

The Regulation of Neuro-Rights*

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ABSTRACT The relationship between the law and neurotechnology is fascinating. Its impact strains the law at its seams: from a person's identity and their free will to liability for damages. This article explores neuro-rights. The constitutional reform undertaken by Chile and the Digital Rights Charter of the Government of Spain are two different ways to achieve the same end: regulating and protecting human rights against the advances of neurotechnology.

1. Introduction. Sciences are advancing at a crazy rate nowadays

Advances in medicine, neuroscience and biochemistry, alongside the development of artificial intelligence (AI) and computing, will enable us to have precise knowledge of the human brain and open the door to controlling it.¹ The speed of these scientific advances is increasingly affecting our lives.

Psychologists, magicians, politicians and advertisers know that the human mind is easy to manipulate, and they apply their knowledge to guide our will. Without needing to use invasive technologies, we also know that the human brain is undergoing important changes simply due to the use of technologies².

However, neurotechnologies represent a qualitative leap and a previously unknown ethical and legal challenge because they hold the key to intervening directly in our brains and controlling our thoughts. In 2014, a scientific team financed by the company Starlab managed to transmit a thought to another person located over 7,000 kilometres away. The scientist and futurist Ray Kurzweil even dares to set a date—2029—by when we will be able to incorporate AI into our bodies, in such a way that machine intelligence will

converge with human's.³

In this article, I will focus on the legal relevance of neurotechnologies, which could be defined in a very broad sense as the set of methods and instruments allowing a direct connection of technical devices with the brain and the nervous system, independently of whether they are invasive or non-invasive brain stimulation techniques.⁴ Neurotechnology is an interdisciplinary concept combining AI, information technology and neuroscience. Brain research has already made it possible to measure, record, alter and manipulate brain activity. This is known as neuromodulation or alteration of brain activity by introducing stimulation⁵.

In particular, it is necessary to start a new debate concerning the regulation of neuro-rights, in order to clarify whether it is better to regulate or not to regulate this issue.

Neurotechnologies improve the clinical diagnosis capacity and enable treatments to be tailored to patients. Brain stimulation using electrodes has been used for decades to study and treat certain diseases. No one is still surprised about magnetic resonance to capture brain images or cochlear implants, based on electrical impulses that reach the brain, for

* Article submitted to double-blind peer review.

This work has been developed within the research project *S22_20R Grupo Consolidado ADESTER* financed by the Autonomous Community of Aragón (Spain). It is also an adaptation of the conference paper presented at *WbinCICAC. Què son els neurodrets?*, Consell d'Advocats de Catalunya, 16 September 2021, on www.cicac.cat.

¹ Not just of the brain: AI is the basis of gene editing, which makes it possible to alter the DNA sequence. CRISPR technology develops treatments to address degenerative diseases and slow down ageing, see on www.agenciasinc.es.

² See L. Macknik Stephen and S. Martínez-Conde: *Los engaños de la mente*, Barcelona, Destino, 2010; D. Bueno i Torrens, *Cerebroflexia. El arte de construir el cerebro*, Barcelona, Plataforma Editorial, 2016.

³ R. Kurzweil, *How to Create a Mind. The Secret of Human Thought Revealed*, New York, NY, Wiking, 2012.

⁴ These devices come under the umbrella of cyber-physical systems (CPS) applied to the human body. CPS are mechanisms controlled by algorithms and AI so that the physical and software components are linked. From medical monitoring to robotic monitoring and including nanotechnology or robotic surgery, their development marks a before and after in the control of human brain processes.

⁵ T. Ausín, R. Morte, and A. Monasterio, *Neuroderechos: derechos humanos para las neurotecnologías*, in *Diario La Ley*, vol. 43, 2020; F.H. Llano Alonso and J. Garrido Martín (eds.), *Inteligencia artificial y derecho. El jurista ante los retos de la era digital*, Cizur Menor, Aranzadi, 2021.

deaf people. There are numerous techniques enabling direct intervention on the brain: deep stimulation (*brain pacemaker*), radioisotope therapy, transcranial magnetic stimulation, electroconvulsive therapy and others, which are used clinically to treat afflictions⁶.

Modern advances in neurotechnologies enable us to manipulate brain activity for various purposes. In 2014 an experiment conducted by scientists from the University of Pittsburgh enabled a young quadriplegic to touch or grasp an object through an implant in his brain connected to a robotic arm. With brain-machine interfaces (microtransmitters) brain processes can be observed and directed to treat patients that have suffered a stroke or neurological diseases such as Alzheimer's, Parkinson's, mental disorders and addictions. Devices are being tested for deep brain stimulation (DBS) to treat multiple diseases, and brain-computer interfaces that record brain activity and transfer it to control prosthetics or peripheral robotic systems.⁷

Their field of action is not limited to therapeutics and people suffering a pathology as they can stimulate and potentiate the intellectual capacities of healthy people as a result of 'cognitive improvement' or *neurocognition*.⁸ Warwick throws down the gauntlet: 'If you could improve by implanting a chip in your brain to expand your nervous system through the Internet, 'update yourself' and partially become a machine, would

you?'

⁹ Neurotechnological advances promise wellbeing for humanity, but, above all, we should evaluate their legal, ethical and moral risks. Not only do they threaten people's privacy and security, they also bring into play the very definition of what a person is.¹⁰

So far, we humans do not feel that our brain or our free will are actually threatened; we view it all as something almost akin to science fiction. However, independently of the rate at which neurotechnology is advancing, it must not take us by surprise and the law must be prepared to face these challenges.

2. The law is lagging behind reality

The law is always—as it should be—a step behind reality; nevertheless, as mentioned above, the crosscutting impact of neurotechnologies cannot leave it unaltered. However, when the law hastens to regulate technological advances (for example AI, drones, nanotechnology and biotechnology), it runs the risk of falling short. The legal framework is overwhelmed by technology and does not know how to cope with the new challenges. In unknown situations, the law usually takes refuge in pure formalities.

Many technological innovations jeopardise democracy and the role of states: metadata, digital identity, interconnectivity, cyber security, machine learning, process and decision automation, and so on. The COVID-19 pandemic has made them even more present.¹¹

⁶ N.A. Vincent, *Neurolaw and direct brain intervention*, in *Criminal Law and Philosophy* vol. 8-1, 2014, 43; R. Yuste, *Las nuevas neurotecnologías y su impacto en la ciencia, medicina y sociedad*, Lecciones Cajal 1, Prensas de la Universidad de Zaragoza, 2019.

⁷ For these and other examples, see *Los retos de la neurotecnología en tiempos de inteligencia artificial*, in *National Geographic*, 2020, on www.nationalgeographic.com.es, and *Los secretos del cerebro*, in *Uciencia*, vol. 9, 2012, on www.umadivulga.uma.es.

⁸ Technological companies (among others: www.starlab.es/team, www.bitbrain.com/es, <https://neuralink.com>, and <https://visionintegral.org>) develop brain-machine interfaces to connect humans directly with technology. These include from biosensors to monitor physiological and movement variables to devices capable of analysing our visual response to certain stimuli, monitoring our brain activity during activities or measuring consciousness. The applications of these technologies extend beyond care, and they cover fields such as paediatrics (child neurodevelopment), pedagogy, psychology or simply data processing.

The legal implications of what is known as transhumanist development is in J.L. Domínguez Álvarez, *Inteligencia artificial, derecho administrativo y protección de datos personales. Entre la dignidad de la persona y la eficacia administrativa*, in *Ius et Scientia* vol. 7-1, 2021, 309.

⁹ K. Warwick, *El futuro de la inteligencia artificial y la cibernética*, in *Hay futuro: visiones para un mundo mejor*, 2012, on www.bbvaopenmind.com.

¹⁰ Vv.Aa., *Traducir el pensamiento en acción: interfaces cerebro-máquina y el problema ético de la agencia*, in *Revista Bioética y Derecho* vol. 46, 2019, 29; A. Cortina, *La indeclinable libertad de los ciudadanos. Neuroética y neuropolítica*, in J. De la Torre (ed.), *Neurociencia, neuroética y bioética*, Madrid, Comillas, 2014; A. García and J.C. Abellán, *Derechos humanos, libre albedrío y neuroética. Retos biojurídicos de las neurotecnologías emergentes*, in *Medicina y Ética*, n. 3, 2019, 1031–1067.

¹¹ On the legal implications of digitalisation and AI in fundamental rights, see S. De la Sierra, *Digitalización y derechos fundamentales*, presented at Simposio sobre Digitalización y Derechos Fundamentales. Parte II. Tutela judicial efectiva en la era digital, 2021, on www.ibericonnect.blog; D. Canals, *El proceso normativo ante el avance tecnológico y la transformación digital (inteligencia artificial, redes sociales y datos masivos)*, in *Revista General de Derecho Administrativo*, vol. 50, 2019. One of the most interesting debates is the legal nature of algorithms that will end up replacing traditional laws (see A. Boix,

The unstoppable advance of neuroscience and neurotechnologies also leads us to rethink our own subjectivity as human beings, a debate that needs to address legal, ethical and moral issues.

And this is where we come across the construction of neuro-rights, which this article concerns. The aim is to prevent information on our brain from being used for purposes other than general interest. To prevent abuse and interference by these scientific advances we must know which tools the legislator and other authorities can draw on.

There are many questions that need answering. Do human rights protect against the risk of neurotechnology? Do new rights need to be created? Who should recognise them? Should constitutional reforms be fostered?

3. Freedom of research in neurotechnologies

Commentators have highlighted how contradictory it is that the same scientists studying ways to control our brain—captained by Rafael Yuste from the NeuroRights Foundation, perhaps the best-known voice—are also supporters of neuro-rights being recognised in the Universal Declaration of Human Rights. It seems they are shooting themselves in the foot because the law can, inevitably, throttle the development of neurotechnology.

Nevertheless, the fact that neuroscientists are concerned about protecting citizens from these abuses can only indicate one thing: the risk is real and not potential. They must be acutely aware of the ethical implications of their advances and how humans can change when absolute control of our brains is achieved.

The law cannot stifle neuroscience, but basic human rights come above any other interest.

Should we limit the development of neurotechnologies? We cannot prohibit the research, innovation and development of neurotechnology, but we can limit it: finding that balance is extremely complicated. Freedom of research in neuroscience would be limited by regulation, as is general research in bioethical matters.¹² Scientific advances and

the procedures and tools used to attain them generate significant ethical and legal uncertainties that must be properly regulated with the balance and prudence required by a matter so complex that it directly affects human identity.

The Convention for the Protection of Human Rights and Dignity of the Human Being with regard to the Application of Biology and Medicine (*Oviedo Convention*) was signed in 1997 in Oviedo (Spain). It is the main international legally binding instrument on the protection of human rights in the field of biomedicine.

It is a framework Convention aiming at protecting the dignity and identity of all human beings and guarantee everyone, without discrimination, respect for their integrity and other rights and fundamental freedoms with regard to the application of biology and medicine. It establishes fundamental principles applicable to daily medical practice and is regarded as such at the European treaty on patient's rights. It also deals specifically with biomedical research, genetics and transplantation of organ and tissues.

A future regulation of the freedom of research in this area should consider whether establishing some prohibitions is appropriate, such as those in the field of human embryos. If we apply the thesis defended by Cotino Hueso, we could extend the principle of technological precaution to reject neurotechnologies whose implementation involves a risk of irreversible damage or that are not transparent to control.¹³

I would like to underscore the importance of research ethics committees (RECs), since any biomedical research project—neuroscientific ones included, obviously—are subject to the evaluation of RECs. The evaluation extends to whether the main researcher and the research team are qualified as well as the viability of the project. But, above all, RECs consider the methodological, ethical and legal aspects of the research project' and the 'balance of risks and

293.

¹³ L. Cotino Hueso, *La necesaria actualización de los derechos fundamentales como derechos digitales ante el desarrollo de internet y las nuevas tecnologías*, in E. González, R. Rubio and B. Pendás (eds.), *España constitucional (1978-2018): trayectorias y perspectivas*, vol. 3, Madrid, Centro de Estudios Políticos y Constitucionales, 2018, 2347.

Algorithms as Regulations, in *European Review of Digital Administration & Law - Erdal*, vol. 1, Issue 1-2, 2020, 75, doi: 10.4399/97888255389608).

¹² F. Rivas, *Límites éticos y jurídicos de la investigación biomédica*, in *Revista de Derecho UNED*, vol. 18, 2016,

anticipated benefits emanating from the study. When the project involves an invasive intervention in human beings, the REC evaluation report must be prior, mandatory and favourable.

What about neurotechnologies? The research conducted by technological companies outside the medical field is unregulated, since their interdisciplinary approach falls outside medicine and includes biology, psychology, information technology, physics, engineering and mathematics.

That is why there is a proposal to extend controls equivalent to the ones performed by RECs to promoters and others (for example entrepreneurs and computer programmers) at companies developing disruptive technologies to act as good practices, a code of (technological) ethics or a *technocratic oath* attaching importance to legal and ethical aspects.¹⁴ This technocratic oath would incorporate seven basic ethical principles: beneficence and non-maleficence, autonomy, justice, dignity, privacy and transparency.¹⁵

As we will see, these technological ethical principles coincide with the design of neuro-rights, but in a self-regulation version. They are not regulations, neither are they legally enforceable, but they share the features of other codes of ethics, practices or professional conduct.¹⁶ The problem is that there are no

effective legal instruments to ensure compliance, although they can prove incredibly useful due to their authority. In all cases, public authorities should step in to safeguard citizen rights by means of tools as a model for evaluating ethical impact in the fields of health and research.¹⁷

European Parliament resolution of 16 February 2017 with recommendations to the Commission on Civil Law Rules on Robotics (2015/2103(INL)) ‘underlines the importance of urgently establishing in hospitals and in other health care institutions appropriately staffed committees on robot ethics tasked with considering and assisting in resolving unusual, complicated ethical problems involving issues that affect the care and treatment of patients; calls on the Commission and the Member States to develop guidelines to aid in the establishment and functioning of such committees’. The European Parliament also recommends the creation of independent trusted entities capable of providing people who have cyber-physical systems (CPS) or advanced medical devices with the services they need for maintenance, repairs and improvements, including software updates. Specifically, it suggests ‘creating an obligation for manufacturers to supply these independent trusted entities with comprehensive design instructions including source code, similar to the legal deposit of publications’.

4. The impact of neurotechnologies on a person’s identity and free will. Enhanced cyborg

Advances in neuroscience and neurotechnologies fully affect the law: from procedural law,¹⁸ to administrative law¹⁹ and

¹⁴ According to the Spanish newspaper *La Vanguardia* on 7 June 2021, www.lavanguardia.com, Facebook and IBM, encouraged by R. Yuste and his NeuroRights Foundation team, are collaborating in a project so that anyone working in neurotechnology, such as neuroscience doctors and researchers, will promise to uphold ethical principles. Apparently, they are already running pilot programmes in major technological companies so that their employees can endorse them.

¹⁵ The principle of non-maleficence means that the neurotechnology applied must not intend to cause damage. According to the principle of beneficence, it must contribute to the common good. The principle of autonomy of will requires having the consent of the affected parties. The principle of justice ensures that neurotechnology generates fair and impartial outcomes (without bias). According to the principle of dignity, everyone must be treated with respect and their integrity must be protected. Privacy requires deleting the sensitive and identifiable data of affected subjects. Lastly, the aim of the principle of transparency is to ensure the algorithms used are known. Source: *La Vanguardia*, 7 June 2021.

¹⁶ On the nature of the codes of ethics and conduct, see J.M. Cabra Apalategui, *Códigos éticos y función pública. Una aproximación desde la teoría del derecho*, in *Estudios de Deusto. Revista de Derecho Público*, vol. 68, n. 1, 2019, 19; O. Soro Russell, *¿Códigos de conducta o legislación?*, in *Revista General de Legislación y Jurisprudencia*, n. 1, 2014, 77.

¹⁷ R. Morte Ferrer, *Reflexiones sobre las evaluaciones de impacto. Una propuesta para un modelo de Evaluación de Impacto Ético en el ámbito de la salud*, in *Revista Internacional de Éticas Aplicadas*, vol. 32, 2020, 71.

¹⁸ For example, the neuroscientific test has a decisive impact in procedural and criminal law. The one known as the P300 truth test is a potential method of cognitive recall based on neurophysiological analysis of sensory responses captured by electrodes. In this test, terminals are placed on the subject to detect brain waves and obtain evoked potentials as electrical responses of the central nervous system when stimulated, which can be auditory or visual. An order of the Civil and Criminal Chamber of the High Court of Justice of Aragon, dated 20 July 2015, declared void the P300 test conducted on a man charged with murder because it was taken against his will. This was the first time a court had pronounced

including civil law,²⁰ labour law,²¹ and, of course, criminal law.²²

Furthermore, if law is a tool for regulating human behaviour and if neuroscience is the study of brain processes, then this leads to a new branch of law called *neurolaw*, which addresses how to make better laws and procedures based on advances in knowledge of the brain and which, as mentioned above, results in ramifications in all spheres of law besides ethics and philosophical issues. Coinage of the term is attributed to S. Tovino,

who warned about the scope that empirical study advances would have on the brain, given that the brain is considered essential for explaining human conduct.²³

Expert jurists in neurolaw must become used to working with interdisciplinary methodology in contact with medicine, bioethics and psychology.

In truth, we do not need to wait until invasive neurotechnologies are installed in our brains to reconsider personality and free will in law. Behavioural psychology shows us that we humans are not rational in our decision-making, that we are complex beings, with limited rationality, extremely emotional, influenced by social interactions but also by the context and our surroundings when making decisions that are totally biased.²⁴ A jurist sensitive to the evidence must take due note of our brains' limitations. Moreover, there are certain natural connections in the development of behavioural psychology, psychiatry and neuroscience, although the techniques and methods are far more

on a test affecting neurotechnology. The High Court of Justice of Aragon concluded that it cannot be equated to other expert evidence obtained through bodily intervention, but that it is equivalent to the accused's statement or confession and, therefore, it can only be performed with the subject's consent. For more details, see M. Taruffo and J. Nieva, *Neurociencia y proceso judicial*, Madrid, Marcial Pons, 2013; A. Sánchez Rubio, *El uso del test p300 en el proceso penal español: algunos aspectos controvertidos*, in *Revista electrónica de ciencia penal y criminología* n. 18-04, 2016, on <http://criminet.ugr.es/recpc>.

The techniques known as neuroimaging also apply to the process, see S. Desmoulin-Canselier, *La France à l'ère du neurodroit? La neuro-imagerie dans le contentieux civil français*, in *Droit et société*, n. 101, 2019; A. Martínez Sánchez, *Neuroimágenes y neurodisciplinas: sobre ciertas limitaciones de la utilización de la imagen por resonancia magnética funcional*, in *Revista Internacional de Filosofía*, n. 59, 2013, 115.

The ruling of the Administrative Chamber of the Provincial High Court, SAN 2350/2020, of 30 September 2020 (appeal no. 2187/2019), illustrates how the use of AI systems can impact inquiry into human conduct (here the system called Viogén used by the Civil Guard police to analyse the risk of gender-based violence) in a case of administration's pecuniary liability.

¹⁹ C. Amoedo-Souto, *El derecho administrativo español ante las neurociencias y el neuroderecho: desarrollos y perspectivas*, in *Ius et Scientia*, vol. 4, n. 1, 2018, 84; C. Amoedo-Souto, *De las neurociencias al neuroderecho: perspectivas de regulación jurídica del cerebro*, in *El Cronista del Estado Social y Democrático de Derecho*, n. 78, 2018, 42.

²⁰ B. Donnelly-Lazarov (ed.), *Neurolaw and Responsibility for Action*, Cambridge, Cambridge University Press, 2018.

²¹ J.A. Iglesias Cáceres, *La Carta de Derechos Digitales de España y su incidencia en los neuroderechos laborales*, in *Revista Jurídica del Trabajo*, vol. 2, n. 5, 2021, 92.

²² E. Demetrio Crespo (ed.), *Neurociencias y derecho penal. Nuevas perspectivas en el ámbito de la culpabilidad y tratamiento jurídico-penal de la peligrosidad*, Edisofer, Madrid, 2013.

C. Ariano recounts two rulings pronounced by the Trieste Court of Appeal (Italy) referring to the impact of neuroimaging techniques as a method of evidence in a criminal process (rulings n. 5, of 18 September 2009, and n. 40, of 20 July 2011). See C. Ariano, *Reflexiones sobre el neuroderecho*, in *Vox Juris*, vol. 32, n. 2, 2016, 101.

²³ S. Tovino, *The impact of Neuroscience on Health Law*, in *Neuroethics*, vol. 1, 2008, n. 101, doi: 10.1007/s12152-008-9010-z.

In this regard, see J.J. García Deltell, *El neuroderecho y el impacto de las neurociencias como nuevo paradigma para la filosofía del Derecho*, in *Bioética, neuroética, libertad y justicia*, Comares, Granada, 2013, 920; N. Zavakivker, *Metodología del neuroderecho*, in G. Lariguet (ed.), *Metodología de la investigación jurídica: propuestas actuales*, Córdoba, Brujas, 2016, 367; C.A. Gómez Pavajeau and C. Gutiérrez de Piñeres, *Neurociencias y Derecho. Reflexiones sobre la cognición social, el libre albedrío, la dignidad humana, la culpabilidad y la prueba novel*, Bogotá, Universidad del Externado de Colombia, 2017; A. Petoft and M. Abbasi, *Current limits of neurolaw: A brief overview*, in *Médecine & Droit*, 2020.

²⁴ The US National Academy of Sciences published the results of the experiment of three scientists from Ben-Gurion university of the Negev and Columbia entitled 'Extraneous factors in judicial decisions'. For months, the scientists analysed the decisions of a judicial board responsible for hearing prisoners' requests for parole. The study came to a simple conclusion: justice is influenced by what the judge had for breakfast. The results revealed that, at the start of the day, the likelihood of the accused obtaining a favourable ruling could rise to 65% and gradually decreased to 0% throughout the morning. After the lunch break, the likelihood of receiving parole again rose to 65%. In short, hungry judges tired by their work tend to make the easiest decision for the human brain, which consists, in this and in other cases, of refusing parole requests. See D. Kahneman, *Thinking, Fast and Slow*, 2011. Other studies show the effect of external factors in examinations. A general overview of the manipulation of our cognitive biases can be found in J. Ponce (ed.), *Acicates (nudges), buen gobierno y buena administración*, Marcial Pons, Madrid, 2022.

sophisticated now. In the case of behavioural psychology, as in neuroscience, the goal is the same: discovering the reasons for human behaviour to try to change it or modulate it for our own purposes. In short, the principle of free will, which forms our identity as people, is at stake. Neurotechnologies, however, are an extremely intense intervention in our brains because they use AI tools and, therefore, they open the door to a hacker being able to control our decisions and thoughts without our consent, even without being aware it is happening.

As it is linked to the regulation of neuro-rights, I will refer briefly to the debate on the identity of cyborgs, venturing into areas bordering on neuroethics.²⁵ The term cyborg was used for the first time in the 1960s to describe an individual modified to improve their adaptation to space travel, to an ‘enhanced human’ capable of controlling their physiological variables and surviving in alien environments.²⁶

The term *cyborg* or *cybernetic organism* can be defined as a being formed by live matter and electronic devices. According to this broad concept, any human intervened by technology (a deaf person with a cochlear implant, a diabetic with a continuous glucose monitoring device or a person with a pacemaker) would be considered a cyborg. No

²⁵A. Canabal Berlanga, *Origen y desarrollo de la neuroética 2002-2012*, in *Revista de Bioética y Derecho*, n. 28, 2013, 48–60; N. Zavadikver, *Metodología del neuroderecho*, 367.

The debate is also connected to robots and whether we should recognise them as having a personality. As in the film *Eva* by Kike Maíllo, “when robots are as sophisticated as humans, they will be as imperfect as humans”. *Eva* is a 2011 Spanish film set in a future society in which humans live accompanied by robots. Among other awards, it won a Goya award for best new director.

Civil personality is a useful tool for solving problems such as liability for damages or a criminal charge arising from the actions of robots. European Parliament resolution of 16 February 2017 with recommendations to the Commission on Civil Law Rules on Robotics (2015/2103(INL)) reviews all these implications and underscores the need to regulate the system of liability, research into robotics and the link to ethical principles.

In contrast, another doctrinal sector rejects this robotic personality. See M. Lacruz, *Robots y personas. Una aproximación jurídica a la subjetividad cibernética*, Barcelona, Reus, 2020.

The debate is remarkably similar to the one considering extending personality to animals, see C. Rogel Vide, *Personas, animales y androides*, in *Revista General de Legislación y Jurisprudencia*, vol. 4, 2017, 681.

²⁶ I. Sádaba, *Cyborg. Sueños y pesadillas de las tecnologías*, Madrid, Península, 2009.

one questions that the protection of human rights extends to human beings combining living matter with electronic devices. The cyborg does not substantially change the legal principles of free will or personal identity. Human cyborgs are natural persons and their identity as subjects of rights is not altered.²⁷

They could cause other legal problems.²⁸

We are already debating the limits that should be imposed on the use of devices implanted into the human body (electronic prosthetics and orthotics) to improve our physical abilities in sports competitions.²⁹ However, the legal system does not have effective solutions for some of the conflicts. The activist known as Meow-Meow implanted the travel card chip of the city of Sydney (Australia) into his hand. This enabled him to place his hand over optical readers to gain access to terminals. But when the transport authority officials asked him to show his travel card, they considered that he did not have a valid ticket. His chip was deactivated, and they fined him for travelling without a ticket.³⁰ That is why I believe the concept of cyborg should be outlined for legal purposes because humans that have an electronic device in their body, which is occurring more and more frequently, cannot be defined as one. I doubt whether people with these electronic devices in their body consider themselves to be cyborgs.

In my opinion, the differential factor is *enhanced cyborg*, which, if we consider that neurotechnology promises tools to improve cognition, is a category with more legal rough edges. Increasing our cognitive abilities leads us to imagine situations that strain the law at its seams. Specifically, will we allow people who have improved their abilities with a microchip or brain implant capable of memorising data to sit examinations? How

²⁷ S. Camacho Clavijo, *La subjetividad cyborg*, in S. Navas (ed), *Inteligencia artificial. Tecnología y Derecho*, Valencia, Tirant lo Blanch, 2017, 231.

²⁸ H.M. Amorim and R.C. Cardoso, *El ciborg en el umbral de la humanidad: redefiniendo la persona natural*, in *Revista de Bioética y Derecho*, n. 46, 2019, 67, on www.bioeticayderecho.ub.edu; J.E. Cárcar Benito, *El transhumanismo y los implantes cerebrales basados en tecnologías de la inteligencia artificial: sus perimeters neuroéticos y jurídicos*, in *Ius et Scientia*, vol. 5, n. 1, 2019, 157–189.

²⁹ S.I. Verdugo Guzmán, *Bioteología, ética e implicaciones jurídicas ante los ciborg-atletas*, in *Ius et Scientia*, vol. 5, n. 1, 2019, 112.

³⁰ The court ended up siding with Meow-Ludo Disco Gamma Meow-Meow, on www.theguardian.com/australia-news/2018/jun/18/man-who-implanted-opal-travel-card-chip-has-conviction-overturned.

will a brain implant capable of controlling our impulses or our behaviour impact the system of liability for damages?

These are problems that the law has already had to resolve when advances in psychology, psychiatry, medicine and neuroscience have expanded knowledge of the human brain. The situation of an athlete who takes performance-enhancing drugs to achieve better results or a student who takes psychotropic substances to achieve better grades in an examination may not differ greatly from the situation of an enhanced cyborg. The law establishes a red line separating the legality of certain technological advances from illegality, as it did to prohibit doping in sports. Now the challenge is huge because neurotechnology is more sophisticated and uses intrusive AI-driven techniques that easily slip out of the interested party's control.

In this regard, there is a movement fighting to have a special statute of rights recognised for cyborgs that is closely related to the scenario in which the debate on neuro-rights takes place, especially as far as transhumanism is concerned.³¹

5. To regulate or not to regulate: that is the question

Up to this point, it is clear that neurotechnological advances challenge the legal configuration of our identity as people and, by extension, of our free will. We must also reflect on the need to expand the existing legal framework to address the use and abuse of neurotechnologies. One of these proposals relates to neuro-rights and recommends creating new human rights to protect the privacy of our brain and our thoughts against external attacks.

5.1. Definition and design of neuro-rights

The neologism *neuro-rights* refers to the new human rights protecting the privacy and integrity of people against the abusive use of neurotechnologies. We could define neuro-rights as rights protecting people from knowledge of the brain. Neuro-rights are ethical, legal and social principles of freedom

related to the ownership of people's brains and thoughts, in other words, rights protecting the human brain and thoughts.

As mentioned above, the law is based on the premise that we humans have the capacity to choose freely (autonomy of will or free will). But what will happen when humans are exposed to others knowing our emotions and introducing thoughts in our heads? That is why attention must be paid to neuro-rights. European Parliament resolution of 16 February 2017 with recommendations to the Commission on Civil Law Rules on Robotics (2015/2103(INL)) already highlights the risks of manipulating or switching off devices integrated in the human body or even wiping memories, which could endanger human health.

The creation of neuro-rights is based on two premises: mental privacy (conscious or unconscious) and personal identity.

M. Ienca and R. Andorno designed the creation of four neuro-rights to protect us from the threats of neurotechnologies.³²

The *right to cognitive liberty or mental self-determination*, an update of the right to freedom of thought and consciousness.

The *right to mental privacy*, which protects against any information that can be obtained from our brains by neurotechnologies and distributed by digital media, to prevent leaks of these data.

The *right to mental integrity*, concerning the idea that intrusions in the brain not only affect privacy but can also involve an alteration of a person's neural computation.

The *right to psychological continuity*, which ensures the perception of our own identity as human beings.

R. Yuste proposes designing a regulatory framework recognising five new basic human rights.³³

The *right to mental privacy*, ensuring no one can use data related to the activity of neurons, which support thinking, without the subject's consent.

The *right to personal identity and autonomy* to ensure people do not lose their identity as human beings when neurotechnologies enable control of our brain. R. Yuste specifically considers that the right

³¹ The Cyborg Foundation, www.cyborgfoundation.com, cofounded by N. Harbisson, the first cyborg recognised as such, fights for recognition of a range of rights for cyborgs, such as equal rights with natural persons or the right to design themselves as a species.

³² See M. Ienca and R. Andorno, *Towards new human rights in the age of neuroscience and neurotechnology*, in *Life Sciences, Society and Policy*, vol. 13, 2017, on <https://lsspjournal.biomedcentral.com>.

³³ R. Yuste, *Las nuevas neurotecnologías*, 2019.

to personal identity is not recognised as such in any international instrument protecting human rights, which is why its regulation is especially important.

The *right to cognitive liberty* (free will or self-determination) to ensure people make their decisions freely. If our brain is connected via a brain activity reader to a computer, the risk is that we will not be free to make decisions or that a third party will be able to invade our brain, just as a hacker can seize our computer now.³⁴

The *right to fair access to enhanced neurorecognition*, which enables humans to improve their brain activity. The aim is for this cognitive increase to be accessible to everyone on an equal basis and not to be reserved to just one sector of society (the one with the most resources).

The *right to protection against the biases of AI* so that neurotechnology knowledge does not discriminate against people because of their race, colour, gender, language, religion, opinion, national or social origin, financial position, birth or any other condition.

5.2. Who should regulate?

Once neuro-rights have been designed, the question of how to regulate them arises. R. Yuste and S. Goering recommend incorporating clauses that protect neuro-rights in the highest international instruments such as the 1948 Universal Declaration of Human Rights or the 1950 European Convention on Human Rights.³⁵ However, aware that agreement among states is complicated, they advocate an international agreement defining which actions are considered prohibited in relation to neurotechnologies and AI, similar to the prohibitions listed in the 2010 International Convention for the Protection of All Persons from Enforced Disappearance, which, while not containing rights, does outline common actions.

S. Muñoz Machado and J.L. Piñar also agree on the need for international regulation so that the protection of rights against technologies will not end up as mere words or good intentions.³⁶ De la Quadra-Salcedo also

broaches the need to reflect on whether the regulation of these rights must be comprehensive or only found in sector legislation.³⁷

Currently, these international organisations, such as the UN³⁸ and the Council of Europe,³⁹ have restricted themselves to making declarations and recommendations in which we can see some interest in protecting human rights against technologies. But neuro-rights as such are not mentioned specifically.

The European Union has also revealed its concern for the impact of the Internet and AI advances in rights such as privacy, freedom of speech or data protection. The Commission's communication entitled Artificial Intelligence for Europe (COM(2018) 237 final) outlines the ethical and legal problems of new technologies. It specifically states that 'the EU must therefore ensure that AI is developed and applied in an appropriate framework which promotes innovation and respects the Union's values and fundamental rights as well as ethical principles such as accountability and transparency'. The communication adopts the objective of ensuring 'an appropriate ethical and legal framework, based on the Union's values and in line with the Charter of Fundamental Rights of the EU'. But, as I have said, there is no direct or indirect mention of neuro-rights.

The EU general data protection regulation 2016/679 (GDPR) may also play an indirect

derecho en internet, Madrid, Taurus, 2000; J.L. Piñar Mañas, *Sociedad, innovación y privacidad*, in *Información Comercial Española ICE*, vol. 897, 2017, 67.

³⁷ T. De la Quadra-Salcedo, *Retos, riesgos y oportunidades de la sociedad digital*, in T. De la Quadra and J.L. Piñar (eds.), *Sociedad Digital y Derecho*, Madrid, BOE, 2018, 21.

³⁸ The Office of the United Nations High Commissioner for Human Rights has produced several reports on privacy in the digital era, which do not address mental privacy or neuro-rights. Its report *Impact of new technologies on the promotion and protection of human rights in the context of assemblies, including peaceful protests* (A/HRC/44/24, of 24 June 2020) focuses on the practices of face surveillance and facial recognition and its report *The right to privacy in the digital age* (A/HRC/39/29, of 3 August 2018) focuses on the impact of networks and the Internet on data privacy.

³⁹ In 2018 the committee of experts on human rights of the Council of Europe approved a draft of recommendations for Member States on the impact of algorithms on human rights (*Addressing the impacts of Algorithms on Human Rights*, MSI-AUT(2018)06rev3), which advises reviewing national regulations and offers guidelines for that purpose.

³⁴ This is a possibility already addressed in criminal law. See: 'Can You "Hack" the Human Body?' on the blog *OpenMind* at <https://bbvaopenmind.com>.

³⁵ R. Yuste and S. Goering, *Four ethical priorities for neurotechnologies and AI*, in *Nature*, n. 551, 2017, 159, DOI: 10.1038/551159a.

³⁶ S. Muñoz Machado, *La regulación de la Red, poder y*

role. According to Article 22 GDPR ‘the data subject shall have the right not to be subject to a decision based solely on automated processing, including profiling, which produces legal effects concerning him or her or similarly significantly affects him or her’. This rule could be a safeguard of the right to cognitive freedom. However, the current response of EU law is insufficient.

The year 2021 was especially prodigious in documents and proposals for regulating digital rights. The European Commission promotes a ‘Declaration of Digital Principles’ so that Member States can address the legal and ethical challenges of the digital society to implement the one known as 2030 Digital Compass: the European way for the Digital Decade (COM(2021) 118 final). This initiative places respect for citizens’ rights, specifically privacy, data protection, freedom of speech, the child and consumer, at the heart of digital citizenship. The Proposal for a Regulation Laying Down Harmonised Rules on Artificial Intelligence (COM(2021) 206 final) affects the guarantee of the EU’s fundamental rights, but it does not refer to neuro-rights either.

Finally, it has been the states, in isolation, that have made a move in this regulatory endeavour. Besides Chile, which I will refer to in the next section, other countries such as Brazil,⁴⁰ Italy,⁴¹ Germany⁴² and Spain,⁴³ have

begun initiatives aimed at protecting human rights against the abuse of (neuro)technologies. They are proposals taking the form of recommendations or guiding principles, which means they follow the soft law formula.⁴⁴ Neither is their specific objective the protection of neuro-rights but rather, more broadly, personal identity and data against Internet abuses.

5.3. Critical voices: What’s new?

Identifying a standard definition of neuro-rights and how to address them legally is a new and challenging task. It is normal for criticism to be voiced. The essential controversial points can be summarised in one: the inconvenience of a specific regulation of neuro-rights for the simple reason that they would already be protected by human rights recognised in international treaties and constitutional texts.

The main point of discrepancy is, as I said, that they are unnecessary.⁴⁵

These critical voices refute that these rights are strictly new. Already recognised human rights, such as the right to equality, physical and mental integrity, data protection or freedom of speech already protect against the abuses of neurotechnologies.⁴⁶ At most the

human dignity, self-determination, privacy and security. This commission has designed a regulation proposal based on risk levels depending on the likelihood and severity variables of damage caused by algorithms.

⁴³ In 2021 the Government of Spain approved a Digital Rights Charter that includes digital rights in the use of neurotechnologies, which will be analysed in detail due to its novel nature.

I am not going to talk about other initiatives here established by autonomous governments and even local authorities, which are producing their own digital rights charters, for example Catalonia (Catalan Charter of Digital Rights and Responsibilities, on <https://participa.gencat.cat>).

⁴⁴ In the dichotomy between legal rules and soft law, A. Mozo Seoane seems to prefer the second option in the field of emerging technologies. However, he also highlights the need to find precise limits for both normative spaces. See A. Mozo Seoane, *Los límites de la tecnología. Marco ético y regulación jurídica*, Barcelona, Reus, 2021.

⁴⁵ P. López-Silva and R. Madrid, *Sobre la conveniencia de incluir los neuroderechos en la Constitución o en la Ley*, in *Revista Chilena de Derecho y Tecnología*, n. 10, 2021, 49; N. Walker Silva, *Ciborgs y neuroderechos: luces y sombras de la inteligencia artificial*, 2021, on <https://idealex.press>.

⁴⁶ However, N. Reche Tello draws attention to the fact that brain data cannot properly be considered personal data and, therefore, the current legal framework would not be an effective tool against the risks of neurotechnologies. N. Reche Tello, *Nuevos derechos*

⁴⁰ The Brazilian Congress approved the Civil Internet Framework in 2014 to ensure the right of privacy of communications, among other rights.

⁴¹ Italy was the first European state to approve a declaration of Internet rights. In 2015, the Italian Chamber of Deputies approved a Declaration of Internet Rights, which, although it mentions neuro-rights, opts to extend the guarantee of already recognised human rights to this new technological environment. Consequently, article 1 of the Declaration recognises that: ‘1. The fundamental rights of every individual enshrined in the Universal Declaration of Human Rights of the United Nations, the Charter of Fundamental Rights of the European Union, national constitutions and other relevant international declarations shall be protected on the Internet. 2. These rights shall be interpreted to ensure their enforceability on the Internet. 3. The recognition of rights on the Internet shall be based on comprehensive respect for the dignity, freedom, equality and diversity of each individual, which constitute the underlying principles for balancing these with other rights.’, on www.camera.it/application/xmanager/projects/leg17/commissione_inter_net/testo_definitivo_inglese.pdf.

⁴² In 2019 the German government established a Data Ethics Commission (*Datenthikkommission*) advocating a new European regulation on algorithmic systems and establishing general horizontal requirements that should be developed by sector rules, including the guarantee of

material aspect of these rights would have to be adapted or extended, but no new category would have to be created.

That is why I also agree with the criticism that the constitutional enshrining of neuro-rights—which is the path Chile has taken—is not justified. However, we do recognise that, given the advance of neurotechnologies and AI, these rights are increasingly more vulnerable and easier to attack.

Human rights are pervious to new human requirements and adapt to them. For example, the fundamental right to the inviolability of the home and the individual's right to physical and mental integrity have become a protective shield against noise pollution. This was recognised by the jurisprudence of the European Court of Human Rights (ECHR of 16 November 2004, the case of *Moreno Gómez v. Spain*).

In short, there is nothing in neuro-rights that enables them to be identified as new rights, unlike what happened when the rights known as *second- or third-generation rights* (economic, social and cultural) were added to *first-generation rights* (civil and political). The idea is for neuro-rights to fit into a *fourth generation of human rights*, but they do not have enough autonomy and they are identified with rights that are already assured by international treaties and constitutional texts.

Even the design of neuro-rights has been criticised for possibly not sufficing to protect us from the advances of neurotechnologies. These voices warn, with the same future anticipation, that other rights—or all of them?—could be threatened by neurotechnologies. For example, the right to property could be contravened if, by reading neurodata, someone seized protected and sensitive content (passwords and similar). However, there is no proposal to create a new *neuro-property Law*.

To prevent new threats from limiting old human rights, the best way forward is not to create more rights. Human rights are constantly exposed to new threats. The right to privacy, for example, protects people against both the written press and video surveillance or face recognition technologies. The universal system for the protection of human rights, which has taken 75 years to build,

frente a la neurotecnología: la experiencia chilena, in *UNED. Revista de Derecho Político*, n. 112, 2021, 415, on doi.org/10.5944/rdp.112.2021.32235.

install and consolidate, cannot suddenly be questioned because of a new legal construction that needs more rigorous assessment. Creating new rules for a field with such nascent findings is inappropriate.⁴⁷

The pioneering ruling of The Hague District Court on predictive algorithms is a good example of this. In fact, an intriguing conflict arose in the Netherlands in relation to data privacy against the risks of governmental surveillance, from which interesting conclusions can be extracted for the construction of neuro-rights. In 2014 the government began an algorithm-based predictive tracing system known as SyRI to determine which citizens were allegedly more inclined to defraud the state. The ruling of The Hague District Court, of 5 February 2020 (Case NJCM c.s./De Staat der Nederlanden (SyRI case), no. C/09/550982/HA ZA 18/388) upheld the appeal as it concluded that the predictive algorithm violates Article 8 of the European Convention on Human Rights regarding the right to a private life.

The matter caught the attention of the UN Special Rapporteur on extreme poverty and human rights, who sent a report to the court criticising the inequality that the state surveillance creates for more disadvantaged collectives,⁴⁸ and it focuses attention on how hard it is for AI and neurotechnologies to attain knowledge of humans' behaviour by studying their brain.⁴⁹

⁴⁷ Doubts have been raised about the success of European and US neuroscientific projects to map the brain, given they are far removed from initial aspirations due to bureaucratic reasons, among others. There is a critical outline in E. Mullin, *How big science failed to unlock the mysteries of the human brain*, 2021, on www.technologyreview.com.

Furthermore, the findings on our brain are still limited and they do not enable us to understand the scope of human decisions at the moment. Let us suppose that we must sign a document. When we do this, our brain activates a series of neural firings. We could be signing a cheque or an autograph, authenticating a will or authorising a sale or a death certificate. The neural firing is the same in each case. Yet the meaning of what we have done when signing is completely different. Today, cognitive neuroscience is only capable of identifying where these neural firings come from, but it has no more idea of their significance than social media does when we like an image.

⁴⁸ See G. Lazcoz and J.A. Castillo, *Valoración algorítmica ante los derechos humanos y el Reglamento General de Protección de Datos: el caso SyRI*, in *Revista Chilena de Derecho y Tecnología*, n. 9, 2020, doi:10.5354/0719-2584.2020.56843.

⁴⁹ In fact, there are ethical and philosophical critics who believe that protecting neuro-rights equates to a mistaken reductionist theory of neuroscience. That is

6. Chile, world laboratory for neuro-rights

So far, Chile is the only country that has begun a constitutional reform procedure and that is processing a bill to expand its framework of fundamental rights to include neuro-rights. The initiative is based on two means that have been processed in parallel: constitutional reform and a supplementary bill on the protection of neuro-rights and mental integrity.⁵⁰

6.1. Bill on the protection of neuro-rights and mental integrity

On 7 October 2020 a group of Chilean senators led by Guido Girardi, a member of the Commission of Future Challenges, Sciences, Technology and Innovation, introduced an initiative to regulate by law the protection of neuro-rights and mental integrity, the implementation of research and the development of neurotechnologies. The Spanish neurobiologist Rafael Yuste, director of the famous BRAIN project, enthusiastically supported by the rector of the Pontifical Catholic University of Chile and senator Girardi, had participated actively in the proposal.⁵¹

The recitals in the bill are extremely long, but the substantive provisions are quite short and structured into three titles and ten articles. The first striking aspect of the bill is that it does not contain a list of neuro-rights, neither are they classified as subjective rights. As they are new rights, it would have been preferable if they had been named and defined, and for their mechanisms to have been regulated to make them effective. However, the bill is limited to describing a series of prohibitions concerning research into neurotechnologies

why they support the need to construct new rights to protect the brain. However, a human's identity is not identified with the brain.

⁵⁰ A general overview of these reforms can be found in C. Weidenslauffer and R. Roberts (*Informe de frontera: asesoría científica legislativa para apoyar la tramitación de proyectos de ley en temas de vanguardia científica y tecnológica*, in *Revista Chilena de Derecho Parlamentario*, n. extra. 50+1, 2021, 722), who also focus on the legislative process method and its distinctive features, since a compared legislation or compared public policies illustrating the handling of neuro-rights in other countries is not provided here.

⁵¹ It is called Bill, initiated by motion of the honourable senators Mr Girardi, Ms Goic, Mr Chahuán, Mr Coloma and Mr De Urresti on the protection of neuro-rights and mental integrity and the implementation of research and neurotechnologies, Gazette n. 13.828-19, www.diarioco.nstitucional.cl.

and their advances. This deficient legislative technique has been criticised as it leads to legal insecurity.

The bill's text includes partial references to neuro-rights. Article 1 a) simply recognises the objective of 'protecting people's physical and psychical integrity by protecting the privacy of neural data, the right to autonomy or freedom of individual decision, and of access with no arbitrary discriminations against neurotechnologies involving an increase in psychical capacities'.

According to Article 3, 'any interference or form of intervention into neural connections or intrusion into the brain using neurotechnology, brain-computer interface or any other system or device is prohibited without the free, express and informed consent of the person or user of the device, even in medical circumstances. Even when the neurotechnology is capable of intervening without the person being aware of it'. This precept of the bill seems to include two of the (neuro)rights: the right to the privacy of neural data and the right to cognitive liberty.

In accordance with Article 4 of the bill, 'any system or device, whether neurotechnology, brain-computer interface or other, whose purpose is to invasively or non-invasively access or manipulate neural activity, is prohibited if it can damage the psychological and psychical continuity of the person, in other words, their individual identity, or if it decreases or damages the autonomy of their will or ability to make a decision freely'. Given its content, the bill seems to be referring here to the (neuro)right to personal identity and autonomy.

The other neuro-rights are even more diluted in the bill's articles. Article 10 provides that the state will ensure 'equal access to advances in neurotechnology and neuroscience', which seems to be a reference to the (neuro)right of fair access to enhanced neurorecognition, without calling it that, linking it to Article 1 a) of the bill.

However, we have not found references to the neuro-right that protects against the biases of neurotechnology. It is possible that it is hidden in the objective of 'ensuring information for users of neurotechnologies on their potential negative consequences and secondary effects', recognised in Article 1c), although it is more linked to autonomy or freedom of decision.

As I mentioned, several dissenting voices

have already criticised the bill's deficient regulatory techniques and the inconsistency between the message in the bill's recitals and its articles. The legal technique the bill contains to provide the promised protection for mental integrity and privacy is the inclusion of prohibitive and some imperative precepts, but none of the articles *define a subjective right*. How is it possible for a bill seeking to protect neuro-rights not to include subjective rights? It gives the impression that it is legislating without properly understanding what it wanted to protect or that it is simply a matter of announcing to the world that Chile is approving pioneering legislation. It is, but the innovation should not overlook legal security.

In fact, the bill does not include recognition of neuro-rights but rather 'measures to protect mental integrity and privacy' in the form of limits or prohibitions to research in neuroscience and neurotechnology. Many precepts are ambiguous, such as the distinction between mental integrity and psychical integrity or the very concept of neurotechnologies.

6.2. Act No. 21383 on constitutional reform

The processing of the bill on neuro-rights was preceded by a motion to reform the 1980 Political Constitution of the Republic of Chile, also promoted by the senators Girardi and Goic, on 7 October 2020. The motion aimed to introduce a new paragraph in number 1 of Article 19 of the Political Constitution of the Republic of Chile, which regulates people's right to life and physical and psychical integrity to protect mental integrity and indemnity against the advances of neurotechnologies.

After the appropriate parliamentary procedure,⁵² Act no. 21383 was approved on 14 October 2021 and published in the official gazette on 25 October 2021, which modifies number 1 of Article 19 and adds a new section on the limitations of scientific and technological development.

Scientific and technological development shall be at the service of people and shall be conducted with respect for life and physical and psychical integrity. The act shall regulate requirements, conditions and restrictions for

use in people, and brain activity, as well as information from it, must be especially protected.

The modification brought about by Act 21383 involves express constitutional recognition of advances in science and technology being at the service of people and having to respect the right to life and physical and psychical integrity. The—surely superfluous—mention is rounded off with a reference to ordinary law so that it regulates the requirements, conditions and restrictions of the use of neurotechnology when it affects people and endangers brain activity. In any event, Act No. 21383 avoids any mention of neuro-rights.⁵³

7. The soft law model. The digital rights charter of the government of Spain

In July 2021, the Government of Spain introduced the Digital Rights Charter with the aim of protecting citizens' rights in the new era of the Internet and AI (hereinafter simply the charter).

The charter contains six categories of rights, including a list of digital rights in specific contexts (section 5), which includes a set of digital rights in the use of neurotechnologies (section: 5.XXVI). The charter text is reproduced below:

- 1) The conditions, limits and guarantees of implanting and using neurotechnologies in people may be regulated by the law with the purpose of:
 - a) Guaranteeing every person's control over their own identity;
 - b) Guaranteeing individual self-determination, sovereignty and liberty in decision-making;
 - c) Ensuring the confidentiality and security of data obtained or relative to their brain processes and complete ownership and disposal of them;
 - d) Regulating the use of person-machine interfaces that can affect physical or psychical integrity;
 - e) Ensuring that the decisions and processes based on neurotechnologies are not

⁵² Learning about the passage of this bill is fascinating. See document History of Act n. 21383, Library of the National Congress of Chile, www.bcn.cl/historiadelaley.

⁵³ We should remember that Chile is in the middle of a constitutive phase, processing a constitutional reform bill that will replace the 1980 Political Constitution. We do not know whether neuro-rights will find any space here, as M.I. Cornejo Plaza (*Neuroderechos en Chile: consagración constitucional y regulación de las neurotecnologías*, 2021, on <https://agendaestadodederecho.com>) points out.

conditioned by the supply of data, programmes or incomplete, unwanted, unknown or biased information.

- 2) To ensure people's dignity, equality and non-discrimination, and in accordance with international treaties and agreements, if applicable, the law shall be able to regulate those cases and conditions when, beyond their therapeutic application, the aim of neurotechnologies is cognitive augmentation or stimulating and strengthening people's abilities.

Digital rights, the counterpart of the idea of *digital citizenship*, generically encompass citizens' rights in a digital context. This category not only includes updating traditional rights to identify new contents within the framework of the digital society (for example the right to be forgotten within the fundamental right to data protection), but also new fundamental rights, which would be universal access to the Internet, cybersecurity or the right to the truth to combat fake news.

The charter is not regulatory as it is limited to being a reference framework for public authorities to serve as a guide or mould for future legislative bills. According to one of its promoters, Tomás de la Quadra-Salcedo, the charter acts as a beacon for digital society users. He insists there is no duplicity of rights because its ultimate basis is the constitutional framework of fundamental rights.⁵⁴

In any event, these *digital rights in the use of neurotechnologies* listed in section 5.XXVI of the charter are easily identified with the original design of neuro-rights: the right to mental privacy (letters a and c), the right to personal identity and autonomy (letter b), the right to free will and self-determination (letter c), the right to equal access to cognitive augmentation (point 2) and the right to protection from algorithmic biases (letter e).

It is curious that the soft law option Spain has chosen has managed a more convincing legal recognition of neuro-rights than the constitutional reform that Chile has embarked on. Declarations of rights without guarantee or protection instruments come to nothing and it is almost more effective to cause a silent

revolution from bottom up. Given this perspective, the charter can be considered a pioneering tool, although N. Reche Tello doubts that the proposal of self-regulation or soft law will suffice for the risks heading our way.⁵⁵

8. Conclusions

The proposal to produce a charter of (new) neuro-rights is suggestive. Just as computer advances force us to maximise the security of our data, neurotechnology makes us pay attention to the privacy of our brain. Humanity must be in a position to protect itself against the advances of neurotechnology so that no violations of rights or undesired manipulations of the brain are committed. This objective is embodied in the expression found in the well-known publication by Bublitz, 'My Mind is Mine!?'⁵⁶ P. López Silva and R. Madrid advocate that the creation of neuro-rights is not *necessary*, because they are already protected by human rights; however, it is a *good idea* to make citizens aware of the importance of the topic as it puts us in alert mode.⁵⁷

Although the digital space and AI require new legal concepts and instruments, I believe our legal system suffices to guarantee people's identity and autonomy against the advances of neurotechnologies. Creating new (neuro)rights is not necessary, at least not now, as it would be premature. The proposal would require an unhurried debate and, in short, more time.⁵⁸

Based on a dogmatic-systematic focus, even if we accept that neural manipulation will be an everyday occurrence in future, the attempt to introduce concepts arising from euphoria or trends is dangerous for two reasons. Firstly, it diverts energy and resources that would be better used if we invested them in enhanced guarantees of the human rights recognised so far against scientific and technological advances. Secondly, it leads to an inflationary spiral in

⁵⁵ N. Reche Tello, *Nuevos derechos*, 440.

⁵⁶ J.C. Bublitz, *My Mind is Mine!?* *Cognitive Liberty as a Legal Concept*, in E. Hildt and A. Francke (eds.), *Cognitive Enhancement*, New York, NY, Springer, 2013, 233.

⁵⁷ P. López Silva and R. Madrid, *Sobre la conveniencia*, 58.

⁵⁸ See D. Borbón Rodríguez, *Análisis crítico de los Neuro-Derechos Humanos al libre albedrío y al acceso equitativo a tecnologías de mejora*, in *Ius et scientia*, n. 6, 2020, 157. But M. Ienca and R. Andorno (*Towards new human rights*, 159) do not agree.

⁵⁴ The addresses given by the speakers from the working parties responsible for drafting the charter can be found at <https://digitalfuturesociety.com/es/agenda/carta-derechos-digitales-streaming> They include the speeches made by T. de la Quadra-Salcedo and S. de la Sierra. The speech made by R. Yuste on neuro-rights is a must watch (minute 1:47).

which every new development questions how applicable the protection afforded by the universal system of human rights is.

Obviously, the law is not a panacea against abuses. Everyone knows that basic human rights (life, freedom of thought, education) have been recognised in the Universal Declaration of Human Rights of the United Nations since 1948 and in other international texts as well, but they are not observed in many countries in the world.

In the administrative law area, we can extend already explored principles to justify public action in protecting fundamental rights linked to neurotechnology (privacy, freedom of thought, data protection and others). The protection of neuro-rights is related to already established principles such as good regulation, good governance, transparency and, naturally, data and consumer protection.

J. Ponce Solé proposes a reserve for mankind so that certain decisions are reserved for humans, which could be extended to the protection of brain privacy. The principle of technological precaution expounded by L. Cotino Hueso, however, could lead to rejecting neurotechnologies whose implementation involves a risk of irreversible damage or that are not transparent to control. Another useful solution was devised by A. Boix Palop, who argues that algorithms are regulatory provisions.⁵⁹

But we will have to be very attentive and modify this pre-existing framework if legal categories need to be changed (personality, imputation, integrity, free will). An international rather than a national regulation is far more appropriate to achieve this aim, as J.L. Piñar advocates.⁶⁰ The European Union must play a leading role in this regard, as it did in data protection.

The regulatory framework should be completed with the approval of ethical codes and educational measures (soft law) reflecting the social, medical and bioethical implications of neurotechnology and produced with the agreement of all European stakeholders (public authorities, citizens, businesses,

associations and so on).

There is genuine concern about ethical limits that cannot be exceeded in neurotechnological research. And I am talking of ethical limits because legal limits are either non-existent—in some cases—or vague. As these are areas that have recently developed, legislative or soft law advances are still few and far between.

Organisational obstacles are another factor to be assessed. Legislators, governments and local authorities must be in a position to explore other social sciences (such as economics, behavioural psychology or sociology) and sciences (mathematics, evolutionary biology, neurosciences and even physics). Inter- and transdisciplinarity is an added difficulty, but it is an unavoidable challenge if we are seeking an effective legal protection of neuro-rights.

To sum up, rather than outlining new neuro-rights, it is more important to guarantee already existing rights against the risks of neurotechnology by adapting or moulding them based on their own traits. As in other areas linked to AI, there are many legal rough edges that need smoothing. But the mere fact that debate is being considered is a clear sign that people's dignity, free will and respect for human rights must come before any other interest.

⁵⁹ J. Ponce, *Inteligencia artificial, derecho administrativo y reserva de humanidad: algoritmos y procedimiento administrativo debido tecnológico*, in *Revista General de Derecho Administrativo*, n. 50, 2019; L. Cotino Hueso, *La necesaria actualización*, 2350; A. Boix Palop, *Algorithms as Regulations*, 96.

⁶⁰ See J.L. Piñar, *Notas sobre las propuestas normativas para la regulación de los neuroderechos en Chile*, in *Derecho Digital e Innovación* n. 7, 2020.