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Legal incentives for innovations in the emotional AI domain: a carrot and stick approach?

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Abstract

- Emotions strongly influence the human way of living and life experiences. In this context, Artificial Intelligence (AI) technologies are crucial to pushing developments further. Although emotional AI-driven innovations are welcome in our society, they might also have negative effects on the interdependence and autonomy of natural persons. Thus, they might be challenged by several legal provisions in the EU such as the General Data Protection Regulation (GDPR) and the draft AI Act. Yet these inventions require considerable investment, where legal incentives such as intellectual property rights (IPR) are crucial. Indeed, it is also important to secure certainty as to the legal and ethical acceptability of such innovations.
- This article looks at emotional AI to investigate the interlinkage between technological innovations, legal incentives and ethics, through the lenses of patent law and fundamental rights, in order to shed light over the challenges, limitations, but also opportunities for the protection, commercialization and exploitation of emotional AI-related inventions.
- Our research offers new scientific knowledge on the largely under-explored issue of legal incentives for emotional AI-related inventions in the European framework. It also provides companies and inventors with key points to consider in decision-making related to investments in and incentives for emotional AI-related innovations, also elaborating on suggestions for the European legislator and policymakers to better stimulate and promote emotional AI technology through regulation.

1. Introduction

That emotions strongly influence and drive our way of living and our experiences as human beings is undeniable. For instance, even now—and likely in the future—an essential element of innovations in technology is related to their 'emotional' aspects. In this context, Artificial Intelligence (AI)¹ technologies are crucial

in terms of pushing developments further. Both AI-driven innovations that are able to collect, analyse and understand emotional data and innovations that can 'create' or 'transform' emotions by making a person 'feel' certain emotions are amongst the most interesting—yet most challenging—developments of our era. Several of these types of innovations could be perceived as welcome in our society, as they can improve our well-being by providing an emotion-based solution to an emotion-based problem. However, these types of inventions might also have a negative effect

¹This article relies on the latest (23 November 2023) definition of AI provided by the OECD, which will also be integrated in the AI Act (Art 3): 'An AI system is a machine-based system that can, for a given set of human-defined explicit or implicit objectives, infer, from the input it receives, how to generate outputs such as makes predictions, content, recommendations, or decisions that can influencing physical real or virtual

environments. Different AI systems are designed to operate with varying in their levels of autonomy and adaptiveness after deployment'.

on the privacy, interdependence and autonomy of natural persons. Additionally, use of these highly sensitive data combined with algorithms could produce a problem in both a legal and an ethical sense.²

Emotional data collected from facial expressions, speech tone, physiological measurements and other sources provide a wealth of information about a person's emotional state, but have to be handled carefully. Although no official definition of 'emotional data' currently exists in EU legislation, we propose, and use throughout this article, the following definition of emotional data:

'Emotional data' is data representing the emotional, psychological or physical status of natural persons by identifying and processing their (facial) expressions, movements, behaviour, or other physical, physiological or mental characteristics.

Moreover, for questions concerning the patentability of inventions that create emotional data in the sense of emotional response, or services that have an emotion-based nucleus directed at or having an influence on natural persons, we define emotion-generating AI systems as follows:

'Emotion-generating AI systems' are AI applications that generate data capable of altering the emotional status of natural persons to influence their mood and emotional status.

The use of AI allows us to analyse and interpret these data at a scale and speed that was previously unimaginable. Companies can use these insights to improve customer service, personalize experiences and improve products and services. However, this progress raises important legal issues that cannot be ignored. Some examples of these innovations already exist. For instance, research is already studying methods to enable features of physical spaces to change in various ways, reacting to human emotions. AI-powered systems through various types of remote sensor and intelligent camera technologies are being developed to collect large amounts of emotional and behavioural data, analyse them, understand their meaning and determine what types of reactions the system should produce to trigger certain (desirable) emotional states. An example of this are the products developed by NViso, which provide enhanced perception and interaction features enabled by AI, including gaze and eye-state tracking, body tracking and activity and gesture recognition for driver and interior monitoring.³ Another example is provided by Emoshape, a New York-based start-up that launched MetaSoul in 2022 as the first sentient digital entity, allowing people to interact in the Metaverse through avatars that capture and reproduce the emotions of their human creators.⁴

It is clear that inventions like those mentioned above might require considerable investment, which means that legal incentives such as IP rights—primarily patents—are crucial for supporting investments in R&D in these fields. Moreover, it is also important to secure a level of certainty in terms of the extent of the legal and ethical acceptability of such innovations (for

instance, with regard to their exploitability and marketability), as well as their societal acceptance.

This notwithstanding, however, the current legal landscape in Europe appears quite unclear. First, it is questionable whether inventions that aim to create or transform emotions (that is, an inherently psychological phenomenon) fit under the current patent law system—at least in Europe, where only inventions that are, for example, of a 'technical' nature, that are new and that provide 'technical' effects are accepted, according to the thresholds set by the European Patent Convention (EPC) and related interpretations. Second, even if innovations were to use (personal) data to create 'technical' inventions that have 'technical effects', the sensitive nature of these technologies might raise several ethical and legal constraints that could still be challenged by the patent system as being 'contrary to ordre public or morality', according to Article 53 EPC. Third, even if the patentability of some of these inventions were possible under current rules, their acceptability in terms of allowing certain technological developments as well as their exploitation and commercialization could be questioned in the light of key provisions such as the General Data Protection Regulation (GDPR) and the draft AI Act (AIA) due to the sensitive nature of the bio-data that forms the fuel of these technological applications. Indeed, it could be considered problematic that these technologies diminish the autonomy of natural persons, let alone the effect of control of feelings and emotions by third parties. This of course depends on the sensitivity of those data. However, if something is considered personal data, its use might be blocked at least by the GDPR and the draft AI Act. For instance, the still changing draft of the AI Act considers emotional data to be extremely risky, as indeed is made clear in Recital 18:

The use of AI systems for 'real-time' remote biometric identification of natural persons in publicly accessible spaces is particularly intrusive to the rights and freedoms of the concerned persons, and can ultimately affect the private life of a large part of the population, evoke a feeling of constant surveillance, give parties deploying biometric identification in publicly accessible spaces a position of uncontrollable power and indirectly dissuade the exercise of the freedom of assembly and other fundamental rights at the core to the Rule of Law.

Shedding light over the boundaries of what is allowed and acceptable from the perspective of law and ethics with regard to research and development, as well as exploitation and commercialization, of innovations in the emotional AI domain is essential in order to enhance clarity and identify gaps where legal incentives are either lacking or short-fetched. Yet, research in this field is to date almost non-existent, leaving developers and innovators to navigate into uncertain waters in this context. Consequently, opportunities might be left unused and the great potential of inventions related to emotional AI remains underexploited. The future does not seem brighter either, with the draft AIA provision seemingly following a preventive law approach that does not seem to stimulate innovations, but rather leans towards blocking future—as yet unknown—developments. Overall, this might lead to disincentivizing innovations in this field, at least in the European area, reducing the competitiveness of Europe in respect to other markets such as the USA.

Grounded on these premises, this article investigates the interlinkage between legal incentives, technological innovations and ethics through the lenses of patent law and key fundamental rights provisions, in the context of emotional AI, in order to offer a comprehensive overview of the challenges, limitations—but also opportunities—for the protection, commercialization and

²This was pointed out eg in the decisions of 31 December 2022 by the Irish Data Protection Commission on complaints brought against Facebook and Instagram for behavioural advertising. Available at <https://www.dataprotection.ie/en/resources/law/decisions/inquiry-into-meta-platforms-ireland-limited-january-2023> (accessed 6 March 2024), following Binding Decisions no. 3/2022, 4/2022 and 5/2022 of the European Data Protection Board (EDPB), available at https://www.edpb.europa.eu/our-work-tools/consistency-findings/binding-decisions_en (accessed 6 March 2024).

³Available at www.nviso.ai (accessed 6 March 2024).

⁴Available at www.metasoul.one (accessed 6 March 2024).

exploitation of emotional AI-related inventions. After an overview of key definitions, such as emotions, feelings and behaviour, and their interlinkage with AI applications (section 2), we offer new insights on the role of emotions and innovations in European patent law, digging into examples of emotion-driven inventions and specifically scrutinizing the requirements of invention and inventive steps in line with the European Patent Convention (EPC) and related interpretations (section 3). Thereafter, we elaborate on the acceptability of these types of sensitive inventions, shedding light on major legal and ethical constraints that could hamper the commercialization and exploitation of some of these inventions. On those bases, we offer reflection points for companies and inventors to consider in decision-making related to investments in and incentives for emotional AI-related innovations, and we provide suggestions for the European legislator and policymakers to better stimulate and promote emotional AI technology through regulation.

2. Emotions, feelings, behaviour and AI-related inventions

Many people use the terms ‘feeling’ and ‘emotion’ as synonyms. Some scholars see no difference between these terms and think that separating them would be artificial.⁵ Others argue that these terms are not interchangeable and that, while they share similar elements, nevertheless, there is a marked difference between feelings and emotions.⁶ We tend to agree that feelings and emotions are not identical concepts.

According to the American Psychological Association (APA), emotion is defined as ‘a complex reaction pattern, involving experiential, behavioral and physiological elements’. Emotions are how individuals deal with matters or situations they find personally significant. Emotional experiences have three components: a subjective experience, a physiological response and a behavioural or expressive response. Emotional experiences and physical sensations—such as hunger or pain—bring about ‘feelings’.⁷ According to Brackett et al (2004), an emotion ‘can only ever be felt [...] through the emotional experiences it gives rise to, even though it might be discovered through its associated thoughts, beliefs, desires, and actions’.⁸

Emotions are not conscious but instead manifest themselves in the unconscious mind. These emotions can be brought to the surface of the conscious state through extended psychotherapy.⁹ Indeed, a fundamental difference between feelings and emotions is that feelings are experienced consciously, while emotions manifest themselves either consciously or subconsciously. Some people may spend years, or even a lifetime, not understanding the depths of their emotions. Throughout life, humans experience many emotions. This range of emotions is impacted by such factors as their behaviour, the culture they come from and their previous traumatic experiences.

According to a study published in *Personality and Social Psychology Review* (PSPR), emotion is a ‘feedback system whose influence on behaviour is indirect’.¹⁰ While according to the same study, behaviour is used to ‘pursue (or avoid) anticipated emotional outcomes’, behaviour also ‘provides feedback and stimulating retrospective appraisal of actions, conscious emotional states [which] can promote learning and alter guidelines for future behaviour’.¹¹

Research conducted by Association for Psychological Science’s Fellow Jeanne Tsai at Stanford University shows how most people want to ‘feel more positive than negative’.¹² Yet, the emotions that cause a positive experience are shown to change between cultures. For example, the positive emotions that ‘European Americans (as well as “real” Europeans) typically preferred [were] excitement and elation’, while Chinese populations ‘preferred calm and relaxation more’.¹³ This difference is seen in, for example, advertising, which utilizes the positive experience emotions to craft messages for maximum impact. What kind of emotions will be triggered is culture-dependent. Moreover, hormones will trigger emotions and are also age-dependent. So, it is very difficult to state that certain emotions will be triggered by a certain situation, because target groups differ immensely. Therefore, it would be difficult to set rules for emotion-generating AI systems because it is never certain what will be the emotional result of certain actions, taking into consideration the uniqueness of each natural person as recipient and the difference in the recipient’s cultural background. It would be even harder to define the patentability of a system that combines technological processing of personal data of an invention with emotion-generating services in describing technology that has psychological or even physical effects.

Additionally, it should be mentioned that circumstances also have an influence. The same kind of manifestations can have a totally different result in terms of emotions. For instance, explosions on New Year’s Eve are not considered threatening but instigate a positive emotion of joy and festivity. Under different circumstances (for example, in war), people could consider them as threatening, for instance as attacks, which would develop feelings of fear. Additionally, climate zones influence persons in terms of what they perceive as comfortable or less pleasant. A person used to live in The Netherlands might be enthusiastic when the lakes freeze over and they could feel excitement because they will be able to skate, but a person from southern regions of the world could just feel unpleasant because of the cold.

The difference between emotions and feelings seems to be rather artificial and more theoretical than humanly perceived. However, the two concepts are intertwined. To read and observe emotions to create a clear image of the emotional status of a natural person is, for the reasons given above, far from simple because of the difference of perception by natural persons in different circumstances as well as cultural backgrounds. Therefore, the collection and generation of emotions by AI applications will not be easy. Although cause and manifestation could be said to be variable, a readable emotion has fewer varieties and could be analysed more easily by AI as well as by human beings. Yet, it is reasonably simple to recognize emotions like happiness, sadness

⁵Antonio R Damasio, ‘Emotions and feelings’ in Anthony S R Manstead, Nico Frijda and Agneta Fischer (eds), *Feelings and Emotions: The Amsterdam Symposium* (UK, Cambridge University Press 2004) 49.

⁶Available at <https://counseling.online.wfu.edu/blog/difference-feelings-emotions/> (accessed 6 March 2024).

⁷Rainer Reisenzein, Andrea Hildebrandt and Hannelore Weber, ‘Personality and emotions’, in Philip J Corr and Gerald Matthews (eds), *The Cambridge Handbook of Personality Psychology* (UK, Cambridge University Press 2020) 81.

⁸See also Antonio R Damasio and Gil B Carvalho, ‘The nature of feelings: evolutionary and neurobiological origins’ (2013) 14 *Nature Reviews Neuroscience* 143.

⁹Marc A Brackett, John D Mayer and Rebecca M Warner, ‘Emotional intelligence and its relation to everyday behaviour’ (2004) 36 *Personality and Individual Differences* 1387.

¹⁰See also Roy F Baumeister, Kathleen D Vohs, C Nathan DeWall and Liqing Zhang, ‘How Emotion Shapes Behavior: Feedback, Anticipation, and Reflection, Rather Than Direct Causation’ (2007) 11 *Personality and Social Psychology Review* 167.

¹¹*Ibid.*

¹²Joe Dawson, ‘Emotions in context: what we know about how we feel’, *Association for psychological science* (31 January 2018). Available at <https://www.psychologicalscience.org/observer/emotions-in-context-what-we-know-about-how-we-feel> (accessed 6 March 2024).

¹³*Ibid.*

and anxiety as well as physical feelings like cold and warm. Face- and body-recognizing sensors and movement-detecting applications could be a logical element of AI applications that will process these emotional data. Therefore, it could be possible to develop inventions through AI that read and even trigger these types of emotions.

3. Patents, inventions and emotions: the current landscape

Generally speaking, ‘emotion’ is not specifically considered a legal concept specified in legal documents.¹⁴ Emotions are, though, the underlying reason for creating laws and norms. Without emotional conceptions, law would not exist because humans approve or disapprove actions and behaviour on the basis of emotional considerations. Again, on the basis of human emotions, people living together as a community have created a kind of common conviction that has governed a certain society.

The English philosopher John Locke, whose theories built the foundations of several of our current laws, affirmed the importance of using the powers that we have as human beings in order to act in such a way that we obtain things that are good and useful for us. Specifically, as he said, ethics is ‘the seeking out those rules, and measures of humane actions, which lead to happiness, and the means to practice them’.¹⁵ The nature of humans requires a kind of regulation of these emotions via norms to create an acceptable society in which to live together. But it seems that, in terms of a source of regulation, emotions are lost in the legal framework of today. That is understandable, as emotions are influenced by circumstances and feelings, while the law should be objective. Yet, law is influenced by emotions in many ways.¹⁶ For example, in the treatment of criminal cases, emotional behaviour plays a part in determining the accountability of the perpetrator in certain cases. Moreover, emotions often play a role in legal activities because these are the result of human behaviour. For instance, emotions certainly have an effect on the results of contract negotiations.¹⁷

In the specific context of IPR legislation, especially patent law, emotions have not played much of an important role other than in relation to the quite scarce case law interpreting provisions related to inventions deemed contrary to morality (such as cloning human beings).¹⁸ However, our hypothesis is that AI developments in general, and in relation to emotions especially, might challenge the approach followed so far in this regard—and thus it is important to take a step back and revisit key patenting rules through the lens of emotions. To that end, we look at the patentability criteria in the European Patent Convention (EPC) tradition in detail. Particularly relevant here are the requirements of invention, or patentable subject matter, and inventive step, while other patentability criteria such as novelty, industrial applicability and disclosure, are considered not so crucial.¹⁹ Moreover, as in the European patent context the decisions of the Boards of

Appeal (BoA) of the EPO are highly consequential since they interpret the EPC, we also scrutinize relevant BoA decisions because they are illustrative of how emotions—or psychological issues in general—are to be treated in terms of patentability.

3.1. Patentable subject matter and technical inventions

The first patentability requirement that is questioned when we speak of emotional AI is the requirement of ‘invention’ or of patentable subject matter. The EPC Article 52 (1) states that ‘European patents shall be granted for any inventions, in all fields of technology, provided that they are new, involve an inventive step and are susceptible of industrial application’. In other words, the EPC does not provide a positive definition of ‘invention’. However, it reveals what cannot be considered as an ‘invention’ from the perspective of European patent law. In this regard, the EPC provides both ‘exclusions’ and ‘exceptions’ to patentability.

Exclusions are listed in Articles 52(2) and (3) EPC, according to which discoveries, scientific theories and mathematical methods, aesthetic creations, schemes, rules and methods for performing mental acts, playing games or doing business, programs for computers and presentations of information as such are to be excluded from patentability—that is, they are not inventions. Here, the rationale is that the things listed in Article 52(2) EPC are abstract ideas and/or fundamental concepts that should be available to everyone, and not restricted exclusively to some.²⁰ Accordingly, it is believed that providing a patent monopoly right on such fundamental ideas would stifle rather than foster technological progress.²¹ If we look firstly at the concept of ‘exceptions’ to patentability in relation to emotional AI, at least two major considerations can emerge. First, it is a question whether AI can (always) be considered patentable. This is a question that has already been much explored in the literature where questions related to AI-generated innovations have been particularly prominent.²² However, this discussion applies generally to AI with no particular specificity stemming from the fact that an AI is emotional or not.

More interesting, instead, is the interpretation of the patentable subject matter requirement in view of the so-called ‘exclusions’ to patentability sealed in Article 53 EPC, which stipulates that:

²⁰WIPO, SCP/15/3, Annex I.

²¹See, eg, Rosa Maria Ballardini, *Intellectual Property Protection for Computer Programs: Developments, Challenges, and Pressures for Change* (Helsinki, Hanken School of Economics 2012).

²²See, eg, Rosa Maria Ballardini and Robert van den Hoven van Genderen, ‘Artificial intelligence and intellectual property rights: the quest or plea for artificial intelligence as a legal subject’ in Taina Pihlajarinne and Anette Alen-Savikko (eds), *Artificial Intelligence and the Media: Reconsidering Rights and Responsibilities* (UK, Edward Elgar 2022) 192; Rosa Maria Ballardini, Kan He and Teemu Roos, ‘AI-generated content: authorship and inventorship in the age of artificial intelligence’ in Taina Pihlajarinne, Juha Vesala and Olli Honkila (eds), *Online Distribution of Content in the EU* (UK, Edward Elgar 2019) 117; Jacqueline Allan, Daniel Gervais, Christian Hartmann, Bernt P Hugenholtz and Joao Pedro Quintais, *Trends and Developments in Artificial Intelligence: Challenges to the Intellectual Property Rights Framework: Final Report 2020* (Publications Office of the European Union 2020). Available at <https://op.europa.eu/en/publication-detail/-/publication/394345a1-2ecf-11eb-b27b-01aa75ed71a1/language-en> (accessed 6 March 2024); Stephen Carlisle, ‘Should Music Created by Artificial Intelligence Be Protected by Copyright?’ (7 June 2019). Available at <http://copyright.nova.edu/ai/> (accessed 6 March 2024); Madeleine De Cock Buning, ‘Artificial Intelligence and the creative industry: new challenges for the EU paradigm for art and technology by autonomous creations’ in Woodrow Barfield and Ugo Pagallo (eds) *Research Handbook On The Law Of Artificial Intelligence* (Edward Elgar 2018) 511; Erika G E Hubert, ‘Artificial Intelligence and Copyright Law in a European context, A study on the protection of works produced by AI-systems’. Available at <https://iup.lub.lu.se/student-papers/search/publication/9020263> (accessed 6 March 2024); Jani Ihalainen, ‘Computer creativity: artificial intelligence and copyright’ (2018) 13 *Journal of Intellectual Property Law & Practice* 724.

¹⁴Jules L Coleman, ‘Truth and objectivity in law’ (1995) 1 *Legal Theory* 33.

¹⁵John Locke, *Essay*, Book IV, chapter xii, section 11 (Essay, IV.xii.11). See also Johan Olsthoorn, ‘Self-ownership and despotism: Locke on property in the person, divine dominion of human life, and rights forfeiture’ (2019) 36 *Social Philosophy and Policy* 242.

¹⁶Eric A Posner, ‘Law and the emotions’ (John M. Olin Program in Law and Economics Working Paper No. 103, 2000).

¹⁷Melvin A Eisenberg, ‘The world of contract and the world of gift’, (1997) 85 *California Law Review* 821.

¹⁸Robert van den Hoven van Genderen, Rosa Maria Ballardini, and Marcelo Corrales Compagnucci, ‘AI innovations, empathy and the law: user-centric perspective on copyright and privacy’ in Melanie Sarantou and Satu Miettinen (eds), *Empathy and Business Transformation* (London, Routledge 2022).

¹⁹For basics on patentability rules in the European system, see, eg, Duncan Matthews and Paul Torremans, *European Patent Law* (De Gruyter 2023).

European patents shall not be granted in respect of (a) inventions the commercial exploitation of which would be contrary to 'ordre public' or morality; [...] (b) plant or animal varieties or essentially biological processes for the production of plants or animals; [...] (c) methods for treatment of the human or animal body by surgery or therapy and diagnostic methods practiced on the human or animal body; [...].

Here, the rationale is based on socio-economic considerations, such as that allowing patenting of these types of inventions would be considered against widely accepted (European) moral values.²³ Since the time when the preparatory works for the EPC started back in 1949, it became evident that amongst all the exclusions from patentability, those related to ordre public and morality were the most difficult to be agreed upon—mostly because, on the one hand, it was considered difficult to define the difference between ordre public and morality, while, on the other, it was a challenge to agree upon a European definition, especially of morality.²⁴

In the central BoA decision T 0356/93 (21 February 1995), it was ruled that such moral judgment is to be approached as follows:

The concept of morality is related to the belief that some behaviour is right and acceptable whereas other behaviour is wrong, this belief being founded on the totality of the accepted norms which are deeply rooted in a particular culture. For the purposes of the EPC, the culture in question is the culture inherent in European society and civilisation. Accordingly, under Article 53(a) EPC, inventions the exploitation of which is not in conformity with the conventionally-accepted standards of conduct pertaining to this culture are to be excluded from patentability as being contrary to morality.

However, this statement does not add much to the difficult challenge of defining common European conventionally accepted standards.

As a result of all these uncertainties, even if the provision has been left in the text of the EPC, it has in practice been used very seldom, and mostly in the field of genetics and biotechnologies (for instance, cloning, modification) of animals (for example, T 0315/03, 6 June 2004) or plants (T 0356/93, 21 February 1995). To our knowledge, there is to date no BoA decision where the concept of ordre public or morality has been discussed in the context of inventions involving emotions—or other psychological effects or psychology-related features in an invention. Nor does the EPO case law collection discuss any types of inventions other than the above-mentioned one.²⁵

Therefore, in terms of case law, it remains an open question whether inventions involving emotions—and especially those intended to elicit emotions—could be patentable or not in view of this moral evaluation. In that regard, for example, in a case where inventions make use of such personal data as emotions, objections could be raised to their patentability on morality grounds based on fundamental rights arguments, especially legal provisions such as the GDPR and the proposed AIA. For example, as we will explain in detail in section 5, it could be questioned whether the patentability of these technologies will be deemed acceptable in the light of Article 9 of the GDPR, as well as Article 5 of the draft AIA. Moreover, 'subliminal techniques' in audiovisual commercial

communication are prohibited in the EU.²⁶ As is relatively well-known, subliminal stimuli are those that operate under the level of conscious awareness yet produce psychological effects in people.²⁷ This would fit the description of emotional data and would be a problem in putting such AI inventions on the market as well as their patentability. The same also applies to the so-called Digital Services Act package,²⁸ comprising the Digital Services Act (DSA)²⁹ and the Digital Markets Act (DMA).³⁰ Especially in the DSA (to be applied from 17 February 2024), so-called 'dark patterns' are prohibited (Articles 25 and 31 DSA). The DSA itself, however, does not contain a definition of 'dark patterns'; however, Recital 67 states that 'dark patterns' are practices that aim to prevent users from making autonomous and informed choices or decisions. Moreover, the European Data Protection Board has called dark patterns 'deceptive design patterns' and defined them as:

interfaces and user journeys implemented on social media platforms that attempt to influence users into making unintended, unwilling and potentially harmful decisions, often toward a decision that is against the users' best interests and in favour of the social media platforms interests, regarding the processing of their personal data.³¹

Deceptive design patterns aim to influence user behaviour and can hinder the users' ability to effectively protect their personal data and make conscious choices. This includes use of subliminal techniques and manipulating the emotions of natural persons in their offering of services, described in the EDPB Guidelines as 'stirring', which includes 'emotional steering'. This technique affects the choice users make by appealing to their emotions or using visual nudges.

In sum, all these could at least suggest that inventions intended to produce or elicit an emotional response would not be patentable as such both due to 'ordre public' or morality concerns as well as the constraints mentioned in other European regulations. Thus, even if there is no established case law or practice at the EPO concerning whether inventions involving—and especially intended to produce or elicit—emotions are objectionable or not from the morality or 'ordre public' point of view, there could be reasons to believe that inventions intended to produce or elicit an emotional response might be objected in terms of patentability in Europe.

3.2. Inventiveness and technical effect

The question whether inventions involving emotions are patentable is often approached through the notion of 'inventiveness'. According to Article 56 EPC:

²⁶See Audiovisual Media Services Directive (EU) 2018/1808, Art 9, para 1(b).

²⁷J V McConnell, R L Cutler, and E B McNeil, 'Subliminal stimulation: an overview', (1958) 13 *American Psychologist* 229.

²⁸Available at <https://digital-strategy.ec.europa.eu/en/policies/digital-services-act-package> (accessed 6 March 2024).

²⁹Regulation (EU) 2022/2065 of the European Parliament and of the Council of 19 October 2022 on a Single Market For Digital Services and amending Directive 2000/31/EC (Digital Services Act).

³⁰Regulation (EU) 2022/1925 of the European Parliament and of the Council of 14 September 2022 on contestable and fair markets in the digital sector and amending Directives (EU) 2019/1937 and (EU) 2020/1828 (Digital Markets Act).

³¹EDPB Guidelines 03/2022 on deceptive design patterns in social media platform interfaces: how to recognise and avoid them, Version 2.0 (Adopted on 14 February 2023). Available at: https://edpb.europa.eu/system/files/2023-02/edpb_03-2022_guidelines_on_deceptive_design_patterns_in_social_media_platform_interfaces_v2_en_0.pdf (accessed 6 March 2024).

²³WIPO, SCP/15/3, Annex I.

²⁴Sigrid Sterckx and Julian Cockbain, *Exclusion from Patentability. How Far Has the European Patent Office Eroded Boundaries* (UK, Cambridge University Press 2015), 21.

²⁵Case Law of the EPO Boards of Appeal, Part I, Chapter B, item 2.2.2(b).

An invention shall be considered as involving an inventive step if, having regard to the state of the art, it is not obvious to a person skilled in the art.

In practice, the established practice at the EPO is that in assessing whether an invention meets the criteria of involving an inventive step, *only* those features may be taken into account that contribute to the *technical* solution of a *technical* problem by providing a *technical effect*.³² A technical solution must be non-obvious for a person skilled in the art (who, according to the EPO, should be presumed to be a skilled practitioner in the relevant field of technology, who possesses average knowledge and ability and is aware of what was common general knowledge in the art at the relevant date³³) for it to be inventive to a sufficient degree.³⁴

Thus, whether inventions involving emotions are deemed patentable is evaluated in terms of whether the focal invention is technical in that it employs *technical* means to produce a *technical effect*—as opposed to, for example, something happening in the mind of a human being, like a *psychological effect*. Put differently, in European practice, an invention is not deemed to be involving an inventive step at least if:

- it is only based on ‘psychological’ features to produce a technical effect, or
- it has technical features but only produces a ‘psychological’ effect, or
- both of the above.

Thus, as emotions are inherently psychological phenomena and, moreover, are deterministically unreliable in that they vary from one individual to another, inventions involving emotions—either as their main/only feature or an effect that the invention is intended to produce—are seen as problematic or suspicious in European patenting practice.

To date, very few EPO BoA decisions have expressly interpreted the requirement of inventiveness and the role of emotions. However, decision T 1008/19 generating animation based on text and user information/SAMSUNG (19 May 2022) is representative. This decision concerned a patent application for a system which interprets user emotions from text and produces an output which is appropriate for the emotion interpreted. Here, the BoA deemed the ‘emotion → emotion-appropriate output’ link as non-technical because what was or was not an emotion-appropriate output in this case could have depended on essentially psychological factors (though not using these precise words). At the same time, however, the BoA did not rule that an emotion interpretation system or method could never be able to produce technical effects. Indeed, this could be considered technical, as long as such a system or method were to employ technical means, such as AI, for this task.

Thus, it seems that systems which would ‘read’ human emotions and produce an emotion-appropriate response are not patentable. However, a system or method which ‘reads’ human emotions and produces a deterministic outcome by using technology (such as turning lights brighter when the emotion is ‘read’ as sadness) would appear to meet the requirement of inventiveness and produce a technical effect. Here, however, it must be emphasized that such emotion ‘reading’ systems or methods must themselves be premised on unambiguous technical

features. An example could be recording brain waves with a technical system and comparing readings with a database containing known brainwave examples of each emotion to be ‘read’. In other words, the key question to be addressed here is *how* emotion ‘reading’ is done, not just *that* it is done.

In the examples presented above, the causal pathway was: emotion → action (that is, collecting emotions to produce certain effects). But what about the other way around, namely: action → emotion (or, inventions that would aim to produce or elicit an emotional response or effect)? An example could be a system that adjusts environmental conditions in a room to cheer up or invigorate the occupant. For this category of inventions, BoA decisions are more plentiful and, in their parlance, are concerned with the possible ‘psychological effects’ deriving from the inventions involved.

As noted above, inventions producing or intended to produce (only) a psychological effect (such as stimulating some emotion or otherwise eliciting an emotional surprise) are deemed non-patentable because they lack a *technical effect*.³⁵ For example, BoA decision T 0188/11 game machine/GAMEACCOUNT (3 May 2013) is usually seen as a ruling which established that emotion-like effects such as amusement, entertainment, suspense and surprise are psychological effects which, in turn, are not technical effects, so that inventions involving *only* such effects as target outcomes are not patentable in Europe. Yet, not all inventions at the machine–human interface lie outside patentability. For example, visually presenting the orientation of a medical ball joint as a visual aid to assist a surgeon in correcting its position has been deemed to be technical in nature as it does not extend to the psychology of the surgeon; the surgeon is free to do whatever with the presented information.³⁶ But an invention intended to reduce a system user’s information overload and distraction has not been deemed as having technical effect because whether any overload or distraction occurs with a given set of stimuli depends on the psychological makeup and state of each individual user (see BoA decision T 0862/10 Notification system/MICROSOFT (15 May 2013)). However, if the emotional effect is removed from the invention and replaced by a technical effect which has a known psychological effect (for instance, bright light in the morning, on average, lifting the mood of a human being), such an invention could be reframed by defining a technical chain of effects leading to a technical effect (namely, turning on a bright light). In this case, the definition of the invention would not include a psychological or emotional effect but a technical one—which, in turn, is known to have a psychological or emotional effect. Hence, thus reframed, the invention could fall within the scope of patentability.

4. Acceptability, exploitation and commercialization of emotional AI inventions

The previous sections have shed light over key issues that should be considered for emotional AI inventions to be patentable in Europe. In particular, we have identified possible obstacles and limitations that such inventions could face in terms of meeting the patentable subject matter and the inventive step requirements, as well as how other areas of law could pose challenges to the patentability of ‘emotional-types’ of inventions. The next

³²EPO Guidelines for Examination, part G, chapter VII, items 5.4 and 5.4.1.

³³EPO Guidelines for Examination, part G, chapter VII, item 4.

³⁴EPO Guidelines for Examination, part G, chapter VII, item 4.

³⁵EPO Guidelines for Examination, part G, chapter II, item 3.7.

³⁶*Ibid.*

question, though, is: even if certain types of AI driven emotional-based inventions could potentially be patentable according to current rules, is there room in the legal and ethical European framework for such inventions to be exploited and/or commercialized afterwards? Indeed, the fact that an invention is patentable or patented does not necessarily mean that all its possible uses would be acceptable. For instance, an AI system that combines a new technique with an emotional data generative system to stimulate people to be more physically active has to take into account the personal physical and psychological status of the subject in order to protect the well-being of that natural person in general. Overstressing physiological capabilities, as well as processing a person's emotional data, could endanger the mental and physical balance of a human subject.

Because the processing of emotional data is undeniably closely connected to human life, it is no surprise that fundamental rights play an important role in terms of acceptability of emotional AI innovations. First and foremost, it is important to point to the rights protected by the European Charter of Fundamental Rights (CFR),³⁷ especially Article 1, according to which 'Human dignity is inviolable. It must be respected and protected', and Article 3 on the right to integrity of the person.³⁸ In particular, for the purpose of this article, it is very important to focus on the rules concerning personal data protection and personal data processing by AI applications, namely the General GDPR and the so-called AI Act.

4.1. The wicked problem of privacy

There is no universally accepted definition of privacy but, broadly speaking, privacy is the right to be let alone, or freedom from interference or intrusion. Information privacy is the right to have some control over how personal information is collected and used, also described as 'personal information sovereignty'.³⁹ One of the defining features of applying AI in relation to personal data is the emergence of new products and services such as smart wearables and even body devices and apps that leverage algorithm-based AI systems. These new developments create challenges for regulators and other policymakers, in particular in the context of privacy.⁴⁰ These challenges, however, can also bring new opportunities. For instance, will it be possible, in an increasingly complex framework, to assure data subjects of their information sovereignty over their own data? Crucially, personal data should be treated as an extension of the individual's own personality right, granting protection to their personal development.⁴¹ As the European Data Protection Supervisor (EDPS) Ethics Advisory Group stated in its report of 2018: 'Direct encounters

between persons in the digital world are increasingly replaced by remote algorithmic profiling'.⁴² Transcription of behaviours and propensities is neither neutral nor exhaustive. The question is whether digital representation of persons may expose them to new forms of vulnerability and harm. Data protection is not a technical or legalistic matter. It is a profoundly human one.

The leading principle of the GDPR is found in Recital (4), according to which:

The processing of personal data should be designed to serve mankind. The right to the protection of personal data is not an absolute right; it must be considered in relation to its function in society and be balanced against other fundamental rights, in accordance with the principle of proportionality.

This recital is in line with the ongoing debate over the assertion that modern technology should improve the lives, privacy and security of individuals but not undermine fundamental rights. One of the more difficult requirements to be met under the GDPR is the requirement that personal data must be processed 'transparently' and with the explicit consent of the data subject. Article 6 of the GDPR describes the options available to process personal data without the express consent of the data subject. Under its points (e) and (f), however, this article offers several possibilities by mentioning grounds for processing without the consent of the data subject, namely the vital interests of the data subject or the public interest. Paragraph 3 provides that processing data without consent is governed by (a) Union law or (b) the national law to which the controller is subject.

Emotional data will fall under the GDPR if they are considered personal data as defined in Article 2:

(1) 'personal data' means any information relating to an identified or identifiable natural person ('data subject'); an identifiable natural person is one who can be identified, directly or indirectly, in particular by reference to an identifier such as a name, an identification number, location data, an online identifier or to one or more factors specific to the physical, physiological, genetic, mental, economic, cultural or social identity of that natural person.

Importantly, emotional data (for instance, collected or used in 'emotional inventions') can be considered as sensitive data, as defined in Article 2:

(14) 'biometric data' means personal data resulting from specific technical processing relating to the physical, physiological or behavioural characteristics of a natural person, which allow or confirm the unique identification of that natural person, such as facial images or dactyloscopic data;

(15) 'data concerning health' means personal data related to the physical or mental health of a natural person, including the provision of health care services, which reveal information about his or her health status.

If considered sensitive data, they will fall under the special regime of Article 9 of the GDPR, according to which 'the processing of genetic data, biometric data for the purpose of uniquely identifying a natural person' is forbidden except with the consent

³⁷Charter of Fundamental Rights of the European Union, Official Journal of the European Union C83, vol 53, European Union, 2010, 380.

³⁸According to Art 3 CFR: '1. Everyone has the right to respect for his or her physical and mental integrity. 2. In the fields of medicine and biology, the following must be respected in particular: (a) the free and informed consent of the person concerned, according to the procedures laid down by law; [...] (c) the prohibition of the reproductive cloning of human beings'. Specifically these two areas are the subject of use of emotional data.

³⁹IAPP, 'What does privacy mean?'. Available at <https://iapp.org/about/what-is-privacy/> (accessed 6 March 2024). See also Robert van den Hoven van Genderen, *Privacy Limitation Clauses: Trojan Horses Under the Disguise of Democracy* (Wolters Kluwer 2016). Privacy may entail a right to non-disclosure of personal information but at the very least also contains a right to selective disclosure of personal information (ibid, chapter 1, at 5).

⁴⁰In the context of healthcare, see, eg, Marcelo Corrales Compagnucci, Mark Fenwick, Helena Haapio, Timo Minssen and Erik P M Vermeulen, 'Technology-driven disruption of healthcare & "UI layer" privacy-by-design' in Marcelo Corrales Compagnucci, Michael Lowery Wilson, Mark Fenwick, Nikolaus Forgó and Till Bärmighausen (eds), *AI in eHealth: Human Autonomy, Data Governance & Privacy in Healthcare* (UK, Cambridge University Press 2022).

⁴¹Bart Van der Sloot, 'Privacy as personality right: why the ECtHR's focus on ulterior interests might prove indispensable in the age of "Big Data"' (2015) 31 *Utrecht Journal of International and European Law* 25.

⁴²Peter Burgess, Luciano Floridi, Aurélie Pols, Jeroen van den Hoven, *Towards a Digital Ethics EDPS Ethics Advisory Group, Report 2018*, 11. Available at https://edps.europa.eu/sites/default/files/publication/18-01-25_eag_report_en.pdf (accessed 6 March 2024).

of subjects or other legitimate reasons listed in the article as securing the data subject's vital interest or reasons of national (security) interest.

Additionally, the requirement of transparency in Article 12 GDPR can pose a problem for emotional AI inventions. Indeed, the data subject has to be informed about the data processing, its purpose and possible extensions, in a concise, transparent, intelligible and easily accessible form, using clear and plain language. All the information rights of the data subject are specified in other articles of the GDPR: access, change, control, storage information, retraction of consent, complaints procedure and so on. On top of that, explaining the system, if possible, could pose problems concerning trade secrets.

Since emotional AI invention may be utilized to automatically trigger actions in response to emotional data, Article 22 GDPR may also become relevant:

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.

In addition to the GDPR, the ePrivacy Directive⁴³ provides rules for the processing of location data collected by providers of electronic communications (see Articles 6 and 9 of the ePrivacy Directive). With regard to this type of personal data, there is a clear preference for the use of anonymized data instead of pseudonymized data. Regardless, the latter category would still fall within the protection regime of the GDPR.

In sum, all data that are considered to be capable of identifying a natural person will fall under the GDPR. The more advanced the technology is, the greater the chance that seemingly neutral data may be considered identifiable. It is questionable whether the draft ePrivacy Regulation, which has been on the table for a long time (since 2017), will take technology developments into account, striving for technological neutrality.⁴⁴ European privacy rules might pose several challenges to consider for any invention that might process emotional data and, in the worst-case scenario, such inventions (even if patented) may never be put into use or exploited legitimately.

4.2. The draft AI Act: possible repercussions on emotional inventions

The AI Act (AIA), an abbreviation of the proposal for a Regulation of the European Parliament and of the Council Laying Down Harmonized Rules on Artificial Intelligence (Artificial Intelligence Act),⁴⁵ is being enacted to regulate AI based on the concept of risk assessment. At the time of writing (December 2023), the amended Commission text of the AIA has been accepted by the European Parliament and the European Council after the trilogue procedure. The Member States in the Council have adapted this text to their doubts, national political ideas and convictions. Until now, the text of the AIA has been changed several times during discussions in the different parliamentary commissions and via amendments

proposed by the delegates.⁴⁶ The AIA can be classified as a form of preventive or proactive (as opposed to reactive) law, meaning that the approach to law is based on an *ex ante* rather than an *ex post* view.⁴⁷ The text is presented as being 'technology neutral'—however, this seems rather strange, as the Act regulates the technological character of AI and the claim is also disproved by mention of the different technological AI applications in the annexes.

The scope is directed to all AI providers and users, also outside the EU. The Act takes a human-centric approach, in the sense that all development and use of AI-related applications should be guided by certain essential (human) value-oriented principles. This is believed to enhance and promote protection of the rights covered by the CFR, especially human dignity, democracy, respect for human rights and the rule of law. The AIA follows a risk-based approach and establishes obligations for providers and users depending on the level of risk the AI can generate, divided into four different risk categories: unacceptable, high, limited and minimal. AI systems with an unacceptable level of risk to people's safety would be strictly prohibited, including systems that deploy subliminal or purposefully manipulative techniques, exploit people's vulnerabilities or are used for social scoring (for instance, classifying people based on their social behaviour, socio-economic status or personal characteristics). Although there might be some 'lighter' AI applications, it is to be expected that emotion-related AI inventions will be categorized under forbidden or at least high-risk level.

Looking at the AI Act, several of the currently known articles of the last trilogue-agreed text could play a role in terms of the acceptability of emotional AI inventions. First is Article 5, according to which 'the placing on the market, putting into service or use of an AI system that deploys subliminal techniques beyond a person's consciousness in order to materially distort a person's behaviour in a manner that causes or is likely to cause that person or another person physical or psychological harm' would pose some limitations here. Further, based on the fact that AI can be a potential threat to citizens' rights and democracy, Article 5 in the known final text is banning the following applications of AI:

- Biometric categorization systems that use sensitive characteristics (eg political, religious, philosophical beliefs, sexual orientation, race)
- Untargeted scraping of facial images from the internet or CCTV footage to create facial recognition databases
- Emotion recognition in the workplace and educational institutions
- Social scoring based on social behaviour or personal characteristics
- AI systems that manipulate human behaviour to circumvent their free will
- AI used to exploit the vulnerabilities of people (due to their age, disability, social or economic situation)

Although not specifically directed at emotional data, but rather at biometric and other characteristics-related data, there is the exception that this prohibition will not apply to AI systems intended to be used for approved therapeutic purposes, medical purposes and security on the basis of specific informed consent of the individuals that are exposed to them or, where applicable, of their legal guardian. This exception could very well be extended to more AI applications that process or infer emotional data.

⁴³See also 2002/58/EC (ePrivacy Directive), especially Art 15.

⁴⁴COM(2017) 10 final/2017/0003 (COD) Proposal for a Regulation of the European Parliament and of the Council concerning the respect for private life and the protection of personal data in electronic communications and repealing Directive 2002/58/EC (Regulation on Privacy and Electronic Communications)

⁴⁵Proposal for a Regulation of the European Parliament and of the Council laying down harmonized rules on artificial intelligence (artificial intelligence act) and amending certain union legislative acts COM/2021/206 final. Available at <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A52021PC0206> (accessed 6 March 2024).

⁴⁶The final text has not been published at the time of writing

⁴⁷Louis M Brown, *Preventive Law* (Prentice-Hall 1950).

Moreover, of particular importance are inventions and patentability of products and services which the AIA considers as emotion recognition systems according to Article 3:

(34) ‘emotion recognition system’ means an AI system for the purpose of identifying or inferring emotions or intentions of natural persons on the basis of their biometric data [.]

The risk assessment requirement for these types of applications is rather severe and, in several cases, these applications are not even allowed. For instance, some of such critically viewed concepts could include placing on the market, putting into service or use of an AI system that exploits any of the vulnerabilities of a specific group of persons due to their age, physical or mental ability, in order to materially distort the behaviour of a person belonging to that group in a manner that causes or is likely to cause that person or another person physical or psychological harm. Under Article 5, the inferring or processing of the emotions of natural persons by AI systems in certain domains is not allowed except for medical and security reasons:

(dc) the placing on the market, putting into service for this specific purpose, or use of AI systems to infer emotions of a natural person in the areas of workplace and education institutions except in cases where the use of the AI system is intended to be put in place or into the market for medical or safety reasons[.]

5. Fear and loathing in the EU: does the European legal framework stimulate or hamper innovations in the emotional AI domain?

As we noted at the beginning, our aim was first to shed light on reflection points for companies and inventors to consider in decision-making related to investments in, and incentives for, emotional AI-related innovations. In addition, our ambition was to develop recommendations for the regulation of AI technology in the emotional AI domain.

From the point of view of the available legal incentives that the current framework in Europe provides, especially considering the role of IPRs and patents to promote emotional AI-related innovations, our analysis shows that even if European patent law does not directly forbid or exclude ‘emotion-related inventions’ from the domain of patentable subject matter, it might be difficult for such inventions to meet key patentability requirements such as inventiveness. This is particularly so in the case where the alleged invention would be such as to read human emotions to produce a certain emotion-appropriate response. Moreover, our analysis indicates that these types of ‘sensitive’ inventions might be considered as being against the current standard of European ‘morality’ and/or *ordre public* and thus might be deemed unpatentable in accordance with Article 53 EPC.⁴⁸

This interpretation is supported by current trends in European regulation of AI, such the GDPR but also—and especially—the draft AIA. In light of the continuing developments of AI, hardly any data cannot be considered sensitive personal data by the GDPR regime. This will hamper further use of processing data because of the requirements of transparency and explicit consent. Moreover, in the draft AIA, systems with an unacceptable level of risk

to people’s safety and fundamental rights would be strictly prohibited, including systems that deploy subliminal or purposefully manipulative techniques or exploit people’s vulnerabilities or are used for social scoring (for instance, classifying people based on their social behaviour, socio-economic status or personal characteristics). On top of that, in the latest published version of the AIA (dated 15 June 2023), the European Parliament proposed a full ban on AI for biometric surveillance, emotion recognition and predictive policing. Article 5 of the final text is banning a wide range of applications of AI that pose a potential threat to citizen’s rights and democracy (see above).

Even though this ban would not be absolute,⁴⁹ as in some therapeutic medical cases the use of emotional data could be considered acceptable (and, therefore, also necessary human-centric applications in the workplace to increase safety and comfort could, in our view, be allowed), it is still quite a restrictive approach.

Moreover, as we have seen, these regulations place considerable importance on human-centric approaches and on respect for fundamental human rights, such as the right to be let alone and freedom from interference or intrusion. Indeed, it could be argued that all these principles form the current crux of the concept of morality (and, by implication, immorality) in terms of AI developments and use in Europe, and, accordingly, inventions that do not respect these concepts can be considered unpatentable as immoral. It is important to note that, at the moment, the case law of the EPO BoA on issues related to emotional AI inventions is almost non-existent, but should a case on these matters appear before the EPO BoA or a patent application be filed with the EPO, it might be that our interpretative line would be followed. Indeed, this situation creates several uncertainties for those currently working on emotional AI innovations, who might prefer to protect their inventions through other tools such as trade secrecy to secure returns on investments, rather than risk having to open up their innovations without any guarantee that a patent would be granted. On that basis, it is questionable whether patents—at least in the European framework—are actually providing any incentive to emotional AI development; it seems that they might be hindering rather than promoting innovations under current rules.

In addition, when we look at the future destiny of AI regulation, especially the AIA, some further restrictions appear. As mentioned, the AIA follows a preventive approach to law, based on an *ex ante* rather than an *ex post* view.⁵⁰ Notwithstanding the good intentions, and the certainly great potential of preventive/proactive approaches in law, their functioning is dependent on the premise that they are used to stimulate positive actions. For example, as Berger-Walliser (2012) states:

Instead of perceiving law as a constraint that companies and people in general need to comply with, proactive law considers law as an instrument that can create success and foster sustainable relationships, which in the end carries the potential to increase value for companies, individuals, and societies in general.⁵¹

Such an approach, it is claimed, could be beneficial to foster healthy, trustful and more sustainable legal relationships

⁴⁸It could be noted that recent decision from the UK could have the possibility to address issues related to the emotional aspect of AI inventions, but the judgement did not focus on that. See *Emotional Perception AI Ltd v Comptroller-General of Patents, Designs, and Trade Marks* [2023] EWHC 2948 (Ch).

⁴⁹Available at <https://www.europarl.europa.eu/news/en/press-room/20231206IPR15699/artificial-intelligence-act-deal-on-comprehensive-rules-for-trustworthy-ai> (accessed 6 March 2024).

⁵⁰*Ibid.*

⁵¹Gerlinde Berger-Walliser and Kim Østergaard, *Proactive Law—In a Business Environment* (Denmark, Djøf Publishing 2012), 16.

amongst parties.⁵² However, this approach should not be used for limiting positive developments or penalizing future actions that are not even yet in existence. Indeed, this would be both against the rule of law and legal certainty. Further, there are also many AI systems—for instance, insurance or comfort-enhancing AI—that could be using emotional data in a positive sense. In many cases, inventions that use emotional data could provide an increase of comfort and security for individuals and society as a whole. Regulations should provide stimulation for enhancing comfort and security, also from the aspect of fundamental rights in personal life, as a basis for human-centric rules of law.

6. Conclusions

There are numerous advantages in increasing emotional comfort and stability. People who are emotionally dissatisfied can suffer from emotional instability leading to a more negative mood and even depression. This can result in discomfort and illness. The negative aspects are clear: less pleasure in work or even inability to work. This will have a negative economic and societal impact as well as personal damage for the person(s) concerned and work circumstances in general. Additionally, non-work-related spaces such as shops, medical institutions and other public places can be more effective and satisfying to people if aligned with increased personal comfort by processing the emotional requirements of individual human beings. Regulations should be oriented to increasing people's comfort and well-being instead of prohibiting positive services by AI processing of emotional data based on (insufficient) knowledge of negative effects.

Notwithstanding this premise, our analysis shows that the current European legal landscape follows a rather cautious—to say the least—approach in terms of promoting developments and stimulating exploitation of emotional AI innovations. On the one hand, the European patent system—one of the most important legal pillars when it comes to direct R&D and investments in innovations—albeit not preventing emotional AI inventions from being patented—is not particularly incentivizing them either.

A similar approach can be observed when we look at the current legal landscape regulating the domain of exploitation of emotional AI inventions, especially in relation to privacy issues and the GDPR, where several challenges, limitations and, at times, even impediments are in place. This makes it difficult for innovators operating in various streams related to this field to find freedom to operate, security for the heavy investments required, as well as for sufficient returns and revenues. Nor does the future look brighter, with the currently pending AIA draft leaning towards a preventive law approach that seems to limit possibilities rather than promote opportunities. Considering that innovations—in general and in the field of emotional AI especially—are also known to be key in terms of improving welfare, progress and life on earth, one could even question whether the claim that the AIA follows a human-centric approach does indeed hold true. As Albert Einstein once said:

Life is like riding a bicycle. To keep your balance, you must keep moving.

What if European legislators made greater use of this philosophy in their approach to regulating (emotional) AI developments? After all, rewarding positive results in increasing the comfort and well-being of human participants in all layers of society would have a multiplier effect, instead of concentrating on pre-emptive controls and even interdiction of services that process emotional data. A better approach would be to use the carrot of stimulating AI applications enhancing human-centred comfort and personal well-being, rather than the stick of forbidding those human-centred applications because of (unknown) risks. There are ample national and European regulations that will prevent inventions with negative effects, including those related to product liability, privacy, human rights and even criminal law. It will be a risk for lawmakers to develop ex ante regulations of yet unknown AI applications, chilling further developments of inventions that may increase the well-being of natural persons and society, and ultimately hampering legal certainty.

⁵²Siedel George J and Haapio Helena, 'Using Proactive Law for Competitive Advantage' (1 August 2010). Ross School of Business Paper No. 1148, available at SSRN. Available at <https://ssrn.com/abstract=1664561> (accessed 6 March 2024).