any damage that can be traced back to its design or production — such as an error in a robot’s algorithm causing injurious behaviour — the designer or producer should be held liable. However, in fact, the type of liability may vary depending on whether the victim bought the robot (contractual responsibility) or is a third party (extra-contractual responsibility). It might be important within the framework of the future instrument to consider this dichotomy and whether it would be a good idea to align its application with Directive 85/374/EEC, which does not distinguish whether or not the victim is contractually bound to the person having caused the damage.

- If a robot causes any damage when in use or while still learning, its user or owner should be held liable. In this regard, the solution may vary depending on whether or not the user is a professional, and whether or not they are the victim. For example, any damage linked to a robot’s instruction by a professional user and inflicted upon a third-party victim could be governed by the new instrument. It would be an entirely different story if the same damage were caused to a victim who was a professional, salaried user, since this would then be considered an accident at work.

Moreover, we should take into account various possible scenarios, such as the one in which a self-learning robot is hired out (a growing trend), perhaps a commercial robot intended for product demonstration or advertising in shops. However, it might prove impossible to pin responsibility on a particular client, since a series of shops will have hired the robot, possibly making it difficult to ascertain each party’s liability in terms of what they taught the robot. Therefore, failing any evidence to the contrary, we should operate on the principle that the lessor of the robot should remain liable.

3/ We should note that setting up a specific liability regime for autonomous robots, while other robots remain subject to traditional regimes, could create problems. In the event of damage, the parties might prefer to apply one regime rather than the other. Judges will then be constrained to analyse, on a case-by-case basis, the characteristics of the robot in dispute, to check whether the robot corresponds to the definition of a smart robot in the present motion and to determine the applicable law. It follows that proceedings for damage caused by a robot might well always need to be preceded by recourse to an expert to determine the machine’s capacities. This would lead to a considerable increase in procedural costs and slow down legal proceedings. In view of this, a uniform application of

the future provisions to all robots might be a solution, given that only autonomous robots pose any real trouble in determining liability.

4/ We lend our full support to the idea explored in paragraph 26 of the motion that "the future legislative instrument should in no way restrict the type or the extent of the damages which may be recovered, nor should it limit the forms of compensation which may be offered to the aggrieved party, on the sole grounds that damage is caused by a non-human agent". In other words, the fact that a robot was behind the damage should not be used as a pretext for reducing the victim's compensation or limiting the recoverable losses.

5/ Furthermore, it is somewhat unclear where we now stand with mobile robots in terms of safety and liability. More often than not, autonomous robots will be mobile, and might even be used to transport goods or people. The future instrument should clearly set out which rules apply to mobile autonomous robots, for example with a view to Directive 2007/46/EC of the European Parliament and of the Council of 5 September 2007 establishing a framework for the approval of motor vehicles and their trailers, and of systems, components and separate technical units intended for such vehicles, and in the face of questions regarding liability, particularly with this issue of road accidents.

6/ Finally, although the motion for a resolution does not relate to criminal responsibility, we should mention the great difficulty this question poses in autonomous robotics, in terms of establishing that an offence has been committed, determining its author, proving intent, the causality link, etc. This situation should influence civil liability.

## 4. ANALYSIS OF THE ETHICAL PRINCIPLES TO DEVELOP IN ROBOTICS

### KEY FINDINGS

The motion for a resolution seeks to introduce an ethical framework for the design, production and use of robots (paragraph 6). This step now appears unavoidable in view of the developments in robotic technology. With regard to the balance to be struck between the advantages and dangers, as mentioned in paragraph 5, we suggest several ethical principles that it would be conceivable to enshrine in robotics in order to protect humans.

The draft report proposes a Charter on Robotics as an annex, establishing a code of conduct for robotics engineers, a code for research ethics committees and a set of model licences for designers and users. This confusion of texts in a single charter, devoid of legal force, raises questions regarding their binding nature.

Paragraph 6 of the motion for a resolution states that an ethical framework is needed for the design and use of robots. With this in mind, we believe it would be helpful to propose a general ethical framework for robotics, introducing the main roboethical principles for protecting humanity from robots.

In any event, paragraph 6 states that the draft project has opted for a robot ethics charter; we will analyse its legal value.

### 4.1. Devising a general ethical framework for robotics: proposal to establish the main roboethical principles for protecting humanity from robots

Paragraph 6 of the motion for a resolution starts by saying that "a guiding ethical framework for the design, production and use of robots is needed to complement the legal recommendations of the report and the existing national and Union acquis".

A general ethical framework governing robot design through to robot use is now needed, composed of a set of ethics applied to robotics and aimed at humankind. Back when he chaired a workshop financed by the European Robotics Research Network (EURON) in 2002, Gianmarco Veruggio labelled this discipline "roboethics"<sup>17</sup>. To his mind, the ethical standards should be directed at humankind, i.e. at the designers, producers and users of robots. Finally, the term "roboethics" was endorsed by the robotics players in San Remo in 2004<sup>18</sup>. Following a workshop, the first roboethics roadmap was published in 2006<sup>19</sup>. Then the whole world developed an interest in ethical musings about robotics<sup>20</sup>, although

<sup>17</sup> Gianmarco Veruggio and Fiorella Operto, "64. Roboethics : Social and Ethical Implications of Robotics", in B. Siciliano and O. Khatib, ed., *Springer Handbook of Robotics*, pub. Springer, 2008, p. 1504.

<sup>18</sup> "The ethics, social, humanitarian and ecological aspects of Robotics", First International Symposium on Roboethics, San Remo, Italy, 30-31 January 2004, *Roboethics.org* [online], <http://www.roboethics.org/sanremo2004/>

<sup>19</sup> Gianmarco Veruggio, ed., "EURON roboethics roadmap", EURON roboethics Atelier, Genova 27 February to 3 March 2006, July 2006, *Roboethics.org* [online], <http://www.roboethics.org/atelier2006/docs/ROBOETHICS%20ROADMAP%20Rel2.1.1.pdf>

<sup>20</sup> We might cite, in particular, "ICRA 2005 Workshop on Roboethics, Barcelona", Spain, 18 April 2005; "EURON Atelier on Roboethics", Genova, Italy, 27 February to 3 March 2006; "ICRA 2007 Workshop on Roboethics", Rome, Italy, 14 April 2007; "ECAP07 track 'Philosophy and Ethics of Robotics'", Twente, The Netherlands, 21-23 June 2007; "International Symposium 'Robotics: New Science'", Accademia dei Lincei, Rome, 20 February 2008; "ICRA2009 Workshop on Roboethics", Kobe, Japan, 17 May 2009; "SPT2009 Track 'Robots, cyborgs

rumblings were louder on the other side of the Atlantic. In Europe, in 2014 the European *RoboLaw* Consortium for ethics in robotics published its first ethical and legal recommendations in its "Guidelines on Regulating Robotics"<sup>21</sup>.

However, we should not confuse ethics in robotics with machine ethics, which oblige the robots themselves to adhere to ethical rules. Today, machine ethics is still in a theoretical state since even autonomous robots are incapable of taking moral decisions.

The development of the autonomous robot heralds an improvement in the quality of human life. However, as paragraph 5 of the motion for a resolution rightly points out, the advantages which robotics offer humanity need to be assessed in the light of the risks posed by robots, their use or derived technology. Therefore, it would appear to us that, from an ethical perspective, a set of basic roboethical principles should be devised to protect humans.

#### 4.1.1. Protecting humans from harm caused by robots

The first principle of roboethics is to protect humans against any harm caused by a robot; for example, in an instance where a technician is operating a health care robot which has just injured patients due to a lack of maintenance or faulty settings. Asimov's Laws of Robotics are of just as little use when applied to designers, producers or users (see 2.3) as when protecting humans from robots. Europe already has one founding concept that could act as the legal basis for roboethics: human dignity. This, as the source of all principles protecting people from harm, allows humans to be protected against harm inflicted upon their physical person by a robot<sup>22</sup>. The Charter of Fundamental Rights of the European Union of 7 December 2000 sets human dignity up as the foundation of all rights<sup>23</sup>, since Article 1 states that "human dignity is inviolable. It must be respected and protected". Similarly, judgment *SW v. United Kingdom* of 22 November 1995 of the European Court of Human Rights reiterates that dignity forms the backbone of the Convention<sup>24</sup>. The judgment *Goodwin v. United Kingdom* of 11 July 2002 adds that the principle of dignity is implicit in the protection of life (Article 2 of the European Convention on Human Rights) and the prohibition on inhumane or degrading treatment (Article 3 of the European Convention on Human Rights)<sup>25</sup>. As the cornerstone of all rights, human dignity is the crucible for protecting against violations of physical integrity caused by robots. Article 3(1) of the Charter of Fundamental Rights of the European Union also states that "everyone has the right to respect for his or her physical and mental integrity". Moreover, according to the European Convention on Human Rights, "everyone's right to life shall be protected by law" (Article 2(1)).

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and artificial life", University of Twente, the Netherlands, 8-10 July 2009; "Fourth Workshop on Roboethics", Shanghai, China, 13 May 2011; "We Robot: Getting Down To Business", Stanford Law School, 8-9 April 2013; "We Robot 2014 – Risks and Opportunities", University of Miami, 4-5 April 2014; "We Robot 2016", University of Miami School of Law, 1 and 2 April 2016.

<sup>21</sup> "Guidelines on Regulating Robotics", *RoboLaw* [online], 22 September 2014, <http://www.robotlaw.eu/>

<sup>22</sup> See our aforesaid work, No 928 et seq.

<sup>23</sup> Florence Benoît-Rohmer, "La Charte des droits fondamentaux de l'Union européenne", *D.* 2001, p. 1483.

<sup>24</sup> ECHR, 22 November 1995, *SW v. United Kingdom*, req. No 20166/92, § 44.

<sup>25</sup> ECHR, 11 July 2002, *Christine Goodwin v. United Kingdom*, req. No 28957/95.

#### 4.1.2. Respecting the refusal of care by a robot

This principle follows on from the first and establishes the right for a person to refuse to be cared for by a robot. It may apply in the sensitive situation that arises when a person suffers no physical harm from a robot but feels so profoundly uncomfortable in its presence as to render this presence unbearable. This situation could occur often with certain robots which assist people, such as robots tasked with feeding elderly or disabled people, who could refuse to become the object of the robot's service. It is possible to root this roboethical principle in the protection of human dignity, since the notion does not necessarily imply that a person has suffered any actual or real harm. Thus, there would be two rules attached to this principle. First, it needs to be accepted that a person would be entitled to refuse care from a robot, even if they would stand to come to no harm, for the simple reason that not accepting this refusal would violate their dignity. Second, where a health care robot is to administer care, prior consent should be sought from the patient<sup>26</sup>.

#### 4.1.3. Protecting human liberty in the face of robots

This roboethical principle calls for respect of human liberty when using a robot. Some autonomous robots might trample all over freedoms, on the pretext of protecting a person, leading to a clash of certain basic rights — such as protecting liberty versus considering people's health and safety. For example, a security robot might restrain a person who has broken into a shop, or a robot might detain a runaway child at home or prevent a sick person (such as an alcoholic) from engaging in dangerous behaviour (drinking alcohol). Yet, in Europe, human liberty is protected. Article 6 of the Charter of Fundamental Rights of the European Union of 7 December 2000 states that "everyone has the right to liberty and security of person". Article 5(1) of the European Convention for the Protection of Human Rights and Fundamental Freedoms of 4 November 1950 reaffirms this and says in Article 8(1) that "everyone has the right to respect for his or her [...] home".

However, this text does not fully solve the problems posed when robots infringe certain human liberties. It is therefore important to establish a true roboethical principle. Although it would be impossible for us to substantiate our argument fully within the limited scope of this analysis<sup>27</sup>, it is difficult for us to accept that a robot might impose certain behaviour upon, or restrict, a person. Therefore, we need to establish a general principle that the robot should respect a person's decision-making autonomy. This would then mean that a human being should always be able to oblige a robot to obey their orders. Since this principle could pose certain risks, particularly in terms of safety, it should be tied to a number of preliminary precautions. Where the order received could endanger the user or third parties, the robot should, first of all, issue a risk alert that the person can understand. This would mean adapting the message depending on the person's age, and level of awareness and understanding. Second, the robot should have the right to an absolute veto where third parties could be in danger. As such, the robot could not, then, be used as a weapon, in accordance with the wishes expressed in the motion for a resolution in the paragraph on the "licence for users", which asserts that "you are not permitted to modify any robot to enable it to function as a weapon".

<sup>26</sup> See our aforesaid work, No 978 et seq. See also Nathalie Nevejans, Odile Pourtallier, Sylvie Icart and Jean-Pierre Merlet, "Les avancées en robotique d'assistance aux soins sous le prisme du droit et de l'éthique », *Médecine et droit*, forthcoming.

<sup>27</sup> See our aforesaid work, No 1009 et seq.

#### 4.1.4. Protecting humanity against privacy breaches committed by a robot

The aim of this roboethical principle is to protect people from any privacy breaches committed by a robot. Of course, the perpetrator of the breach would not be the robot itself, but the person behind the scenes. With their many sensors, autonomous robots — such as security robots, health care robots and robot companions — may have access to a large volume of information to perform several functions. The specific nature of the breach would mean that the robot user might see not only their private life exposed, but also that of third parties, such as family members, friends or helpers. The right to privacy is already enshrined in the 1950's European Convention for the Protection of Human Rights and Fundamental Freedoms, of which Article 8 states that: "everyone has the right to respect for his or her private and family life, home and communications". However, a roboethical principle should be established which would not only clarify the degree of protection and punishment envisaged, but would also consider the issue of consent from the subject entitled to privacy. Assuming that, when robotics are used to assist people, it will be the family that puts the robot at the disposal of an elderly or disabled person, this last point will certainly become hugely relevant since the consent should come from the person aided by the robot, and not from a family member. It should also be considered that the robot might also come to know a person's health particulars<sup>28</sup>, and this might mean professional or medical secrets are involved. Alternatively, we might find ourselves facing the problem of robots being used as tool for monitoring the actions of staff, thereby violating the employees' right to privacy at work. Finally, of course, drones might also witness private lives.

With regard to the advantages that autonomous robots offer and the very real risks they pose to people's privacy, a balance will often need to be struck between interests<sup>29</sup>. This will be the case for autonomous cars; here the risks to privacy arising from the operation of the entire connected environment (cars and infrastructure) will need to be compared against the safety advantages. Similarly, with health care robots, they absolutely must not constantly disclose information on the assisted person's private life externally (i.e. to a surveillance team located remotely from the person and their family, etc.). A protocol needs to be established, to allow the interested party to remain in control of when a third party is permitted to enter his private sphere.

#### 4.1.5. Managing personal data processed by robots

A very large question mark hangs over data in robotics. Indeed, autonomous robots will gather large volumes of data using their various sensors. This will be the case, in particular, with autonomous cars, drones, personal assistant robots, and security robots. Moreover, once robots have the skills to communicate and interact, not only will they exchange data (among themselves; between themselves and an entity), but this communication may be imperceptible to humans. Not all the data gathered will necessarily be personal data, i.e. any information relating to an identified or identifiable person, pursuant to Directive 95/46/EC of the European Parliament and of the Council of 24 October 1995 on the protection of individuals with regard to the processing of personal data and on the free movement of such data, repealed by Regulation 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal

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<sup>28</sup> Nathalie Nevejans, Odile Pourtallier, Sylvie Icart and Jean-Pierre Merlet, *ibid.*

<sup>29</sup> See our *aforecited work*, No 1063 et seq., and the proposed solutions.



data and the free movement of such data. So, robots might well gather technical data on spatial coordinate calculations, for example.

Therefore, paragraph G of the motion for a resolution is justified in wanting to deepen thinking on protecting personal data in robotics. The issue should be just as important for personal assistant robots handling personal health information as for autonomous robots working alongside employees which might gather sensitive data. The roboethical principle of managing personal data processed by robots is, then, crucial<sup>30</sup>. It should be adhered to right from the robot's design, and then throughout its service life. Data management will also mean that the robot user is always empowered to prevent the machine from gathering or processing personal data. There should also be rigorous rules governing consent, so as to avoid situations where consent might be sought from the people placing a robot at the service of an elderly person, forgetting that it is in fact the latter's consent which is essential. We should also ensure that consent does not take the limited form of a mere formality upon purchase of a robot, but is obtained through a more detailed information request. Finally, great importance will need to be assigned to protecting data from hackers.

#### 4.1.6. Protecting humanity against the risk of manipulation by robots

As we have already stressed, the robot leaves a very real impression on the human psyche. It may incite fear or, by contrast, fascinate, particularly if it appears humanlike. Researchers may have feared, for example, that elderly people would reject self-deciding robots, and they could be even more inclined to do so with autonomous robots which are able to communicate, leaving the person feeling as though the robots have surpassed them or rendered them superfluous<sup>31</sup>. Fear of robots could be particularly damaging with robots which assist people or entertain. Robotics engineers have used various techniques to try to trump this fear through generating human emotions ("emotional robots") or faithfully imitating people.

Emotional robots have some clear advantages when it comes to facilitating interaction between people and robots, as some humanlike robots seek to do with children suffering from autism. To incite human emotion, the robotics engineers play with the robot's appearance, giving it, for example, a childlike face. The scientists experiment with the robot's facial expressions, gestures, bodily movements and voice, etc., to see which people find most acceptable. However, the emotions which a robot displays or shares with a person are fake, because entirely feigned. Nevertheless, through bringing people into contact with robots intended to stir up artificial empathy, is there not a risk that they might forget that the machine cannot feel? Artificial empathy has already been found to exist in the United States with war robots; soldiers interacting with a robot may grow too fond of it, leading to concerns that a soldier might risk their own life for the machine<sup>32</sup>. Thus, whenever we enable a robot to simulate emotions, there is a risk of a person developing the same type of bond as with another human being<sup>33</sup>. The creation of a roboethical principle protecting people from being manipulated by robots would prevent people who are elderly, sick or disabled, as well

<sup>30</sup> See our aforesaid work, No 1204 et seq.

<sup>31</sup> Dominique Boullier, "Objets communicants, avez-vous donc une âme ? Enjeux anthropologiques", in "Ces objets qui communiquent. Perspectives technologiques et usages", *Les Cahiers du numérique*, pub. Lavoissier, Vol. 3, 4/2002, p. 57.

<sup>32</sup> Doree Armstrong, "Emotional attachment to robots could affect outcome on battlefield", *University of Washington Today* [online], 17 September 2013, > News and Information, <http://www.washington.edu/news/2013/09/17/emotional-attachment-to-robots-could-affect-outcome-on-battlefield/>

<sup>33</sup> Serge Tisseron, *Le jour où mon robot m'aimera. Vers l'empathie artificielle*, pub. Albin Michel, 2015, p. 39.

as children and troubled teenagers, etc., from ultimately seeing a robot as a person, which would lead to unprecedented challenges<sup>34</sup>.

While robots that faithfully imitate people might make for interesting research projects, they also carry considerable drawbacks. Aside from Masahiro Mori's "Uncanny valley" theory that the more a robot resembles a human, the greater the revulsion stirred by any imperfection<sup>35</sup>, various legal and ethical challenges are bound to arise if a living, or even deceased, human's face is replicated<sup>36</sup>.

#### 4.1.7. Avoiding the dissolution of social ties

Autonomous robots offer a remedy to various problems linked to aging populations. For example, robots assisting elderly people will allow senior citizens to remain at home, even if they lose their health or independence. Therefore, the public health service could make large savings since people would no longer need to go to a care home or a hospital. Moreover, care staff would also stand to benefit, as these robots could help them with their tasks, such as lifting patients.

However, such robots give rise to serious ethical issues. For example, as it will be less expensive for people to have robots rather than a human helper at home, there is a risk of machines becoming the norm and people the exception. Since the robot is supposed to improve a person's quality of life, it had better not end up isolating them from others. We should point out that this difficulty could potentially extend to other types of robot, such as robot companions, pedagogical robots or sex robots.

A roboethical principle should be established straightaway ensuring that a robot's presence does not dissolve social ties<sup>37</sup>. This could be broken down into two rules: 1) the robot shall act as an agent helping people who are elderly, sick or disabled to become more independent and autonomous; 2) the robot may not substitute humans entirely. It follows that if a person finds themselves alone with a machine for a certain length of time, the robot can be seen to have cut them off from society.

#### 4.1.8. Equal access to progress in robotics

To avoid creating a robotics divide, just as there is already a digital divide<sup>38</sup>, ensuring equal access to robots is essential. A distinction should be drawn between professional and non-professional users.

As regards non-professional users, the robotics divide could arise primarily because of the prohibitive cost of robots which makes them unaffordable to, for example, people requiring robot-assistance. With robots beyond their means, the person would also no longer gain the autonomy and independence for which they might have hoped. Of course, this difficulty arises in other areas too, as with surgery robotics. Access to technological benefits should be open to all, since European legislation anchors it in the principles of solidarity, equality and fairness. The Charter of Fundamental Rights of the European Union of 7 December 2000

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<sup>34</sup> See our aforesaid work, No 1265 et seq.

<sup>35</sup> Masahiro Mori, "The uncanny valley" *Energy*, Vol. 7, No 4, 1970, pp. 33 to 35. More recently, Masahiro Mori, "La vallée de l'étrange", in *Robots étrangement humains*, *Gradhiva* No 15, 2012, p. 27 et seq.

<sup>36</sup> See our aforesaid work, No 1286 et seq.

<sup>37</sup> See our aforesaid work, No 1299 et seq.

<sup>38</sup> Alain Rallet and Fabrice Rochelandet, "La fracture numérique : une faille sans fondement ?", *Réseaux* 2004/5, No 127-128, p. 21.

states in Article 20 that “everyone is equal before the law”. Moreover Article 35 states that “everyone has the right of access to preventive health care and the right to benefit from medical treatment under the conditions established by national laws and practices. A high level of human health protection shall be ensured in the definition and implementation of all Union policies and activities”. We need, therefore, to brainstorm solutions for financing surgical or personal assistant robots to ensure equal access to robots for all. We might consider harmonising national health care and social assistance policies to develop a public/private insurance scheme<sup>39</sup>. Tax incentives could also be put in place to encourage the purchase of health care robots. Should purchase of a robot, such as a robotic chair, become necessary following an accident, it could be paid for on insurance.

However, it is our view that the roboethical principle of equal access should be extended to all users, and not only those who are sick or disabled, through tailored financing solutions. In this way it could apply to the education sector.

As regards professionals, difficulties in accessing robotic technologies may stem from a lack of confidence in, or knowledge of, robotics, as is the case in industry, or from a financial shortfall. To further the development of robotics in Europe, it may be crucial to implement relevant policies, such as tax incentives. In this regard, the aforementioned Korean “Intelligent robots development and distribution promotion act” is very interesting since it assigns the State a degree of responsibility in developing and distributing smart robots, and introduces the general policies required to pursue this objective. Europe could embark upon similar policy initiatives and become the global leader in both producing robots and using robots in manufacturing.

#### 4.1.9. Restricting human access to enhancement technologies

It might seem paradoxical to seek to promote access to robotics and then to call for this access to be restricted. Yet there is no contradiction really, since here we are talking only about enhancement technologies. Indeed, since the beginning of time, people have always sought to overcome their physical shortcomings through corrective techniques. The oldest prosthesis dates back 3000 years. In the Cairo Museum in Egypt, there is even a mummy with an articulated toe, carved from wood, held in place using a leather girdle<sup>40</sup>. Nowadays, robotic prostheses are starting to become widely known and to spread throughout the world. Yet these are merely corrective technologies intended to restore human functions. As such, it might make sense to grant people that have been mutilated an entitlement to a robotic prosthesis<sup>41</sup>.

Very much part of the NBIC convergence, robotics leads to fears that ultimately humanity will no longer seek to merely fix but also enhance itself, i.e. to gain physical and/or mental characteristics which exceed standard human abilities. This desire for human enhancement is underpinned by the transhumanist current, which is very strong in the United States. It is rooted in the assertion that an individual is free to seek self-enhancement, particularly in order to live better or for longer. Taking things a step further, posthumanists would even like to fuse humans and machines, thereby creating a new type of hybrid creature: the posthuman, which would be a “cyborg” (or “cybernetic organism”). The ethical repercussions of transhumanism/posthumanism could be considerable. Humans in their current form would

<sup>39</sup> “Guidelines on Regulating Robotics”, *ibid*, PDF, p. 178.

<sup>40</sup> “Cairo toe earliest fake body bit”, *BBC News* [online], 27 July 2007, <http://news.bbc.co.uk/2/hi/health/6918687.stm>

<sup>41</sup> See our aforesaid work, No 1382 et seq.

be consigned to oblivion, obliging them to enhance or disappear. It would therefore appear essential that a roboethical principle be devised to curb such errances.

## 4.2. Analysing the legal value of the Charter on Robotics

Paragraph 6 of the motion for a resolution calls for a guiding ethical framework for the design through to use of robots, and then goes on to state that it "proposes, in the annex to the resolution, a framework in the form of a charter consisting of a code of conduct for robotics engineers, of a code for research ethics committees when reviewing robotics protocols and of model licences for designers and users". The Charter would therefore be an umbrella framework covering the robotics engineers' ethical code of conduct, the code for research ethics boards, the designer licence and the user licence.

Generally speaking, ethical charters, codes of conduct, good practice codes or codes of professional etiquette (since the label given may vary) are a sign that the professional sector concerned is regulating itself. For example, the Institute of Electrical and Electronics Engineers' 1990 code of ethics introduced several ethical rules for engineers, with public welfare in mind. In 2001, the OECD calculated that there were 256 codes of conduct from individual companies or areas of business<sup>42</sup>. They are an example of soft law, which is a tool often used to either avoid or anticipate formal legislation. As such, the European initiative to create an ethical charter for robotics is a first in that it was not the brainchild of the robotics sector itself.

However, the legal value of such codes may vary. Indeed, the words "charter" and "code of good conduct" are not legal terms<sup>43</sup>. More often than not, these ethical documents are tools used to communicate with clients, civil society or a company's employees. They often contain rights and obligations, principles, values or behaviours which those in the sector voluntarily undertake to respect. The motion for a resolution specifies that "the Code of Conduct is voluntary". In principle, failing a binding legal value, anyone found to have breached such ethical guidelines will mostly be punished by exclusion<sup>44</sup>. However, if the ethical guidelines impose real obligations, a judge may then be prompted to intervene, although on which basis is a difficult question<sup>45</sup>. In any event, these ethical guidelines, which are supposed to govern relations between the stakeholders involved, cannot be imposed on third parties, such as robot buyers. For example, in France, a judgment handed down by the commercial division of the *Cour de Cassation*, recalling the conventional nature of a code of practice, ruled that a company that had failed to abide by this code could not be forced to meet obligations not laid down in its contract<sup>46</sup>. The reverse would be the case if the obligations

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<sup>42</sup> "Corporate Responsibility: Private Initiatives and Public Goals", OECD report, 2001, p. 5.

<sup>43</sup> Paul-Henri Antonmattei and Philippe Vivien, "Charte d'éthique, alerte professionnelle et droit du travail français : états des lieux et perspectives", in "La documentation française, Rapport au ministre délégué à l'Emploi, au Travail et à l'Insertion professionnelle des jeunes", *Collection des rapports officiels*, January 2007, p. 15.

<sup>44</sup> Anne Debet, "Les chartes et autres usages du droit de l'internet", *Cahiers du droit de l'entreprise*, No 4, July 2008, 40.

<sup>45</sup> For example, some judges in France penalise not the violation of the charter (or code of conduct) per se but that of existing legal norms, *Tribune de Grande Instance de Rochefort sur Mer*, 28 February 2001, Comm. com. électr. 2002, comm. 59, obs. L. Grynbaum, on the basis of Article 1135 of the Civil Code, which states that "Agreements are binding not only as to what is therein expressed, but also as to all the consequences which equity, usage or statute give to the obligation according to its nature", repealed by ordonnance No 2016-131 of 10 February 2016 for the reform of contract law, the general scheme and proof of obligations, replaced by Article 1194 of the Civil Code, entering into force on 1 October 2016, which states that "Contracts are binding not only as to what is therein expressed, but also as to all the consequences which equity, usage or law give to them". *Tribune de Grande Instance de Paris*, ref., 15 January 2002, Comm. com. électr. 2002, comm. 59, obs. L. Grynbaum, on the basis of the contractual terms.

<sup>46</sup> Cass. com., 29 June 1993, No 91-21962, Bull. civ. 1993, IV, No 274, p. 194.

had made their way into the contractual sphere, since the robot buyer would then be bound to fulfil them.

On the other hand, a “code of conduct” may refer to documents of widely varying legal effect. Some codes of conduct are legally binding. In France, various professions quite often speak of a code of conduct; however, the only ones with legal force are those drawn up by French professional associations. They acquire regulatory status only once a decree has been published, after which, failure to fulfil a professional obligation can then be penalised. In any event, if a code of conduct has no binding legal force, and has not been contractually imposed either, it remains a mere set of ethical guidelines to those for whom it was intended.

Moreover, the notion of a licence might also prove tricky to interpret. In practice, a user licence is a type of agreement, commonly used with software, in which the holders of certain rights, particularly intellectual property rights, and a user set the terms and conditions for using the product concerned. It would seem, therefore, that the motion for a resolution offers a contractual template for such licences. As a result, one might think that the licence would only assume legal force if formalised in a contract. However, the designer licence, which imposes a number of obligations upon designers, appears even less solid upon analysis, appearing to have merely a moral force for the designer unless it acquires contractual force through, for example, being laid down in a contract between the robot designer and a customer.

Therefore, since the Charter is intended as an umbrella framework covering all codes and licences, it is likely to contain different ethical texts of varying binding force, although the Charter itself has no special legal status. This might complicate overall interpretation, and may even lead to an alignment of the legal force of the various codes and licences with that of the overarching text.

## REFERENCES

Antonmattei, Paul-Henri/Philippe Vivien: "Charte d'éthique, alerte professionnelle et droit du travail français : états des lieux et perspectives", in "La documentation française, Rapport au ministre délégué à l'Emploi, au Travail et à l'Insertion professionnelle des jeunes", *Collection des rapports officiels*, January 2007, **Error! Hyperlink reference not valid.**

Armstrong, Doree: "Emotional attachment to robots could affect outcome on battlefield", *University of Washington Today* [online], 17 September 2013, <http://www.washington.edu/news/2013/09/17/emotional-attachment-to-robots-could-affect-outcome-on-battlefield/>

Benoît-Rohmer, Florence: "La Charte des droits fondamentaux de l'Union européenne", *D.* 2001, p. 1483.

Boullier, Dominique: "Objets communicants, avez-vous donc une âme ? Enjeux anthropologiques", in "Ces objets qui communiquent. Perspectives technologiques et usages", *Les Cahiers du numérique*, pub. Lavoissier, Vol. 3, 4/2002, pp. 45-60.

Debet, Anne: "Les chartes et autres usages du droit de l'internet", *Cahiers du droit de l'entreprise*, No 4, July 2008, p. 40.

Jarvis, Ray: "Intelligent Robotics: Past, Present and Future", *International Journal of Computer Science and Applications*, 2008, Vol. 5, No 3, pp. 23-35.

Joy, Bill: "Why the future doesn't need us", in Allhoff, F. et al., ed., *Nanoethics. The Ethical and Social Implications of Nanotechnology*, pub. Wiley-Blackwell, 2007, pp. 17-39.

Mori, Masahiro: "The uncanny valley", *Energy*, Vol. 7, No 4, 1970, pp. 33 to 35.

Mori, Masahiro: "La vallée de l'étrange", in *Robots étrangement humains*, *Gradhiva* No 15, 2012, p. 27 et seq.

Nevejans, Nathalie: *Traité de droit et d'éthique de la robotique civile*, LEH édition, Bordeaux, coll. « Science, éthique et société », prefaces from Hauser, J. and Ganascia, J.-G., forthcoming, December 2016.

Nevejans, Nathalie: "Les robots : tentative de définition", in Bensamoun, A., *Les robots*, pub. Mare & Martin, coll. « Presses Universitaires de Sceaux », 2015, p. 79 à 117.

Nathalie Nevejans, "Le robot qui voulait devenir un homme... ou le statut juridique de l'androïde", in Defferrard, F., ed., *Le droit saisi par la science-fiction*, pub. Mare & Martin, coll. "Libre Droit", 2016, pp. 137-164.

Nevejans, Nathalie: "Les usines connectées", multidisciplinary symposium on "Les objets connectés", coordinated by Zollinger, A., Poitiers Faculty of Law, 23 September 2016, forthcoming.

Nevejans, Nathalie/Pourtallier, Odile/Icart, Sylvie/Merlet, Jean-Pierre: "Les avancées en robotique d'assistance aux soins sous le prisme du droit et de l'éthique", *Médecine et droit*, forthcoming.

Tisseron, Serge: *Le jour où mon robot m'aimera. Vers l'empathie artificielle*, pub. Albin Michel, 2015.

Vardi, Moshe Y.: "The Job Market of 2045. What will we do when machines do all the work?", *IEEE Spectrum* [online], 22 January 2013, **Error! Hyperlink reference not valid.**

Veruggio, Gianmarco/Operto, Fiorella: "64. Roboethics : Social and Ethical Implications of Robotics", in Siciliano, B./Khatib, O., eds., *Springer Handbook of Robotics*, pub. Springer, 2008, pp. 1499-1524.

Veruggio, Gianmarco, ed., "EURON roboethics roadmap", EURON roboethics Atelier, Genova, 27 February - 3 March 2006, July 2006, *Roboethics.org* [online], <http://www.roboethics.org/atelier2006/docs/ROBOETHICS%20ROADMAP%20Rel2.1.1.pdf>

"Guidelines on Regulating Robotics", *RoboLaw* [online], 22 September 2014, <http://www.robotlaw.eu/>

Report No 1 from the Commission de réflexion sur l'Éthique de la Recherche en sciences et technologies du Numérique d'Allistene, "Éthique de la recherche en robotique", November 2014, [http://cerna-ethics-allistene.org/digitalAssets/38/38704\\_Avis\\_robotique\\_livret.pdf](http://cerna-ethics-allistene.org/digitalAssets/38/38704_Avis_robotique_livret.pdf)







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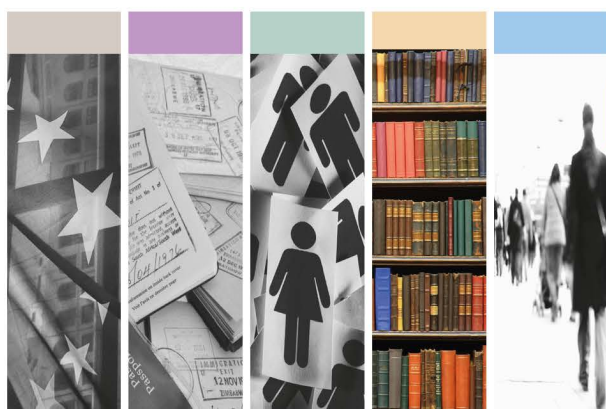
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