The Reasonable Man in the 21st Century

Cognitive Experiences Under the Influence of Technologies & Legal Concepts

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Abstract

The present paper is introducing an innovative legal concept that applies to new behavior standards arising from virtual and augmented technology-based reality. The legal relevance of this reality is undeniable and the need for normative guidelines will only increase in the future.

The present starts by exploring how Law creates its own terminology to describe, regulate or condemn social behavior, whether it is directed by social perception, ethical assessments or human achievements, such as technological innovation. Cognitive experiences, in terms of liability or capacity, fall within legal concepts, such as the *Reasonable Man* or the *M'Naghten Rule*, that are created to attain a standard of behavior, and ultimately, society's understanding about a relevant reality.

By showing that technologies like Virtual and Augmented Reality will trigger a new type of cognitive experiences, the present will showcase that the existing legal concepts are not sufficient or accurate enough to deal with this new technological-based reality.

Notwithstanding, by recognizing the life cycle of these technologies, a detailed legal and philosophical analysis on the impacts of Virtual and Augmented Reality on conscious experiences and capacity is conducted. Such an analysis justifies the need for a new normative-performative concept, which will act as an enabling tool for future policies and frameworks addressing situations deriving from the use of technologies capable of altering an individual's cognitive experience.

Finally, the need for a new legal doctrine is highlighted. Specifically, criteria based on a poly-analogical reasoning are proposed. Lastly, as an example, the application of these principles in Tort Law is examined, regarding the duty of care in creating, modifying or terminating a legal relation celebrated in a virtual or augmented environment.

Keywords: Augmented Reality, Virtual Reality, Reasonable Man, Cognitive Enhancement, Normative Disconnection, Conceptual Loopholes, Epistemological Responsibility, Ontological Analysis, Analogical Reasoning.

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Chapter I – The Reasonable Man in the 21st Century

"All visual perception is based on classifying concepts and interpreting visual information. One cannot perceive that which one cannot classify"[1]

1.1 Introduction

Law creates its own terms to describe, regulate or even condemn social behavior whether it is based on social constructions, traditions, phenomena or human achievements, like technological innovation. Whenever there is a change in society, Law creates its own concepts to deal with it, as Law adapts to societal changes always from the same starting point; language.

Law and its legal actors acknowledged the basic need to define and describe in legal terms a standardized reference of behavior, comprehension, knowledge and awareness of individuals. The creation of a concept like the *Reasonable Man* or *Bonus Paterfamilias* emerged from that need for a standardized cognitive legal reference.

Since the Roman times, legal actors tried to create an *"idealistic"* standard for all cognitive processes that were legally relevant. The Romans called it the *Bonus Paterfamilias*.[2] Common Law addresses it as the *Reasonable Man.*[3] Created by Adolphe Quetelet in 1835 and used for the first time in 1837,[4] its meaning, the good father of the family or the man on the Clapham omnibus Man,[5] refers to a standard of care, i.e. it carries the standard behavior demanded by Law in certain circumstances. It is used to create legal standards and to assess the level of liability of individuals in situations where a judge conducts an *ad hoc* comparison with the definition of the *Reasonable Man*.

The concept of the *Reasonable Man* is a subjective concept based on the cognitive aspects of an individual that are legally relevant. If those aspects are, in some way, different from those of the *Reasonable Man*, the Law enforces a different level of liability, establishing different consequences than the ones that would be applicable to the *Reasonable Man*. Although the concept is a fictitious one, scholars, judges and legal practitioners, contributed in the construction of the features of the *Reasonable Man*.

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[1] Kandel E. (2012) *The Age Of Insight: The Quest To Understand The Unconscious In Art, Mind, And Brain, From Vienna 1900 To The Present*. New York, NY: Random House Publishing Group, p. 238.
[2] Calabresi G. (1985), *Ideals, Beliefs, Attitudes and the Law,* Syracuse University Press, Syracuse, 23, where he refers to the concept as *bonus paterfamilias or diligens paterfamilias.*
[3] Parker,W. (1993). *The reasonable person: a gendered concept?*, Victoria University of Wellington Law Review. 23 pp. 105 and 112.
[4] Vaughan v Menlove (1837) 132 ER 490 (CP).
[5] "Healthcare at Home Limited v. The Common Services Agency, [2014] UKSC 49".

For the Law, the *Reasonable Man* is an individual capable of conducting a risk assessment of his actions while considering the utility level of other alternatives based on the likelihood, extent and foreseeability of the associated risks. He can act in an extraordinary way as well, but the main point is that this individual is generally capable, appropriately informed and he is aware of the social constructions around him. This cluster of qualities leads to the assumption that whatever this individual does or thinks, he/she is always reasonable. However, the conceptual evolution regarding the cognitive standards for certain behavioral patterns in Law stagnated in the 20th century and the existing legal concepts are no longer sufficient and accurate enough to describe and address new realities capable of altering our cognitive experiences, as it will be demonstrated in the second Chapter.

Therefore, the role of legal terminology is increasingly pivotal, since terminology, whether through symbols or concepts, is a fictional model used to represent reality in the most accurate and efficient manner. Thus, legal terminology should be the main tool used by Law to describe, detail, and regulate social reality, subsequently forming the normative reality.

The technological era that we are traversing, brought many new technologies that have been disrupting and enhancing our cognitive processes in a subtle way, that only now, years after their entrenchment in society, enabled us to start notice their consequences, as a reflection of one of the aspects of the Collingridge dilemma.[6] As the technological revolution progresses, the enhancing and disruptive effects of the technologies will be pervasive, despite being instantaneous, timely or permanent. Technologies like Augmented Reality and Virtual Reality raise the need for Law to update the concept and teleological reach of the *Reasonable Man* because of its significance and applicability in the legal framework.

For instance, when there was legal relevance in situations where the actors were suffering from a mental illness or a cognitive disfunction, new legal terms were created. As an example, Law reacted by creating concepts that represent the cognitive status of an individual under the influence of drugs practicing actions with legal relevancy. The concept of insanity was also created to describe society's new understanding about a reality that was already present. In this sense, the relevance of different cognitive statuses is embedded in Law, which can be perceived as a spectrum of legal responsibility according to different cognitive experiences.

Furthermore, the concept of awareness can be viewed as an example:

[6] Collingridge, D. (1980), *The Social Control of Technology*, New York: St. Martin's Press; London.

Fig. 1

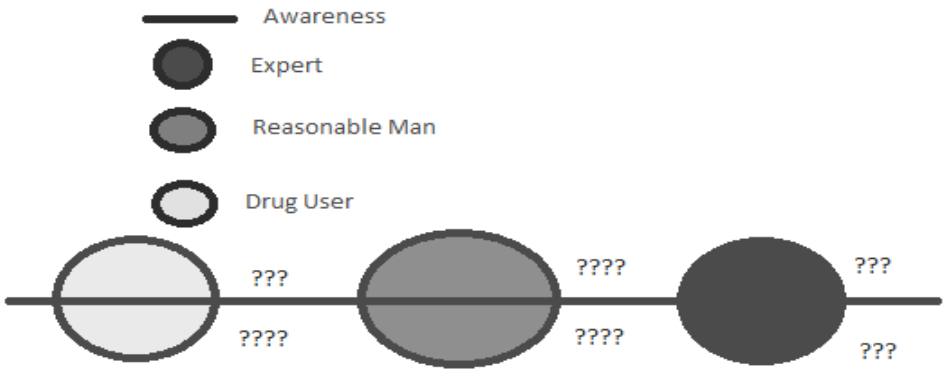


Figure 1. Cognitive field of Awareness – Concrete Dimension of Reasonable Man

What this spectrum represents is the entanglement between legal concepts and the reality of cognitive processes, in this case of the process of awareness.

The question mark in the above figure represents the conceptual loopholes and the normative disconnection where borderline phenomena and other realities not yet addressed by Law stand in the spectrum. Conceptual loopholes exist whenever a certain reality is not accurately described, meaning that it does not fall within any established concept. On the other hand, normative disconnection exists when a reality runs through the entire conceptual spectrum, creating a disconnection between the conceptual and normative reality.[7]

When we look to such a subjective phenomenon like awareness, seen as a dynamic and diverse reality, we acknowledge that the spectrum reflects a vast conceptual dimension that, if not detailed accurately, becomes vulnerable to *ad hoc* and *post hoc* manipulation by legal actors and policy makers.

To understand how these conceptual changes should proceed, the concept of the *Reasonable Man* must be examined in a double dimension; concrete and abstract. This duality of the concept will be scrutinized in the following sub-chapter.

[7] Further information will be given in Chapter 2.1.3 *Normative Disconnection and Conceptual Loopholes*.

Research Question

Based on the above, the present thesis will try to answer the following question:

Do we need to update the concept of "Reasonable Man" in face of new technologies capable of altering our cognitive processes?

To answer this question the following sub-questions will be answered.

i. What is the role of language in legal concepts as regulatory tools of emergent technologies?
ii. Does the analogical reasoning of courts fit the new paradigm created by these emergent technologies?
iii. Is the level of liability the same for the "Reasonable Man" and an individual with his/her cognitive processes enhanced by an augmented reality?
iv. What are the potential effects of Virtual Reality and Augmented Reality in Consumer protection?
v. Is there a need to create a new legal concept capable of addressing emerging realities in an accurate and adequate way?

Methodology

In the present, a *doctrinal research* will be conducted to determine whether and how the concept of the *Reasonable Man* and the level of liability should adapt, when cognitive experiences are altered by technologies, such as Augmented and Virtual Reality.

Moreover, a multi-and-inter-disciplinary documentary analysis, comprising theoretical and descriptive material, such as legal publications, articles and papers, news in digital form and reports, as well as opinions of legal practitioners, economists, psychologists, neuroscientists and technologists, will be followed.

Finally, throughout the present, primary sources from the EU, US, as well as, relevant national legislation will be used, and a partially a comparative analysis will be conducted, when necessary, to establish possible differences and similarities in the field of Tort Law and consumer protection.

1.2 The Fictitious Reasonable Man & the Legal Comparison Between Common Law & Roman Law: The Reasonable Person in Contract & Tort Law

1.2.1. Conceptual Analysis

The concept of the *Reasonable Man* can be viewed in two dimensions.

1. ***The Abstract Dimension*** – *Reasonable Man stricto sensu* – *Reasonable Man* as the *Clapham Omnibus Man* or *Bonus Pater Familias;*

2. ***The Concrete Dimension*** – *Reasonable Man* as legal standard – *Reasonable Man* in Cognoscibility;[8] Knowledge; Culpability and Criminal liability; Awareness; Duty of Care;

The abstract dimension of the Reasonable Man, as a concept, translates standardized references of comprehension, used to assess an individual's cognitive capability in a certain circumstance. Distinct jurisdictions approach the concept differently, while, at the same time, deviations occur within jurisdictions depending on the field of law. The latter differences fall within the scope of the concrete dimension.

Even before the Roman *Bonus Pater Familias*, the traits and qualities of a prudent man and citizen were explored first by Plato in his Republic,[9] and then by Aristotle in Nicomachean Ethics.[10] Finally, even before Socrates, Democritus, when describing Athena as an embodiment of prudence, talked about three manifestations of prudence; to think in a correct manner; to express one´s self impeccably and to act beneficially for others.

For the Roman Law, the *Bonus Pater Familias* was stated as the first behavioral standardized pattern to assess an individual's culpability and liability in certain cases.[11]

Many Civil Law authors began criticizing the suitability of the qualities of the *Bonus Pater Familias* - the good father - to determine a person´s liability. Moreover, it had been proposed by some authors that since these qualities were no longer crucial to assess

[8] Cognoscibility is the ability recognized by law to an individual that is capable of being judicially heard and determined; capable of being known.
[9] Plato described his ideal citizen, as a virtuous man, wise, courageous, just and temperate, *in* Republic IV. 426-435. Plato and Larson, R. (2014), *The Republic.* Hoboken: Wiley, Crofts Classics.
[10] Aristotle, on the other hand, saw prudence as the main quality of a logical and reasonable man. Prudence, for Aristotle derives from a correct and logical way of thinking on matters of ethical importance, hence, a reasonable man will be able to make a prudent and stable decision on given circumstances, *in* Nicomachean Ethics III. Aristotle (2014), *Nicomachean Ethics*, Hackett Publishing Company, Inc., Cambridge.
[11] "… *the average type of an honest prudent and industrious man, father of a family, whose behavior in relations with other citizens is given as a pattern of an upright man and may be required from any one. Acting in contrast to what a bonus pater familias would do in a given situation, may serve as a basis for measuring his culpability and liability in a specific case", in* Berger A, (1953), *Encyclopedic Dictionary of Roman Law*, The Lawbook Exchange Ltd, p. 377.

someone's behavior, qualities like his or her general knowledge, physical abilities or intellectual expertise, especially for economic issues, require another legal standard. [12]

As a result of the aforementioned criticism, the concept of the *Bonus Pater Familias* evolved into the concept of the *Reasonable Man* in civil law countries. Instead of the prudent father of a family, the *Reasonable Man* can be described as a good citizen. Moreover, the concept entails certain qualities that help constructing this fictitious figure that acts reasonably, and thus, serves the need for a behavioral standard in Law.

In Portugal, for instance, the concept of the *cidadão médio* is described as the good average citizen, reasonably cautious, focused, committed, skillful, and qualified. The adjective *average* does not mean that *cidadão médio* is an average person. On the contrary, the adjective is attributed to the reasonable man, after a comparison of the actor´s actions to that of the hypothetical reasonable man, while considering the actor´s knowledge, experience and perception to determine whether the person acted as the Reasonable Man would have acted under the same circumstances. The concept of the average man and its relevance in assessing a cognitive performance will be further analyzed in Chapter II of the present.

In common law, the *Reasonable Man* is an individual capable of conducting a risk assessment of his actions while considering the utility level of other possible alternatives based on the likelihood, extent and foreseeability of the associated risks. He can act in an extraordinary way as well, but the main point is that this individual is generally capable, appropriately informed and aware of the social constructions around him. The predominance of this cluster of features means that whatever this individual does or thinks, are a result of a reasonable process of observation and thinking.

Moreover, on the abstract level, the inherent qualities that this fictitious figure assumes in specific situations, both in Civil and in Common Law, became outdated in the light of the normative revolution that came with the technology. What was taken for granted as the *Reasonable Man* is now heavily debated.

The *Reasonable Man of the 21st Century* has different abilities, tools, and priorities; hence, he exhibits a different behavior. If Law is, or ought to be, the instrument used par excellence to regulate the behavior of society, then, once more, the need for a different legal standard or standards is highlighted. The qualities associated with the *Bonus Pater Familiae* and the *Reasonable Man* provide limited guidance to legal actors regarding contemporary societal behavior, as it is formed by emergent technologies capable of changing our "conventional" perception and cognitive experiences.

[12] Galvão Telles I. (1986), *Direito das Obrigações*, Lisboa, Coimbra, Descrição Física, pp. 324 and 325.

Furthermore, the concrete dimension of the *Reasonable Man* can be viewed as the adaptation of the qualities inherent to the concept, in the different fields of law, used to assess the level of, e.g. cognoscibility, culpability and subsequently liability of the actor.[13]

In the conceptual realm, the concrete dimension of the concept depicts the invariable and constant qualities associated with it while at the same time establishing their legal relevance within several legal fields, where those cognitive qualities manifest. It is on those playfields that the concept of the *Reasonable Man* moves and wields its purpose, manifesting its suppleness.

To understand the concrete dimension of the concept of *Reasonable Man*, a further conceptual categorization is required. The legal fields, across which the concrete dimension of the concept manifests, can be divided into two categories.

a. ***The Legal Field***: The different legal fields where the concept of *Reasonable Man* is applied: Tort Law; Contractual Law; Criminal Law; Intellectual Property Law; Commercial Law; Labor Law;

b. ***The Cognitive Field***: The different cognitive realms that the concept is displayed and that are relevant in the different legal fields: Cognoscibility; Knowledge; Perception; Culpability; Awareness; Duty of Care;[14]

The division between the cognitive and legal field, where the *Reasonable Man* manifests itself, allow a more concise and coherent analysis and subsequent critique of how the concept may or may not apply to new emergent technologies that can cause a cognitive disruption.[15] Since the concrete dimension is the one that expresses the cognitive qualities of the *Reasonable Man*, it will be further explored, while keeping in mind why the abstract dimension of the concept, which entails the characteristics of the Reasonable Man, may be insufficient for the future normative reality.

1.2.2. Comparative Approach

Throughout Common Law and Civil Law, examples of both cognitive and legal fields can be found.

Starting with Common Law, one of the first appearances of the Reasonable Man was in the *Vaughan* v. *Menlove* case[16] in 1837. In this case it was determined when an individual is negligent or reasonable for the purposes of Tort liability.

[13] These qualities entail the Reasonable Man's behavior, knowledge, experience, perception, and his physical characteristics.
[14] As an expression of the cognitive qualities that are valuable in a certain legal context.
[15] E.g. Augmented Reality and Virtual Reality.
[16] The concept of the *Reasonable Man* was used to set a standard to allow courts to decide whether a certain person acted in a negligent way in comparison with what the reasonable man would do. See *supra* note 4.

Soon after, this fictitious concept started to be used in other realms of Law, such as Criminal and Administrative Law.

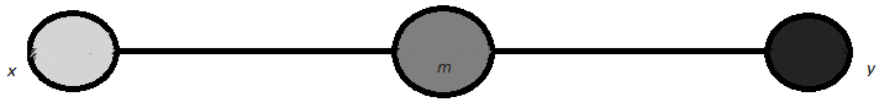
In Criminal Law it was often used as a standard to assess someone's action within the scope of self-defense,[17] while in Administrative Law, the term *Wednesbury standard*, encompassing the concept of the "*reasonable public authority*", [18] was used to set a standard for judicial review of actions taken by State's administrations.

In private law, the concept of the *Reasonable Man* gained special relevance mainly in the area of Contract Law. In this legal field, the concept is usually used for the formation and interpretation of contracts in both Common and Civil Law systems. [19]

Regarding the cognitive field of the concept in Civil Law systems, a classic example is used to demonstrate how the law classifies the reasonable man, in comparison with an expert and a person below the reasonable man, in a specific situation within a specific legal field.[20] In this hypothetical scenario, an un-imputable person (*x*), for instance someone who suffered from a concussion that damage areas of the brain responsible for processing their surroundings or their decision making-process,[21] is in the same room with a specialized doctor (y*)* and with a man fully competent but not specialized in any medical science (*m*). What will the Law demand from each individual in terms of duty of care, foreseeability of consequences of their actions when another individual asks for medical assistance?

The abovementioned example portrays the extremes of the cognitive spectrum, and concomitantly, of the concept of the *Reasonable Man* itself. Within this spectrum, *x* and *y* are at the extremes, while *m* represents the *Reasonable Man*, as depicted in the following graph.

[17] Gardner J. (2015). *The Many Faces of the Reasonable Person,* Law Quarterly Review, 131 (Oct), p.p.3 – 5, and of Self-defense: Attorney-General for Northern Ireland's Reference (No. 1 of 1975) [1977] AC 105, Necessity: In re F [1990] 2 AC 1, Arrest: O'Hara v Chief Constable of the Royal Ulster Constabulary [1997] AC 286, and Duress: R v Graham [1982] 1 WLR 294.
[18] Associated Provincial Picture Houses Ltd v Wednesbury Corporation [1948] 1 KB 223.
[19] Smith v Hughes (1871) LR 6 QB 597 and Investors Compensation Scheme Ltd v West Bromwich Building Society [1998] 1 WLR 896.
[20] de Sá e Mello A. (1989), *Critérios na Apreciação da Culpa na Responsabilidade Civil*, Revista da Ordem dos Advogados 49, p.535.
[21] Prefrontal Cortex.



x - unimputable
m - bonus pater familias
y - medical specialist

Additionally, another example that portrays the different approaches of the concept of the *Reasonable Man*, both in legal and cognitive playfields, can be taken by company law regarding the duty of care of the company's directors. Historically, the level of care that the board members must exhibit was first examined subjectively in *Re City Equitable Fire Insurance Co [1925] Ch 407.*[22] However, as jurisprudence developed, objective criteria are used to define the directors' level of care. In other words, a director when managing corporate affairs has to act as a *reasonable entrepreneur;* to exhibit the diligence that it is reasonably expected from a prudent businessman of his skill and knowledge, in that particular case. [23]

1.2.3. Preliminary Conclusions

Different social context requires different qualities or even different standards. The current society is no different from the one decades ago, in the sense that both required conceptual and logical updates in the legal frameworks that existed back then. The concept was already challenged within the cognoscibility and the liability of individuals acting under drug influence or mentally ill, as it will be discussed in Chapter 2.1. Nowadays, the main problem is not *if* the concept of the *Reasonable Man* is outdated or insufficient, as this is evident from the qualities still attributed to that fictitious man, but

[22] In the case, the Court stated that *"a director need not exhibit in the performance of his duties a greater degree of skill than may reasonably be expected from a person of his knowledge and experience"*. Re City Equitable Fire Insurance Co [1925] Ch 407.
[23] E.g. In UK, Chapter 2 § 174(1),(2) of the Companies Act 2006 and in Greece, Articles 69 of the Greek Civil Code, in conjunction with Article 22a of Law 2190/1920 on Anonymous Companies.

in *how* should the concept be updated, to be able to adapt to the needs of the new cognitive reality developed by disruptive technologies.

As a fictitious concept, the *Reasonable Man*, and the legal system itself, should be able to adapt to reality, either through a process of ontological transformation according to new scenarios and new needs of society, or even through the creation of detailed guidelines with specific concepts capable of legally addressing these new relevant realities.

Finally, the growing need for the modernization of the concept will be underlined in the following subchapter from the perspective of *ad hoc* and *post hoc* manipulation and the Collingridge dilemma seen within the legal playfield of Tort Law.

1.3 Legal Terminology & the Technological Society – *Ad Hoc & Post Hoc Manipulation*

1.3.1. Language & Society – Conceptual Systems

Whenever a different scenario or circumstance emerges in society, we, as a group of individuals, instinctively react by trying to comprehend it. The first individual and social construction that we build to understand reality in a consensual way is language itself. [24] Our thoughts and concerns may differ, but legal concepts and terms try to establish a relevance between Law and almost every aspect of human life. Tort Law, for instance, poses the question of how people should treat each other and who should be held liable in case they do not act as law dictates.[25] If we add the element of technology, for instance Augmented or Virtual Reality, in human interactions, in the light of Tort Law, another question raises regarding whether a new conceptual approach, hence a new legal terminology, is needed.

The need to conceptualize the way we interact with our environment is inherent to our nature. In fact, Language and Law are the most established and sophisticated social constructions that people designed to control their interpersonal relations as well as the environment around them.[26] Both are models of interpretation of our reality and tools that we created to control what we perceive.

[24] Berger L. P and Luckman T., (1966), *The Social Construction of Reality*, Penguin Books, London, New York, Victoria, Toronto, Auckland.
[25] Ripstein A. (2004), *Philosophy of Tort Law*, in Coleman L. J., Himma E. K., and Shapiro J. S. (eds) (2004), *The Oxford Handbook of Jurisprudence and Philosophy of Law*, Oxford University Press, Oxford.
[26] Endicott T. (2004), *Law and Language*, in Coleman L. J., Himma E. K., and Shapiro J. S. (eds) (2004), *The Oxford Handbook of Jurisprudence and Philosophy of Law*, Oxford University Press, Oxford.

The impact of emergent and disruptive technologies in our society is undeniable, as mentioned in the Chapter 1.1. However, as Neil Postman states, to assess the different sociological aspects and effects of a new technology in society, one should ask six questions.[27]

1. What is the problem that this new technology addresses?
2. Whose problem is it?
3. What problems do we create by solving this problem?
4. Which people and which institutions might be harmed using this technology.
5. What changes in **language** occur as the result of this technology entrenchment in society?
6. Which people and which institutions will acquire economic and political power when this technology is adopted?

Of course, from a legal perspective, not every question is clear, but rather grey and blurred, and although all questions assume a different and complex relevance for Law, this thesis will focus on the 5th question regarding the changes in language that certain technologies will trigger.

Technologies that are entering that stage of their life cycle of being broadly used,[28] often come with a very specific and complex conceptual baggage,[29] that regulators oversee most of the times, policy makers, judges, lawyers and even scholars.

To understand if language and legal concepts can be used as a tool in regulating emergent technologies, we must acknowledge the importance of language in addressing reality itself. From a systematic point of view, four (4) processes where reality, normative reality and language interact can be identified. These processes, entangled with each other, form the *Conceptual System* of our society.

(1) The first process occurs when a new phenomenon, circumstance or utterance befalls in society. When it does, the process of understanding and adaptation to the new context is enabled through language, which conceptualizes it, forming *Conceptual Reality*. *Conceptual Reality* is the result of an ongoing process, which is inherent to our social animus as a species. That process is the construction of concepts and mental representations of our interactions with each other and our environment. *Conceptual Reality* comes with the process of the social constructed

[27] Postman N. (1993), *Technopoly - The Surrender of Culture to Technology*, Vintage Books, New York.
[28] Adcock M. (2018), *Augmented reality: Why 2018 might be the year AR tech goes mainstream*, ABC News, available at: http://www.abc.net.au/news/2018-01-12/augmented-reality-why-2018-might-be-year-ar-goes-mainstream/9321472 and Levy S. (2017), *The Race of Augmented Reality Starts Now*, Wired, available at: https://www.wired.com/story/future-of-augmented-reality-2018/
[29] Jones M. L and Millar J. (2017), *Hacking Metaphors in the Anticipatory Governance of Emerging Technology: The Case of Regulating Robots*, in Brownsword R., Scotford E., and Yeung K (eds.) (2017), The Oxford Handbook of Law, Regulation and Technology, Oxford University Press, Oxford.

reality.[30] Once those social constructions are becoming institutionalized, arrive to *Normative Reality*.

(2) The second process is what creates the *Normative Reality per se*. It emerges from a feedback process where the social constructions that people build through their own comprehension and methods are becoming institutionalized, leading to a general and coherent recognition of how we interpret reality.[31] This feedback process is within a loop because we, as a group of individuals, need a coherent representation of our reality because other groups of individuals need a coherent representation of their reality, and so on.[32] That coherence enables us to set standards of behavior and to define the desirable and undesirable outcomes of our interactions.

(3) The third process is the teleological framework of the *Normative Reality*. In this process, we also appeal to terminology and language by building legal concepts and uncovering the analogical and metaphorical reasoning led by the courts and policy makers when addressing, for instance, emergent and disruptive technologies. The need for accurate legal terms justifies the scientific and ontological research and highlights the relevance of philosophy of language and legal terminology in the upcoming technological transformation of our society.[33] The third process focuses on rendering the coherent perception of reality into legal terms by translating undesirable and desirable outcomes into permissible and impermissible behaviors. The transition from descriptive[34] to normative reality[35] is due to an axiological process made through ethical frameworks embedded in individuals' social constructions. These ethical frameworks give axiological value to the perceived reality - *Descriptive Reality* - that then enables the perception of the *Normative Reality - what is ought to be*. If metaphorical reasoning can function as a policy debate,[36] legal concepts must provide clear patchworks and simplify the interpretation issues that might arise from new disruptive technologies. The role of social constructions does not differ from the role of legal concepts. Legal terminology, when it is used to bring to the legal realm aspects of a social behavior,

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[30] Berger L. P and Luckman T., (1966), *The Social Construction of Reality*, Penguin Books, London, New York, Victoria, Toronto, Auckland.

[31] Kuhn T. (1962) *The Structure of Scientific Revolutions*, University of Chicago Press, Chicago.

[32] Araszkiewicz M. (2018), *Participation in legal discourse as an adaptive behavior*, Conference Law, Science and Rationality - April 2018, Faculty of Law, Maastricht University.

[33] *"The fact that technology is recognized as having a social role means that both factors—technology and society—have to be understood as co-producing our reality and as objects of equal contingency and social construction" on the role of technologies and Law in social constructions" in* Graeme L., Harmon H.E. S. and Arzuaga F., (2012) *Foresighting Futures: Law, New Technologies, and the Challenges of Regulating for Uncertainty*, Law, Innovation and Technology, 4:1, 1-33, p. 6. See also Jørgensen, M. S., Jørgensen, U., & Clausen, C. (2009). The Social Shaping Approach to Technology Foresight. Futures, 41(2), 80-86.

[34] *What is.*

[35] *What should be.*

[36] *"Metaphors can both describe and shape technology. In governance contexts, metaphors can be used to frame technology in ways that attach to very specific, often competing, sets of values and norms. Thus, competing metaphors are not just different ways of thinking about a technology; each metaphor carries different ethical and political, that is, normative, consequences.",* in Jones M. L and Millar J. (2017), *Hacking Metaphors in the Anticipatory Governance of Emerging Technology: The Case of Regulating Robots*, in Brownsword R., Scotford E., and Yeung K (eds.) (2017), The Oxford Handbook of Law, Regulation and Technology, Oxford University Press, Oxford.

carries the ethical and normative value that we, as a society, give to a certain situation or utterance, and their context.

(4) Thus, we reach the fourth process, where we can see, similarly to the second stage, a feedback-process taking place. The difference between the second and fourth stage concerns the origin of the feedback itself. Whereas the second stage creates the *Normative Reality*, the feedback of the fourth process derives from *Normative Reality* itself and resonates in the actual *Reality*, to assess the public acceptance and coherence of all the four (4) stages of understanding *Reality*. In other words, there is a feedback loop between the *Normative* and actual *Reality*, in a perpetual cycle of legitimizing the social and conceptual constructions to achieve the needed coherence in the way society views and regulates itself.

1.3.2. Language & Law – The Normative Framework

Language and terminology can and should be seen as a new way to approach the pacing problem of regulating emergent technologies.[37] It is undoubtedly a very relevant part of Law and Society and recent case law has shown the importance of accurate and coherent terms and concepts for new technologies,[38] to avoid a disconnection between *Normative* and *Conceptual Reality*.

Conceptual loopholes and normative disconnection may seem irrelevant in terms of impact, but this conceptual disturbance can create trends in the development of the technology by accelerating or slowing down its pace in an unreasonable way,[39] for instance, through liability loopholes or excessive liability caused by the lack of judicial competence to assess in full extent the effects of technology. The competence argument is not the only one that proves that the judiciary is not sufficient to create the required framework for new technologies. The lack of knowledge and understanding of disruptive technologies, the conflicting cases in different jurisdictions and the *ex-ante* approach of the judiciary contribute in the argumentation against resting the adaptation of the law in the current societal needs solely to the courts.

Whenever a new technology is introduced in society, it is up to the courts to define the liability and sometimes even fill legal vacuums or solve conceptual loopholes. Moreover,

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[37] *"Indeed, the importance of considering a role for the law (and of traditionally political and legal concepts and practices) to the science and technology setting is emphasized by the injection of political and democratic practices into the governance of science"* regarding the relevance of concepts in regulating technologies. *Supra* note 33, p. 10.

[38] In *State v. Smith (Ohio 2009)* the Court realized that it was not possible to find a right analogy or metaphor to cell phones sending the problem to the conceptual realm. The Court recognized the importance of giving an accurate and coherent classification or characterization to the phone. See also City of Ontario v. Quon (2010), where the Court assumed extreme difficulty in interpreting the use of a technology and made a reference to landmark case Olmstead v. USA to state the dangers of addressing new technologies without knowing its effects in society in a clear perspective.

[39] Scherer, U. M. (2015), *Regulating Artificial Intelligence Systems: Risks, Challenges, Competencies, and Strategies*, Harvard Journal of Law & Technology, Vol. 29, No. 2, Spring 2016, available at SSRN: https://ssrn.com/abstract=2609777.

when new technologies enter society, an interpretation technique, what Luke Milligan calls the *mono-analogical reasoning,*[40] anchoring itself on the technical equivalents – functions - of the technology, is led by the courts. However, the functionality of a technology should not be the only feature to bear in mind when assessing the possible legal consequences or level of liability of the individual using it.

Moreover, instead of relying solely on the courts, the necessary terms and concepts should be introduced in the legal framework to create certainty and safety for the actors who interact *ex ante* with these technologies and to facilitate the judiciary when a situation triggers its intervention.

Subsequently, Tort Law can be used as an example to outline the necessity for a new regulatory approach. Tort Law functions follows a reactionary approach. Liability rises as a reaction to a certain behavior or situation. It is not preemptive. However, it is up to legal theorists and regulators to add preemptive elements in Tort Law, when it comes to disruptive technologies.

Such additions, made by other legal actors, can help the courts' reasoning in these special circumstances. This is where legal terminology can be proved an effective tool to regulate the emerging technologies, while a conceptual reform or a detailed analogical reasoning might be the solution that can facilitate the judiciary in liability cases to reach coherent and consistent decisions.

Finally, it could argue that legal concepts do not have great relevance in Common Law since it follows a precedent-based-decision-making process. However, that argument disregards the fact that doctrines together with the industry of reporting cases are giving legal force to the ratio and teleology of the decision expressed by the precedent-setting court.[41]

In conclusion, law is made by means of language. Thus, it can be argued that language is a universal element of legal systems. For a legal theorist, the greatest task is to understand the terms in which the subject matter, e.g. technology, is to be described. That kind of work cannot fall entirely under the judges' purview. Doing so would create a great level of arbitrariness when regulating new technologies, since it allows the possibility to have *ad hoc* manipulation of normative reality and *post hoc* manipulation of expectations when determining the level of liability.

[40] Milligan, L. (2012), *Analogy Breakers: A Reality Check on Emerging Technologies*, Mississippi Law Journal, Vol. 80, No. 4, p. 1319, 2011; University of Louisville School of Law Legal Studies Research Paper Series No. 2012-14. Available at SSRN: https://ssrn.com/abstract=2099761.

[41] Endicott T. (2004), *Law and Language,* Coleman L. J., Einar Himma K., and Shapiro J. S. (eds) (2004), *The Oxford Handbook of Jurisprudence and Philosophy of Law*, Oxford University Press, Oxford.

1.3.3. Ad Hoc & Post Hoc Manipulation

Ad hoc manipulation occurs due to the uncertainty created by courts regarding the teleological framework of the *Normative Reality*, since it compromises the feedback-process taking place in the fourth step of understanding reality. Thus, an incoherent resonance in the way society understands and adapts to the technology manifests. This incoherence leads to conceptual loopholes within the legal systems, creating a never-ending cycle.

The processes leading to *conceptual* and *normative reality*, takes place before disruptive realities enter the courtroom. On the contrary, letting these processes being developed solely by the judiciary, will subsequently lead to the manipulation of the process of legally contextualizing the new normative realities. Additionally, as it has been stated, this process should be done in advance in the form of guidelines introducing the new necessary terminology, facilitated by legal scholars and other legal actors, while taking into consideration the role of terminology and language.

On the other hand, *post hoc* manipulation may arise regarding liability. If a certain technology is designed based on a certain level of liability that exists for specific technological features, changing the level of liability for that technology due to a mono-analogical reasoning led by the court will lead to a *post hoc* manipulation of the technology manufacturer's expectations. For instance, this can happen when the court only considers the information that a technology can aggregate and not its efficiency.[42]

There are several cases where courts used this analogical approach regarding technologies and the result is usually incoherent and inaccurate. The more metaphors and analogies a court uses, the more legal uncertainty and un-foreseeability surrounds these technologies. In fact, the analogical process, when excessively used, reflects the conceptual uncertainty regarding the technology itself.[43]

Conceptual uncertainty in the process of legal contextualization of new normative realities can be tackled, by unfolding the coherent perception of reality into legal terms and concepts. That process should be the starting point of discussion and a tool for the courts when facing cases with emergent and disruptive technologies. If there is more debate and more competence in the conceptual level regarding new technologies, the appropriate conditions to improve the legal reasoning led by courts will be met, which will subsequently lead to better policy making and more coherent frameworks. For that purpose, terminology, whether through conceptual or analogical constructions, can provide techniques capable of offering new solutions to new problems.

The pivotal role of language and terminology, as a tool for policymaking, has been neglected and disregarded, although many scholars stress out its importance to help

[42] In that manner, regarding an analogy between phones and laptops see *supra*, note 38, *City of Ontario v. Quon.*
[43] *Supra* note 38.

regulating new technologies. In the last of years, whether through theories concerning the analogical reasoning led by the courts or by giving relevance to the power of metaphors to state different policy views regarding a specific technology, the importance of language in Law has increased. This new focus in academia can be correlated with the new emerging technological phenomena.

Language, in different stages of regulation, should be treated as a dynamic tool, either by adapting the existing concepts or by creating new ones, capable of addressing the new realities that enter society, by setting the ground for a coherent, effective and foreseeable regulatory framework.

In conclusion, considering the first and second sub-question of this thesis, the present chapter has demonstrated that whether through an ontological creation of a new or the update of old cognitive legal standards or through the application of new analogical reasoning in courts, the importance of language as a tool in regulating emerging technologies is pivotal. Moreover, it has been shown that language can ascertain a coherent and efficient potential normative and regulatory response to the upcoming technological challenges, while terminology and conceptual analysis are of great relevance and utility when addressing emerging realities. The latter will be demonstrated through practical examples and subsequently by the proposed concept and analogical reasoning as a solution when addressing the possible effects of Augmented and Virtual Reality, in the 4th Chapter of the present.

Chapter II: Normative Disconnection in the Cognitive Self & the Conceptual Loopholes of the Reasonable Man

2.1 Introduction to Conceptual Loopholes & Reasonable the Grey – The Grey Areas of the Reasonable Man

2.1.1. Introductory Analysis

In the present Chapter, I will try to showcase that the concept of the *Reasonable Man* is not capable, or at least not sufficient enough, to address already existing challenging realities, as well as the law-related influences of technologies on cognitive processes.

In subchapter 2.1 I will use already existing and legally-recognized examples of how certain individuals perceive and experience reality. The manifold aspects of the human cognitive state, enhanced or diminished, changed both normative and conceptual reality and subsequently the legal terminology used to address those challenging states. Moreover, through the demonstration of such examples, I will show how the concept of the *Reasonable Man* is not suitable to deal with these situations, concomitantly leading to conceptual loopholes and normative disconnection in the way conceptual reality is addressed.

For instance, mental conditions, such as the autistic spectrum disorder or psychopathy, always challenged scientists and the Law in terms of liability. Certain drugs, such as LSD,[44] also create scientific uncertainty regarding the level of cognition of their users, while Law always perceives the use of drugs, in general, as an external diminishing factor, placing individuals below the *Reasonable Man*. Nevertheless, recently discussion has risen around cognitive enhancing drugs and the possibility of the Law recognizing the cognitive state of their users as above the *Reasonable Man*.

Furthermore, in subchapter 2.2 I will examine the technological aspects and potential applications of Augmented and Virtual Reality technologies. It will be demonstrated how an augmented reality device or a virtual environment can alter an individual's cognitive process on different levels, which can be, depending on the perspective, positive or negative, groundbreaking or disconcerting, and regarding their effects on cognitive capabilities, enhancing or disabling.

Finally, the present Chapter will emphasize the need for an update of the cognitive legal standards, followed by a logical reasoning related to the exhaustion of the concept of the *Reasonable Man*, due to: (1) the already existing conceptual loopholes and normative

[44] *LSD 'microdosing' trend popular with tech entrepreneurs may be putting their lives at risk, claim Cambridge University scientists* available at: http://www.dailymail.co.uk/sciencetech/article-4231488/Does-taking-LSD-work-REALLY-boost-productivity.html

disconnection caused by known *altered states of consciousness* and other mental conditions;[45] and (2) the upcoming conceptual detachment generated by the use of technologies that have a potential immersive effect on their users, which inevitably raises concerns on how the Law assesses an individuals' cognitive experience.

2.1.2. Law & Behavior – The Relevance of Cognitive Experiences

Actions are relevant for the Law, and every action follows a certain state of consciousness. The legal relevance of actions is given by the fact that every interaction follows the rule of causality and the Law assesses both the action and the consequence of a certain situation. The interaction between two subjects has a relevance for Law every time that a relationship capable of producing juridical effects occurs. In the realm of cognitive experiences, what may assume relevance is any juridical fact,[46] able to create, modify, or extinguish that legal relationship. A juridical fact can be a juridical act,[47] meaning an act expressed by the human will, or a natural fact, produced by nature itself.[48] In the present, I will focus on the juridical facts, whether subject to the humans' will or not, that have an unequivocal influence on the state of consciousness and, consequently, are relevant for Law.

As referred to throughout this thesis, there are certain cognitive capabilities that are relevant for Law. The *abstract dimension* of the concept of *Reasonable Man* is assessed in its *concrete dimension*, meaning the relevant cognitive fields for the relevant legal fields. In any law-related situation, e.g. a purchase between two subjects, the state of consciousness of each subject is essential to the way Law assesses a situation. The Law assesses one's consciousness when there is a need to establish a consequence of a certain action, whether it is in the form of protection or establishing a duty of care. The way Law perceives a purchase between subject A and subject B is different if one of the subjects is under an *altered state of consciousness*. If that is the case, Law needs to assess if that state of consciousness is in accordance with the cognitive standards, such as the *Reasonable Man or M'Naghten Rule,*[49] and, if not, whether the fact that altered the state of consciousness and therefore the juridical situation, exists in virtue of human will or not.

Although there is no specific definition regarding *altered state of consciousness*, a definition stated by cognitive neuroscientist and psychologist Antti Revonsuo, contemplates in detail some of the major features of the concept by defining it as a

[45] E.g. psychopathic personality and autism.
[46] Mota Pinto C., (2002), Teoria Geral do Direito Civil, 4ª ed. Por, Coimbra.
[47] Corpus Iures Civilliaes – Justinian Empire – Pandectas Compilation.
[48] Like a hurricane, a disease, or any situation not subject to human will that may create, modify or extinguish a juridical relationship.
[49] Definition of *M'Naghten Rule* by the Legal Dictionary, available at: https://legal-dictionary.thefreedictionary.com/M%27Naghten+Rule.

"*changed overall pattern of conscious experience, or as the subjective feeling and explicit recognition that one's own subjective experience has changed*."[50]

The way Law assesses these kinds of situations is intrinsically connected with the cognitive capabilities of the set behavioral standards that are affected by these *altered states of consciousness*.

2.1.3. Normative Disconnection & Conceptual Loopholes

Regarding the example mentioned above, from a legal point of view, if subject A purchases a certain object from subject B during a hypnotic state or under the influence of a heavy psychedelic drug that causes hallucinations or puts the user in a delusional state, it is obvious that this *altered state of consciousness* places the subject below the *Reasonable Man*.

On the contrary, a different legal consequence would have been enacted, if the cognitive state of subject A were above the *Reasonable Man*. For instance, if subject A is an expert on the state of the art concerning the object that he or she intends to purchase, that individual will be considered, for that specific juridical relationship, above the *Reasonable Man*. In this case, the concept of the Reasonable Man is the threshold that if met, produces the intended juridical effects. This means that if an expert, in this scenario, requests the annulment or invalidity of the contract due to the fact that he/she bought a painting on the assumption that it was a Rembrandt although in fact it is a Van Gogh, assuming that the seller had less knowledge than the buyer, Law will not give any protection to the expert, since the knowledge expectations for subject A are different than those of an individual either within the scope of the *Reasonable Man* or of an individual with cognitive capacity lower than the *Reasonable Man*.

An alternative hypothesis, regarding another possible higher cognitive status of an individual can be considered here. For instance, what will be the legal assessment if subject A created a juridical relationship with subject B under the influence of a cognitive enhancement substance like *modafinil* or *methylphenidate*, such as Provigil.[51] Although,

[50] While recognizing that most definitions fail to draw the line between *Altered State of Consciousness* (ASC) and *Normal State of Consciousness* (NSC) he argues that: "*the proper way to understand the concept of ASC is to regard it as a representational notion: the alteration that has happened is not an alteration of consciousness (or subjective experience) per se, but an alteration in the informational or representational relationships between consciousness and the world. An altered state of consciousness is defined as a state in which the neurocognitive background mechanisms of consciousness have an increased tendency to produce misrepresentations such as hallucinations, delusions, and memory distortions. Paradigm examples of such generally misrepresentational, temporary, and reversible states are dreaming, psychotic episodes, psychedelic drug experiences, some epileptic seizures, and hypnosis in highly hypnotizable subjects*", *in* Revonsuo A., Kallio S. and Sikka P., (2009), *What is an altered state of consciousness?*, Philosophical Psychology, Vol. 22, No. 2, 187–204.

[51] *Modafinil* or *methylphenidate* is the active substance of Ritalin, while Provigil is a medicine used to treat several cognitive conditions such as deficit hyperactivity disorder (ADHD) that contains the active substance modafinil, which has been shown to have modest effects on working memory, episodic memory

one could argue that again here subject A should be placed above the *Reasonable Man*, the truth is that the Law perceives and interprets the cognitive spectrum in a strict manner.

Moreover, whereas in the first scenario little doubts are left regarding whether Law will judge the state of subject A as being below the *Reasonable Man*, the same cannot be said in the second scenario where the subject is under a substance that enhances his/her cognitive capabilities. However, the *abstract dimension* of the *Reasonable Man*, within the same scenario, when the subject is an expert in the state of the art is much more *tangible* than the when the subject is under of the influence of an enhancing drug.

The use of the word *"tangible"* stands for the ease in placing an individual's cognitive state in the spectrum of the legal standard of the *Reasonable Man*. Moreover, even if that process can be facilitated by scientific facts that will ascertain the cognitive state of the individual, the approach of the Law is still frivolous.

A situation like the one described in the second scenario would certainly be considered an unusual situation for the lack of 'tangibility' of this specific cognitive enhancement situation.

In fact, usually it depends on how easily the cognitive status can be assessed in the legal realm. In the above examples, the level of expertise can be easily proved by an educational background check, an investment or work history. On the contrary, the enhancement of an individual's attention or memory, the degree of this enhancement and its relevance in leading to, modifying or extinguishing the juridical relationship requires a perplexing, but nonetheless necessary, legal assessment.

Concomitantly, the complexity and the lack of certainty of legal assessments, as it was described above, inevitably lead to two more conceptual pitfalls; either *conceptual loopholes* or *normative disconnection*.

Specifically, the lack of conceptual homogeneousness usually leads to *conceptual loopholes*, not *normative disconnection.* In the cognitive enhancement scenario, subject A acted beyond reasonableness due to its current *altered state of consciousness*, since there was an overall change of its cognitive experience patterns. However, it is difficult to argue, with utter certainty and accuracy, whether this enhanced cognition is, in anyway, similar to the level of expertise recognized to a person skilled in the art.

Nevertheless, the absence of a better concept to describe this *enhanced* reality, within the cognitive spectrum, leads to a *conceptual loophole*. A *conceptual loophole* regarding a cognitive assessment will inevitably create an incoherent framework, which subsequently can lead to inconsistent and inaccurate judgements.[52]

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and attention. On cognitive enhancement drugs, *see* Hussain M. and Mehta A. M. (2011), *Cognitive Enhancement By Drugs In Health And Disease*, Trends in Cognitive Science. 2011 Jan; 15(1): 28-36.

[52] Ad Hoc and Post Hoc manipulation. See Chapter 1.3.3.

On the other hand, *normative disconnection* is created whenever a certain reality, for instance a condition like autism[53] or psychopathy,[54] due to its conceptual complexity and uncertainty regarding the scientific and epistemological effects behind it, can be placed on both the extremes of the cognitive legal spectrum. The inherent conceptual vastness and intricacy concerning these realities is such, that what can be seen as being below the *Reasonable Man*, can actually be considered in a different situation above the cognitive standard.

For instance, autism, in principle, is considered a disability. In fact, our society takes protective measures through social policies and legal frameworks. Although such a condition can bring many personal, social and economic problems, the reality is far more complex. It is true that this condition poses one of the greatest challenges for society, and subsequently for Law to set the proper protection mechanisms. At the same time, common perception and mainstream theories fail to mention, or choose to ignore, aspects of the disorder regarding certain strengths and atypical capabilities, e.g. high level of a specific type of intelligence, that are related with a genetic phenomenon of an intertwined relation between SNP and other variants, [55] associated with other higher-risk genetic or external variants.[56]

A recent study has demonstrated how most of our genetic code is based on polymorphisms. [57, 58] This kind of phenomenon enables scientists to predict more accurately how someone's intelligence might be affected if that individual suffers from Autism Social Disorder (ASD). It also tells us something very interesting. The formation of a genetic code based on polymorphisms and SNP's follows a basic biologic process of competitive evolution present in nature. Nature and species diversify through genetic changes; polymorphisms and SNP. This means that, if the risk of having ASD is associated with genetic variants, and if those variants define evolution by competitive selection, why does the autist variant gene pass from one generation to another? The answer is related with the level of atypical intelligence associated with this disorder. Even if law fails to understand how the autistic variant gene can be an actual genetic advantage in very specific cases and from certain perspectives, science acknowledges it. In these

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[53] "*Autism is a variable developmental disorder that appears by age three and is characterized by impairment of the ability to form normal social relationships, by impairment of the ability to communicate with others, and by repetitive behavior patterns — called also autistic disorder*" as defined in Merriam-Webster dictionary, available at: https://www.merriam-webster.com/dictionary/autism.

[54] Psychopathy, or psychopathic personality, refers to a pathologic syndrome involving prominent behavioral deviancy in the presence of distinctive emotional and interpersonal features

[55] *"A single-nucleotide polymorphism, often abbreviated to SNP, is a variation in a single nucleotide that occurs at a specific position in the genome, where each variation is present to some appreciable degree within a population. Variations in the DNA sequences of humans can affect how humans develop diseases and respond to pathogens, chemicals, drugs, vaccines, and other agents. SNPs are also critical for personalized medicine."* Definition of SNP from Wikipedia, available at: https://en.wikipedia.org/wiki/Single-nucleotide_polymorphism.

[56] Stevenson N. (2015), *Autism Doesn't Have To Be Viewed As A Disability Or Disorder*, *The Guardian*, available at*:* https://www.theguardian.com/science/blog/2015/jul/16/autism-doesnt-have-to-be-viewed-as-a-disability-or-disorder.

[57] Polymorphisms is the occurrence in the same population of two or more genetically determined phenotypes in such proportions that the rarest of them cannot be maintained merely by recurrent mutation.

[58] Hoekstra A. R., Happe F., Baron-Cohen S., Ronald A. (2010). *Limited Genetic Covariance Between Autistic Traits and Intelligence: Findings from a Longitudinal Twin Study*, Am J Med Genet Part B 153B:994–1007.

cases, science builds the conceptual reality, while Law determines the desirable and non-desirable behavior, thus constructing the *Normative Reality*.

Such *Normative Reality*, due to the complexity and uncertainty regarding this subject, sometimes does not coincide with the conceptual reality. Sometimes, certain normative realities may be described with reference to certain legal concepts, like the *Reasonable Man* but, as I said before, they may also run throughout the conceptual spectrum. In practical terms, this study and others that show empirical evidence that an autistic person may have specific advantages over other individuals, elaborate the idea that this reality, considering its complexity and intricacies, creates a *normative disconnection* in the concept of the Reasonable Man.

Moreover, another example of normative disconnection is that of the psychopathic personality.[59] For the present, the phenomenon of the psychopathic personality is of great interest regarding the entanglement of *normative disconnection* and the legal cognitive standard of the M'Naghten Rule.[60]

During the 20th century, people started to account certain personality traits, as it was a disease or a mental disorder. Psychopaths were the main example of this new legal relevance given to particular mental conditions. Different from the Reasonable Man, which assesses common behavioral patterns, the M'Naghten rule is used to measures if someone is legally insane or not to determine criminal liability.

According to the M'Naghten rule, a criminal defendant is not found guilty due to insanity, if at the time of the alleged criminal act, the defendant was in such a deranged state that he/she did not know the nature or quality of her/his actions, or, if she/he knew the nature and quality of her/his actions, but she/he in such a deranged state that she/he did not know that what she/he was doing was wrong. In other words, according to M'Naghten rule, the assessment of someone's knowledge regarding his or her action relates to the subject's capability of assessing if his action is wrong or not.

The uncertainty and the conflict surrounding the concept of psychopathy is present not only in legal discussions but also in the fields of psychology and psychiatry. However, recent studies,[61] using neurological imaging techniques, have been able to show a deep misunderstanding of science and law regarding the psychopathic personality.

Although the concept is only used in Common Law jurisdictions, the elements comprising it are based on the Civil Law paradigm of assessing the elements of legal insanity. In particular, the concept consists of two cognitive elements used in assessing insanity;[62]

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[59] *Supra*, note 54.
[60] *Supra* note 49.
[61] Hosking G. J. , Kastman K. E., Dorfman M. H., Samanez-Larkin R. G., Baskin-Sommers A., Kiehl A. K., Newman P. J., Buckholtz W. J., (2017), *Disrupted Prefrontal Regulation of Striatal Subjective Value Signals in Psychopathy*, Neuron, Volume 95, Issue 1, 2017, Pages 221-231.e4.
[62] On the conceptual analysis of the *M'Naghten Rule* see Meynen G. (2018), *The Relevance Of Free Will And Rationality For Legal Insanity*, Conference Law, Science and Rationality - April 2018, Faculty of Law, Maastricht University.

- *The Epistemic Element,* and
- *The Control Element.*

The first element refers to rationality, meaning the perceptive knowledge that one possesses in the moment of his/her actions.

The second element is the most debatable among legal scholars and scientists.[63] It relates to the idea of free will, or more accurately, the lack of it, when the subject does not have control of her/his actions. Together with the lack of the epistemic element, an insanity defense may stand.

The standard itself is prone to create misconceptions and disconnections within the legal system since it cannot encompass every single situation that entails a certain degree of complexity regarding the cognitive state of a subject.[64] Regardless, the psychopathic personality has always been seen as the most complex and dubious legal defense in the.

The lack of emotional intelligence and empathy are the corner stone that makes a psychopathic personality. However, the lack of this cognitive trait has raised doubts regarding a psychopath's criminal responsibility,[65] specifically regarding the *epistemic element* of the insanity standard.

Since Aristoteles' Nicomachean Ethics, the discussion regarding this *epistemic element* has been one of greatest importance. The ongoing discussion revolves around the wrongfulness of a subject's *mens rea*; whether the subject knew that her/his action was wrong and whether the assessment pertains to the moral or the legal wrongfulness.

Although there is a consensus among scholars regarding the traits of psychopaths - or the lack of them – which prevent them from having any moral standard and, therefore from being able to assess whether an action is morally wrong or not, the rest of their cognitive functions are surprisingly normal and sometimes even considered above average. This suggests that the psychopathic personality, although incapable of having any moral awareness, is indeed able to determine the lawfulness of an action. This complexity in conjunction with the historical entanglement of psychopathy with the M'Naghten Rule is another example of an existing reality that leads to a normative disconnection.

Thus far, different examples of cognitive realities such the use of cognition-enhancing drugs, the autistic disorder and the psychopathic personality disorder were examined. Especially autistic-disorder and the psychopathic personality. These examples prove that

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[63] Morse, J. S. (2007), *The Non-Problem of Free Will in Forensic Psychiatry and Psychology*, Faculty Scholarship. Paper 151.

[64] Catley P. (2018), *Personality change and criminal responsibility*, Conference Law, Science and Rationality - April 2018, Faculty of Law, Maastricht University: Professor Catley mentioned two cases where subjects had experienced traumatic events, that changed their personalities and eventually led to different behaviors, that may (or may not) contributed to the crimes that both subjects committed after the traumatic events. Professor Catley mentions these cases as an example of a normative disconnection, arguing that the insanity standard as a concept within legal systems is not sufficient to address these complex realities.

[65] Levy K. (2011), *Dangerous Psychopaths: Criminally Responsible but Not Morally Responsible, Subject to Criminal Punishment and to Preventive Detention*, San Diego Law Review, Vol. 48, p. 1299.

Law and its legal concepts fail to address entirely or at least accurately already existing cognitive realities. As previously mentioned in subchapter 1.3, the lack of a constant reflection on and adaptation of legal concepts used to address legally relevant realities, generates incoherence in the *Conceptual System* of our society.[66] This, subsequently, hinders the way we, as a society, adapt to complex and ever-changing realities such as the ones referred throughout this Chapter.

Notwithstanding, with the development of new means of investigation, previously unknown aspects of already acknowledged realities can be observed and understood. This constant evolution in the way we perceive known phenomena and concomitantly new emerging realities legitimizes the pursuit of the present on updating and creating new concepts to cope with existing and new realities, respectively, in an accurate and efficient way. For this task, concepts and language are the main tools of a transmutation process inherent in every field of knowledge. Disregarding their value, it jeopardizes the way we conceptualize a specific reality, as well as how that reality entrenches in our society.

2.2 Technological Consciousness – Augmented & Virtual Reality as New Cognitive Externalities

After establishing the relevance of cognitive abilities for Law and the inherent complexity and normative disconnection that comes either from natural mental intricacies, like autism or psychopathic personality, or external stimuli, like drugs, I will address in the present other means that also disrupt our cognitive functions. These new cognitive realities can emerge, as will be demonstrated, by new technologies such as Augmented and Virtual Reality.

If Virtual reality and Augmented Reality become ubiquitous to our most mundane actions and inter-personal relations, they will certainly bring many changes in how Law addresses human behavior.

The need for a coherent discussion regarding the potential cognitive effects of these technologies and, subsequently, the legal consequences that may be triggered by their effects is highly relevant and necessary to avoid possible misconceptions in courts and legal systems.

The use of these technologies may result in alterations of our cognitive functions, significant enough to be considered a type of an *altered state of consciousness*,[67] amenable to different legal consequences. On that premise, it is important to realize that

[66] See the 4th stage of the Conceptual Scheme and the dangers of *Ad Hoc* and *Post Hoc* - Chapter 1.3 - Legal Terminology and the Technological Society – Ad Hoc Manipulation.
[67] *Supra.* note 50.

both these technologies can have both positive[68] and negative effects, [69] thus causing a conceptual disturbance to our cognitive standards, as verified in the previous subchapter. To understand these potential effects, the characteristics, functions and applications of these technologies will be examined.

2.2.1 Ontological Analysis

These technologies are built and defined with reference to the concept of *reality*. Such terminology is used to contrast actual *reality*. Reality, as it is defined by the Oxford Dictionary, is "*the state of things as they actually exist, as opposed to an idealistic or notional idea of them*".[70] This *reality*, or the "*the thing in itself*" as Kant proposed, in the information age and especially in the light of technologies like *Augmented* and *Virtual Reality*, has become harder to ascertain, since the human model of perception[71] is being exposed to more filter layers than it is used to.[72]

- *Reality Stricto Sensu*

Defining *reality* was never an easy process, as it can be demonstrated by the lack of consensus among the brightest minds in past centuries. The ontological dimension of *reality* has always shifted depending on the criteria and discourse used to define it. John Locke for instance, in his *Essay on Human Understanding* in 1690, describes *reality* as the knowledge that we convey on the objects that surround us. That knowledge – he states – comes from our observational *Experience*, which in turn comes from the external

[68] *"Immersive AR and VR applications have the potential to change the connection between customers and companies because of the opportunity to deliver the most engaging, personalized, and useful experiences. Judicious selection of the appropriate tools and venues will provide innovative marketers with effective and valuable solutions."* Finn G. (2017), *How Augmented Reality and Virtual Reality Are Changing Things for Marketers*, MarketingProfs, available at: https://www.marketingprofs.com/articles/2017/32549/how-augmented-reality-and-virtual-reality-are-changing-things-for-marketers.

[69] *"Two computer scientists-turned-ethicists are seriously considering the problematic ramifications of a technology that allows for real-world pop-ups: Keith Miller at the University of Missouri-St. Louis and Bo Brinkman at Miami University in Ohio (...) A very important question is who controls these augmentations," Miller says. "It's a huge responsibility to take over someone's world — you could manipulate people. You could nudge them." For now, this issue has remained largely undiscussed for the simple reason that the market isn't saturated. Google Glass bombed, and nothing has yet stepped into that space. But Miller says it won't take long — maybe a few years — for A.R. to become common, if not ubiquitous. Beyond construction work, augmented reality is being tossed around as a potential alternative to exposure therapy for patients, a way for doctors to practice surgical maneuvers before doing a procedure, and a tool for consumers to make better decisions. Will a headset be required in a decade?", in* Basu T. (2016), *How to Get Lost in Augmented Reality*, Inverse, available at: https://www.inverse.com/article/21706-augmented-reality-technology-ethics-advertising.

[70] Definition of reality by the Oxford Live Dictionary, available at: https://en.oxforddictionaries.com/definition/reality.
[71] For instance, in the cultural and linguistic process the model of human perception assigns meaning to the *reality* captured by our sensorial system.
[72] Youngman, P. (2009). *We Are the Machine: The Computer, the Internet, and Information in Contemporary German Literature.* Boydell & Brewer.

interaction of our senses with *"sensible objects"* followed by the internal operations of our mind.[73] He describes these internal operations as being a cognitive reflective process on the perceived objects, which I interpret as employing meaning - or affections as he says- to those *"sensible objects".* From this systematic process, sensible qualities are born, such as *"Yellow, White, Heat, Cold, Soft, Hard, Bitter, Sweet".*

Newton on the other hand adopts a more scientific and less subjective view of reality.[74] In *Opticks*, in 1779, he portrays *reality* as a pure material conception beyond our subjective minds, composed by particles and atom units with different bodies, textures and forms that exist independently of our perception, as it was later argued by Locke. According to this idea, our perception of *reality* is nothing more than a subjective interpretation of the true and objective material *reality* that was given by God or Nature and that is only distinguishable based on its spatial and temporal determination.

Recent physicists, however, have refuted this idea. For instance, Robert Lanza argues that even this material *reality* of atom units and particles is susceptible to change if its components are observed and measured. [75] This, however, is not a new realization. It was first proved in an experiment first conducted in 1801 that demonstrated that the single act of observation is capable of changing the atomic qualification of certain particles like electrons. [76]

I must emphasize here the critique carried out by Richard Rorty in his book *Philosophy and the Mirror of Nature,*[77] where he asserted the need to abandon this dualistic view of *reality* where everything is divided into a mental or a physical model of perception. He defends instead a behaviorist and materialistically oriented philosophy regarding the concept of *reality.*[78]

This ontological view is established on the notion that the difference between concepts like "*number and tables, quarks and stars, lost socks and moral values*" lies on the descriptive and normative value that we give to these objects.[79] This societal - and individual - assessment is based on the importance -or the non-importance- that we give to every sort of object in the distinctive discourses they appear. This means that the ontological "status" we attribute to a certain reality is often based on our network of beliefs and not just on the intrinsic features of those objects.[80] In my opinion, this ontological perspective of reality is the most coherent and perhaps the most realistic one.

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[73] Valor J-A., (2017), *What Actually is Augmented Reality in Ontological and Linguistic View on Augmented Reality*, in Ariso J-M. (ed.) (2017), *Augmented Reality Reflections on Its Contribution to Knowledge Formation*, Berlin Studies in Knowledge Research, 11, De Gruyter, p.p. 111 – 113.
[74] *Ibid*. pp. 116 – 117.
[75] Lanza R. and Berman B. (2011), *Biocentrism: How Life and Consciousness are the Keys to Understanding the True Nature of the Universe*,
[76] Originally known as the *Thomas Yong's experiment* and known in modern physics as the *Double-slit experiment*.
[77] Rorty, R. (2009) Philosophy and the mirror of nature. Thirtieth anniversary edition, edn. Princeton, N.J.: Princeton University Press (Princeton Classics Ser).
[78] *Ibid*, p.118.
[79] See Chapter 1.2.1.
[80] *Supra*, note 77, p. 127.

The ambiguity of the ontological meaning of *reality* is of the utmost importance since technologies, as the ones addressed in this thesis, were created – and defined – to be a true extension of our *reality*, as we know it. In fact, these technologies are within the scope of the term *Extended Reality*, hereinafter ER. Furthermore, the ontological meaning of these technologies cannot be identified without stating the ambiguity of the concept of *reality* itself. Since the nature of the environments deployed by AR and VR depends on the descriptive and normative value we assign to them, these assessments must be, as much as possible, unambiguous to avoid prospect incoherent ontological status (descriptive) and legal frameworks (normative).

- *Extended Reality: Augmented and Virtua*

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The nature of *Augmented Reality* (AR) derives from *Virtual Reality* (VR) itself. Whereas VR-users experience an entire computer-generated reality, AR applications provide an interaction with the real environment surrounding the users. VR environments are entirely composed by synthetic elements, while an AR environment provides computer-generated elements overlaid in the real environment.

Since both technologies use virtual/digital elements, the main distinction lies in how the technology interacts with the real environment surrounding the users. In AR, the virtual information is combined with the *real* environment, whether by increasing it or unfolding it, while in VR the technology isolates the user from its *real* environment, by inserting him in an entirely computer-generated context. Hence, the terms *Virtual* and *Augmented* are used as a reference to the effect caused to the users and their relation with actual *reality*.

Thus, it is debatable which technology creates a more immersive environment for the user. It depends on which criteria are used to define what qualifies as an immersive environment. In my opinion, the idea of being in an immersive environment depends on three main factors: (a) the quantity of information deployed by the technology; (b) the interface used by the technology to integrate the user in the fabricated environment,[81] and (c) the user's capacity to distinguish the *real* environment from the *technological* environment. These criteria are relevant especially when courts need to assess a legally-relevant behavior caused by using these technologies. This will be discussed in the last chapter of this thesis when possible solutions for addressing the cognitive influence these technologies will be proposed.

Moreover, considering the factors mentioned above, factors (a) and (b) are intrinsically related with the technological features of the technologies, whereas factor (c) takes into

[81] "*Interface can be defined as the common boundary or interconnection between systems, equipment, spaces or realities"* Definition of interface in The Free Dictionary, available at: *https://www.thefreedictionary.com/Computer+interface*. .

consideration the cognitive status of the user. The latter is in accordance with the general approach followed by Law, to take into account the subject's mental qualities when addressing certain behavioral patterns.

To comprehend the plethora of impacts originated by the use of technologies like AR and VR, a multi- and inter-disciplinary study must be conducted. For factors (a) and (b) the study required belongs in the fields of engineering, mechanics and computer science, while the study regarding factor (c) requires a multi-disciplinary study between the subjects of psychology, neuroscience and Law. Any consideration regarding the matter referred in factor (c) must be studied in depth and with the appropriate resources to reach concrete scientific and normative conclusions.

2.2.2. Technical & Functional Aspects

- *Virtual Reality*

With investments up to 4 billion dollars in total, from companies like Facebook and Google developing products, market experts believe that in the next five (5) years, the VR-market will worth more than 80 billion dollars and will become consumer-mainstream by 2025.[82] Hence, since the use of the technology will increase, so will its legal relevance. Thus, there is a pressing need for legal actors to understand how this technology works before addressing it.

Virtual Reality technology generates an entire computer-based reality mostly through a headset device called Head-Mounted Display (HMD). The wider the image projected the more immersive is the experience for the user.

[82] Barnes S., (2016), *Understanding Virtual Reality in Marketing: Nature, Implications and Potential*. Available at SSRN: https://ssrn.com/abstract=2909100.

VR devices usually consist of three tracking apparatus: (1) Head Tracking;[83] (2) Eye Tracking[84] and (3) Motion Tracking.[85,86,87] A complete immersive virtual experience depends usually on the interoperability between these tracking devices, with emphasis on Motion Tracking, which is inherently connected with the optical display and it is what allows the user to interact with the virtual world. The more refined are the tracking devices, the more immersive will the experience be. As the investment increases and the tracking devices become more mainstream, companies will have more means and less costs to generate the intended immersive effect of this technology, which will also create more opportunities for the technology to be applied in different markets.

The abovementioned tracking devices are essential not only for the purpose of creating an immersive experience for the user but also for health reasons since the lack of accuracy in representing reality can trigger conditions such as simulation disease.[88]

- *Augmented Reality*

Similar to *Virtual Reality*, a great investment has been made for *Augmented Reality* technologies to enter the market in the next few years. Several surveys have been conducted in main business sectors, which show that 69% of the respondents believe that AR will become a mainstream technology in the next five years.[89] A more concise study – made by Dell Technologies – demonstrated that only 18% of the surveyed companies do not agree that VR and AR will become a digital business by 2030, while 27% of those businesses are already investing in *Augmented Reality*. 50 per cent of these investments are expected to take place in the next two to five years.[90]

[83] The movement tracked by the device is referred as *pitch, yaw and roll.* For better explanation, see the images available at Smithsonian National Air and Space Museum, *How Things Fly*, available at: https://howthingsfly.si.edu/flight-dynamics/roll-pitch-and-yaw.

[84] Eye Tracking, as one intuitively might think, relates to the device used to track our eye movement. This may seem simple but can also be the trickiest part in building a VR technology, since it is probably the most invasive tracking device of the three. See a detailed explanation in Gobbetti E. and Scateni R. (1998), *Virtual Reality: Past, Present, and Future*, Center for Advanced Studies, Research and Development in Sardinia Cagliari, Italy, p. 13.

[85] *Ibid*, p. 14, on the information regarding the optical or non-optical tracking markers used in Motion Tracking.

[86] See a detailed explanation in Charara S. (2017), *Explained: How does VR actually work?*, Wearable, available at: https://www.wareable.com/vr/how-does-vr-work-explained, and Virtual reality Society, *What is Virtual Reality*, available at: https://www.vrs.org.uk/virtual-reality/what-is-virtual-reality.html.

[87] On the non-optical markers used in Motion Tracking, e.g. gyroscopes, magnetometers or accelerometers, see available information in Levski Y. *A Brief Guide to VR Motion Tracking Technology*, Appreal, available at: https://appreal-vr.com/blog/virtual-reality-motion-tracking-how-it-works.

[88] This condition happens whenever our brain realizes that something is not real, meaning for example if there is a noticeable disconnection between what our eyes are seeing with what our body feels, hence the relevance of Motion and Eye Tracking devices. For more available information see Simulator Sickness, Wikipedia, available at: https://en.wikipedia.org/wiki/Simulator_sickness.

[89] Jabil *Augmented and Virtual Reality Trends Survey*, available at https://www.jabil.com/ar-vr-trends.

[90] Dell Technologies survey: *Realizing 2030: A Divided Vision of the Future*, Quantitative research conducted by Vanson Bourne in June, July and August. Available at

This is a clear proof that both VR and AR are creating a new paradigm in the business industry and it is just a question of when they will become ubiquitous in our lives.

Some available information regarding one of Google's pioneer projects on AR called the Tango Platform,[91] provides some insight regarding the four technological apparatus that a standard AR device needs to generate its desired effects.

Like VR, AR needs a Sensor Tracking (1). However, on the contrary to VR, AR requires a Single-Camera Markerless or a Marker-Based device together with a Software Development Kit (SDK) (2); a Simultaneous Localization and Mapping (SLAM) (3) and finally and most important, a GPS-based Tracking device (4). [92] The interoperability of these devices is what enables the AR effect. The second element of AR; the Single-Camera Markerless device, which enables the platform to overlay the digital information in the environment surrounding the user, generating the user's immersive experience, also marks the main difference between the two technologies. Additionally, the SLAM and the GPS-based Tracking devices are also relevant to the immersive experience of the user, since it allows the individual to interact in real-time with 3D models in his/her real environment and on his/her current location.

- *Haptic Feedback*

I left this subject for the end of the present because of its relevance and potential application both in VR and AR technologies. This technology is definitely what will determine the next big step in the ER industry, since with this, the experiences provided will be capable of recreating at least three of the five biological senses needed to perceive and interact in the real environment, becoming a determinant factor for granting to the user an immersive experience.

Haptic feedback is the recreation, through technological means, of the sensation of touch. Although mostly used in VR systems, this synthetic recreation of tactile sensation started with the use of diverse technological means, from electrical fields;[93] pneumatic systems; mechanical pins activated by solenoid,[94] to kinesthetic interfaces, or anything capable of causing the feeling of expansion and contraction. Mechanics aside, haptic and kinesthetic systems integrated in VR and AR pose some very interesting questions regarding how

https://www.delltechnologies.com/content/dam/delltechnologies/assets/perspectives/2030/pdf/Realizing-2030-A-Divided-Vision-of-the-Future-Research.pdf.

[91] See Bardi J. (2017), *SLAM, GPS, Multi-Camera? 6 Keys To Choosing An AR Solution,* Marxent, available at: https://www.marxentlabs.com/markerless-augmented-reality-google-tango-slam-marxent/.

[92] Regarding GPS tracking applied to AR, see PokemonGo app. See more available information in Wikipedia, available at: https://en.wikipedia.org/wiki/Pok%C3%A9mon_Go.

[93] *Supra*, note 85, p. 15.

[94] *"Solenoid is the generic term for a coil of wire used as an electromagnet. It also refers to any device that converts electrical energy to mechanical energy using a solenoid. The device creates a magnetic field from electric current and uses the magnetic field to create linear motion.".* See more available information Nicholson J. (2018), *How Does Solenoid* Work, Sciencing, avaialbe at https://sciencing.com/a-solenoid-work-4567178.html.

they will affect our biological perceptive systems, and consequently our behavior. These questions raise relevant legal issues regarding criminal and liability when, for example, actions made in the virtual or augmented environment have consequences in reality.

2.2.3. Potential Applications & Conclusions

After explaining the technical aspects of AR and VR, some potential applications of these technologies will be mentioned.

VR has been around already for 30 years, but its applications are increasing as more investment is made. In terms of prospects, VR can be potentially used in every industry;[95] Healthcare; Sports; Military; Entertainment; Scientific Research; Construction, and in Consumer Business and Marketing-Advertising practices.

Recent literature demonstrates how business practices are adapting to integrate Virtual Reality in their consumer-engagement methods.[96] However, the effects of this application, in contrast with other possible uses of the technology, are the most controversial.[97] Thus, Law will also face immense challenges regarding the deployment of VR in consumer engagement techniques.

To provide an immersive experience for the consumer, companies will use VR to increase the consumer's awareness and knowledge of their products by raising his levels of attention and absorption when observing or interacting with a product. This cognitive shift comes also with an affective and conative change.[98] The affective change happens by increasing the consumer's levels of pleasure and preference when interacting with the product in the virtual environment, almost as creating a *virtual* "bond"[99] with the products' features and benefits. Concomitantly, the conative effect will make more desirable the product. This overwhelming sensation can be triggered by subliminal marketing messages that in a virtual environment may be more hyped and intensified than the ones in the *real* market. The function of the technology, combined with targeted advertising based on algorithmic data collection, will engage the consumer in a "*hyperpersonalized*" experience that will raise the need for legal action.[100]

As it will be explained in the next chapter, our perception follows a process that is very similar to the one fabricated by Virtual Reality, in the sense that our brains can also be

[95] See more detailed information Virtual reality Society, *Applications of Virtual Reality*, available at https://www.vrs.org.uk/virtual-reality-applications/.
[96] *Supra* note 82.
[97] *Ibid.*
[98] Nwaneri C. (2017), *Ready Lawyer One: Legal Issues in the Innovation of Virtual Reality*, Harvard Journal of Law & Technology Volume 30.
[99] Ibid.
[100] Ibid.

regarded as machines that create hallucinations.[101] The main difference relies on our biological sensors and registers, which in Virtual Reality devices are fabricated through technological sensors and artificial processes. This fact, although astonishing, is also the reason why certain authors, such as Crystal Nwaneri,[102] or Marc Johnathan Blitz,[103] believe that *Virtual Reality* experiences, depending on their intensity and context, "*may undermine the process by which our brain biologically registers what kind of behavior is necessary for our safety and survival."* In other words, users may lose their survival instincts in the long-term for feeling sensations that do not match with the reality faced in the virtual environments.

Augmented Reality can also spawn some negative effects but mostly on a short-term basis. The main feature of AR is that it generates experiences by (1) combining real and digital information, (2) in real time with and within a (3) 3D environment.[104] These three elements can have applications in various industries they can also be prejudicial.

If we look at the investments being made in the *Augmented Reality* industry a cluster of potential applications arises;[105] Task Support; Navigation; Art; Social Networking; Education; Translation; Entertainment and Advertising. From a pragmatic point of view,[106] we can divide the types of AR applications based on what the AR application enables the user to see, specifically, whether it *unfolds* the already existing reality by enhancing it or uncovering its conceptual essence or whether it *increases* the perceived environment by generating an artificial reality that is not there.[107]

An example regarding the former category is the *Intelligent Eye*, a smartphone application that automatically reads a certain text visible on the camera of the device and translates it into another language requested by the user. Another example is the Google Glass headset, which is an application that enables the user to see specific information floating around the perceived environment. This non-intrusive technology enhances the real world by feeding information about it to the user. Similar applications like HoloLens[108] or Magic Leap One[109] are planning to enter the market by the end of 2018 and beginning of 2019.

In contrast, regarding AR devices that create an artificial reality, there are examples like Construct3D, a mathematical educational device that provides virtual 3D figures to feed students with information enabling a dynamic teaching method. Moreover, there are

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[101] Anil S. (2017), *Your brain hallucinates your conscious reality*, TED Talks, available at: https://www.ted.com/talks/anil_seth_how_your_brain_hallucinates_your_conscious_reality.
[102] *Supra* note 98.
[103] Blitz J. M. (2008), *The Freedom Of 3D Thought: The First Amendment in Virtual Reality*, 30 CARDOZO L. REV. 1141, 1147.
[104] Vilanova, J (2017). *Extended Reality And Abstract Objects: A Pragmalinguistic Approach: Reflections On Its Contribution To Knowledge Formation*. Augmented Reality, p. 41.
[105] Merel T. (2018), *Digi-Capital: 2017 Saw $3 Billion Invested In AR/VR, Half In Q4 Alone*, VentureBeat, available at: https://venturebeat.com/2018/01/08/digi-capital-2017-saw-3-billion-invested-in-ar-vr-half-in-q4-alone/.
[106] Supra, note 104, p.p. 43 - 45.
[107] Ibid, where the author divides these types of applications into two categories called the "*perceptive augmented reality*" and "*creative augmented reality*".
[108] Microsoft HoloLens, available at: https://www.microsoft.com/en-us/hololens.
[109] Stein S. (2018), *Magic Leap One: The Fabled AR Headset Is Real, And It's Available Now*, Cnet, available at: https://www.cnet.com/products/magic-leap-one/preview/.

applications like Magic Mirror, a shopping tool app that allows the user to experience different products through a real and virtual combined experience. However, this enhanced consumer experience can change the consumer's behavior and choices.[110]

Another industry where AR application will be a game changer is the Automobile industry.[111] Great investments have been made to pursue this groundbreaking technology application by major companies such as BMW[112] and Hyundai[113] and it is expected that more companies will follow. The technology is not yet available, at least not as a driving assistance tool, because this kind of change in the industry requires a thorough risk and security assessment regarding the application of the technology.[114] Since Law acknowledges driving as a dangerous activity governed by a strict liability mechanism, questions regarding the liability framework when technology is adopted may rise.

Moreover, because AR technologies enhances the users' awareness over their surrounding environment by providing them with information in real-time, the regulating and policy-making actors should take into special account the fact that our perceptual information is what allows us, individuals, *"to take good decisions and organize our behavior"*.[115] In that sense, AR and VR, by providing *perceptual information* through means different from the biological ones used to interact with our environment can bring behavioral changes that require an anticipatory regulatory framework that takes into account the potential immersive effects of these technologies.

[110] On the potential nudging effect, *supra*, note 104.
[111] Adams E. (2017), *Think Self-Driving Cars Are Around the Bend? Time for a (Virtual) Reality Check*, The Drive, available at: http://www.thedrive.com/tech/17161/think-self-driving-cars-are-around-the-bend-time-for-a-virtual-reality-check, Palladino T. (2018), *Augmented Reality in Cars: Companies Tech-Driving Us Into the Future*, Next Reality, available at: https://next.reality.news/news/augmented-reality-cars-companies-tech-driving-us-into-future-0182485/, and Nowak P. (2017), *Heads-Up: Driving Is About To Be Revolutionized*, The Globe and Mail, avaialbe at: https://www.theglobeandmail.com/globe-drive/culture/technology/augmented-reality-merges-into-vehiclewindshields/article35096455/.
[112] Lavrinc D. (2016), *BMW's Shapeshifting, Crash-Proof Motorcycle Is the Future Of Two-Wheeled Mobility*, The Drive, http://www.thedrive.com/news/5522/bmws-shapeshifting-crash-proof-motorcycle-is-the-future-of-two-wheeled-mobility.
[113] Hyundai, *How Augmented Reality Silently Revolutionises Your Driving Experience*, available at: https://www.hyundai.news/eu/technology/how-augmented-reality-silently-revolutionises-your-driving-experience/.
[114] Davis D. (2016), *Real-World Risks in an Augmented Reality*, available at: https://www.csoonline.com/article/3101644/techology-business/real-world-risks-in-an-augmented-reality.html.
[115] *Supra*, note 104, p. 48.

Chapter III: The Paradigm Shift on Processing Our Surroundings – A Test Drive with Virtual & Augmented Reality with the Reasonable Man on the Wheel

3.1 *The New Paradigm* – Perceiving Our Reality with Technologies

In the previous chapter a general explanation regarding the ontological and technical aspects of AR and VR technologies was given, with a focus on their capacity of changing the user's perception models through technological processes that generate immersive experiences.

This chapter will demonstrate how these technologies may, indeed, bring a shift on how we perceive our surroundings, while the possible danger of a normative disconnection, due to the conceptual vastness inherent to these emergent technologies, will be considered.

To acknowledge this paradigm shift, a philosophical, scientific and legal analysis on the relevance of our perception models and the way they shape societal behavioral patterns should be conducted.

Moreover, I will examine the known and unknown extent of influence that these technologies have on both fields: *cognitive* and *legal*. In the cognitive field it will be demonstrated how these technologies can enhance or diminish the processes relevant to how we experience our environment, while in the *legal* field, the complexity of these technologies will be discussed, since they can lead the user to juridically advantageous or disadvantageous situations.

Finally, examples will be discussed of situations demonstrating the dual role of the law when it comes to these technologies. Emphasis will be given to the cognitive enhancing prospects of augmented reality,[116] and to the consumers' protection approach issues arising from the use of virtual reality for marketing purposes.[117]

3.1.1. Scientific Analysis

[116] *"Put very roughly, people that fall above a certain threshold of capacity are ceteris paribus fully legally responsible for their deeds, no matter how much they are intelligent, rational, sensitive and so forth. So something similar might be true on the enhancement side. It could therefore be the case that the kind and/or quantity of mental modification allowed by cognitive enhancement turns out to be insufficient to modify the capacities in a way that is relevant from the point of view of moral and legal responsibility. (...)"* Maslen, H., Santoni de Sio. F., and Faber N., (2015) *With Cognitive Enhancement Comes Great Responsibility?* in . Koops B-J., Oosterlaken I., Romijn H., Swierstra T., Hoven v.d J. (eds) (2015), *Responsible Innovation* 2, Springer, Cham Heidelberg New York Dordrecht London, p. 127.
[117] *Supra*, note 104.

In the article *Active interoceptive inference and the emotional brain* by Anil K. Seth and Karl J. Friston,[118] scientific conclusions were reached regarding the structural function of our perceptive brain models. Through empirical research, the authors were able to explain how our neuronal system frames the hierarchical structure of perception *per se.* In other words, they proved that our perception functions as a predictive-error sensorial process where a constant exchange of signals takes place between the superficial and deeper pyramidal cells of our brains.[119] This recurring process serves the purpose of explaining our sensory inputs.

Regarding this process, named *predictive coding*,[120] the authors mention that it "*represents a biologically plausible scheme for updating beliefs about the world based on sensory samples*"; meaning that our brain collects data from previous sensorial experiences and compares that data with predictions of sensations not yet experienced, but already represented in this ongoing internal and external process. Additionally, the authors demonstrate through empirical evidence how these predictions of sensorial experiences can actually accelerate the awareness of certain stimuli, and thus, shape our behavioral and neuronal perception.[121]

As a concluding remark, the authors portray perception as a process, which selects the most appropriate externalized prediction for certain sensations through a process of prediction-error, whereas behavior accomplishes the same function – selecting the best prediction for the sensorial stimuli - by changing these internally predicted sensations.[122]

If perception of reality *stricto sensu* is based on a continuing process of adjusting data collected by our biological sensors that is then interpreted and classified in concepts,[123] then we can ascertain that the perceptive process is not an end to itself, but an ongoing system of prediction-error with the short-term goal of explaining our sensations in the best way possible and with the long-term goal of ensuring our survival and continuity as species.

This is relevant to the already mentioned processes in which AR and VR engage the user in an immersive experience. Because these technologies either feed the user with information concerning the surrounding environment or reproduce the perception process mentioned above, through the mediation of a technical device, the subsequent effects that

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[118] Anil K. S., Friston J. K. (2016), *Active Interoceptive Inference And The Emotional Brain*, Royal Society.
[119] *"Pyramidal cells, or (pyramidal neurons), are a type of multipolar neuron found in areas of the brain including the cerebral cortex, the hippocampus, and the amygdala"* as defined in Wikipedia, available at https://en.wikipedia.org/wiki/Pyramidal_cell.
[120] *Supra,* note 118, p. 2.
[121] Pinto Y, van Gaal S, de Lange FP, Lamme VA, Seth AK. (2015), *Expectations Accelerate Entry Of Visual Stimuli Into Awareness*. J Vis. 2015;15(8):13.
[122] *Supra,* note 118, where the authors call these predictions *"exteroceptive and proprioceptive predictions"*, respectively. Moreover, they add that "*in brief, perception can be understood as resolving (exteroceptive) prediction errors by selecting predictions that best explain sensations, while behavior suppresses (proprioceptive) prediction error by changing (proprioceptive) sensations.*"
[123] *Supra* note 1, p. 287.

these technologies may cause on the cognitive processes are, in a certain way, unforeseeable, not to say that they may be dangerous on a short and long-term basis.

Furthermore, it is interesting to examine the cognitive impact of AR and VR in the development of perception models of an infant. In an analysis based on several studies in developmental psychology, it was demonstrated that infants learn to acknowledge and associate objects with certain concepts through their senses even before being able to apply any rules of linguistic symbols.[124] The biological program responsible for sensorial and semantic processing in infants is based on a neural network composed by three bundles of nervous fibers that are not developed until the infant reaches the age of three years old. This neural network, that allows the infant to interact with the environment, only empowers their brains – on an early stage – to process the information attained by just their senses e.g. by touching; hearing; tasting; seeing and smelling. Categorizing that processed information into linguistic representations or concepts is only possible on a later stage of the brain development, namely after the eighth year.

Thus, within this development period, is it wise to let infants to engage into immersive experiences produced by these technologies? The already existing concerns are mostly related with the potential physical harm caused from the distractions. Of course, similar concerns exist regarding adults. However, since an Augmented Reality device can disrupt the natural process of epistemological acquaintance of an infant in the interaction with his\her surrounding environment science must clarify what kind of effect the use of this technology may have in the brain development of an infant for Law to react and possibly setting an appropriate age limitation.[125]

Considering the science behind our brain and our models of perception, some conclusions can be drawn with the support of already existing ascertainments,[126] regarding the potential legal consequences of these technologies, with an emphasis on *Augmented Reality* and its epistemological effect.[127]

3.1.2. Epistemological & Philosophical Analysis

- Philosophical Analysis

[124] Mainzer K. (2017), *From Augmented Reality to the Internet of Things: Paradigm Shifts in Digital Innovation Dynamics in Ontological and Linguistic View on Augmented Reality,* p. 34.
[125]Regarding the *normative disconnection* and relevance of science, see Chapter 2.1.3.
[126] Palermos O. S.: *Augmented Skepticism: The Epistemological Design of Augmented Reality in Ontological and Linguistic View on Augmented Reality*, in Ariso J-M. (ed.) (2017), *Augmented Reality Reflections on Its Contribution to Knowledge Formation*, Berlin Studies in Knowledge Research, 11, De Gruyter, p.p. 134 – 147.
[127]Because Augmented Reality - as previously mentioned in the last Chapter - combines both virtual and real environments, its dangers regarding epistemological constructions in society cannot be confused with the dangers of Virtual Reality, which concern different problems more closely related with marketing and advertising practices. Thus a different legal analysis based on a consumer protection approach is required.

In the *We are the Machine: The Computer, The Internet, and Information in Contemporary German Literature,*[128] by Paul A. Youngman, together with references of dystopian societies where the human world merges with machines capable of perceiving reality as we do, several philosophical ideas come to surface in a metaphorical way to raise questions relevant to our reality. The author starts by stating fears of authors from the beginning of the 20th century relating with the hypothesis a coming "*dissolution of the reality into an un-reality*". This fear is justified by the fact that machines will once be capable of shaping our reality by adding more filters to our biologically filtered perception.

Moreover, the author mentions that since the physical detachment – or intrusive aspect – of technological and informational devices is disappearing, the idea that our nervous system can indeed be extended through technological means is no longer a distant reality but an upcoming future. In this sense, a dichotomy between consciousness and information is made to provide a way of assessing the potential relationship between humans and technologies. This dichotomy is in fact relevant to the ontological construction of a new concept that can address the nature of this relationship, as it will be demonstrated in the final chapter of this thesis.

The *"limbo"* between humans and technologies is perception. The technology-consciousness dichotomy is in accordance with the Kantian construction of subjective perception, in which the author merely develops his idea of technologies adding another layer of perception. However, for the humanistic construction of society – our *conceptual system* – to suffer the consequences described by the author, the Kantian subjective perception becomes frivolous, in the sense that these technologies capable of extending our cognitive perception, do not only add another filter layer but they indeed change our cognitive experiences until a point where we might lose our sense of agency over the external world.

According to Kant, the act of perception is a private, subjective, and observer-dependent mechanism, which, for its nature, grants the subject a sensation of agency over the physical reality – his environment. This feeling of agency can be understood as the empowering subjective experience that is often translated into the individual's freedom and autonomy. However, Kant did not conceive perception as an illusionary look-up mechanism,[129,130] where the basic constructions of our perceived reality are based mostly on what we call the analogue or synthetical perception,[131] opposed to the analytical

[128] *Supra,* note 72.

[129] "*Perception seems, then, to be a matter of 'looking up' stored information of objects, and how they behave in various situations. (…) If this general account of perception as 'look-up' system is correct, we should expect illusions to occur in any effective perceptual system faced with the same kind of problems."* On perception and brain models see Gregory RL. (1968), *Perceptual Illusions And Brain Models*. Proc. R. Soc. Lond. B 171, 179–196.

[130] *Supra,* note 118, p. 4, where the authors state that "*our percepts are constrained by what we expect to see and the hypothesis that can be called upon to explain sensory input."*

[131] "*A convenient term for computers which arrive at solutions by look-up systems of internal syntheses of past data – 'models' reflecting aspects of reality."* Chokrevski T., (2016), *Re-Writing Brains and Minds Freedom of Thought for the Modifiable Self: Neuro-technologies, mind control, and human rights*, LL.M Law & Technology, LL.M. Research Master in Law, Tilburg Law School, Tilburg University.

perception.[132] If it is true that the synthetical perception confers agency over the perceived objects as they are read into our reality, it must also be true that illusions can be triggered if our perception follows systematic errors that occur whenever we have stored wrong information about our reality regarding perceived objects, or when we use the wrong model of perception to interpret the external world.[133] What technologies like AR will cause to our perception, in the short and long-term, is to convey analytical information of the physical world and thus trigger potential changes in our synthetical perception, which can lead to loss of the agency sensation of our reality. VR, on the other hand, can trigger the same effect, by deceiving the synthetical sensory feedback of our biological perception and replicating it through technological means.

In Neuropsychiatry, for instance, it is argued that *"autonomous choice depends for its existence upon certain human functions such as the ability to reason, judge, and assess consequences"*.[134] If this is the case, then there is no autonomy when these capacities are compromised.[135] Technologies like AR or VR, which can assign meaning according to the purposes of the user or the developer, either by overlaying digital information over our reality or by confining us in an immersive virtual environment, participate in the four-step-conceptual system mentioned in the first chapter. The consequences of the inclusion of analytical meaning by default or replicas of our biological sensory feedback in our conceptual system can vary from very positive to very negative, but the uncertainty itself justifies the legal relevance of the matter claimed throughout this thesis.

- Epistemological Analysis

The scientific analysis of the cognitive perception mentioned in the first subchapter favors two recent epistemological theories regarding our knowledge-formation processes. [136,137] These theories state that for an utterance of our subjective perception to be regarded as

[132] *Ibid.* "*Systems employing formal logical or mathematical analysis (...) The brain must work in real time, but it need not work according to analytical descriptions of the physical world, if it all requires are quite crude synthetical analogues of input-output functions, selected by distinguishing features of objects".*
[133] *Ibid.* "*The perceptual brain reflects the redundancy of the external world: when it does so correctly we see aspects of reality without illusion. A wrong model – or the right model wrongly scaled – gives corresponding illusions. These can serve as clues to the way sensory information is handled by the brain, to give perception and behavior".*
[134] Epright M. C. (2010), *Coercing future freedom: consent and capacities for autonomous choice*, 38 The Journal of Law, Medicine & Ethics 799, p. 800.
[135] *Supra* note 131, p. 108.
[136] *"According to reliabilist virtue epistemology, or virtue reliabilism, knowledge is true belief that is produced by intellectual excellence (or virtue), where intellectual excellence is understood in terms of reliable, truth-directed cognitive dispositions"*, Greco j. and Reibsamen J. (2018) *Reliabilist Virtue Epistemology*, Snow E. M. (ed.) (2018), *The Oxford Handbook of Virtue*, Oxford Handbook, Oxford.
[137] "(…) *claiming that artifacts can be parts of an agent's cognitive system presupposes an account of how such external elements can be properly integrated into our cognitive loops*" *in* Palermos S. O. (2014), *Knowledge and Cognitive Integration*.. See also Clark A. & Chalmers J. D. (1998), *The Extended Mind*, Department of Philosophy Washington University St. Louis, Department of Philosophy University of Arizona, Anaysis 58:10-23, 1998. Reprinted in (P. Grim, ed) The Philosopher's Annual, vol XXI, 1998.

knowledge, it must follow a cognitive ability and such cognitive ability process must be founded on a cooperative interaction with multiple aspects of our cognitive system.

Considering the epistemological theory of *Cognitive Integration*, it can be ascertained that a certain individual can be epistemologically responsible for his/her belief process, as long as it comes from his/her cognitive ability and, to be regarded as such, that process must come from a cooperative interaction with aspects of his/her cognitive system.[138] Bearing in mind the technical aspects and potential applications of *Augmented Reality* it is fair to claim that this technology has the potential to be qualified as an extension of our biologic cognitive perception of the world. This means that the sensorial background check to our beliefs and concepts will not be made only on our biological integrated cognitive system but also on the extension of our perception, provided by these technological means. In a real-life example, this situation is similar to that of an individual experiencing drug-induced hallucination or any other condition that would affect the reliability of his/her knowledge.

The difference is that AR can also create situations where the individual does not doubt his/her own process of perception but reinforces its reliability to them. For instance, it is possible for the user to find himself in a position where his knowledge is extended, placing him in a position similar to one of an expert when a specific realm of knowledge is considered, or, on the other hand the user can be distracted in the real environment or in a position of ignorance. In the latter case, his position in the spectrum will be comparable to that of an individual with an *altered state of consciousness*.

However, the possibility of a user of AR to be regarded as a cognitively enhanced individual raises a relevant question for Epistemology and Philosophy. If someone can easily attain a specific knowledge, that until now, time and effort was required, then what will be considered knowledge? The simple acquaintance of analytical information regarding a certain aspect of the world or the time and effort spent to acquire such information?

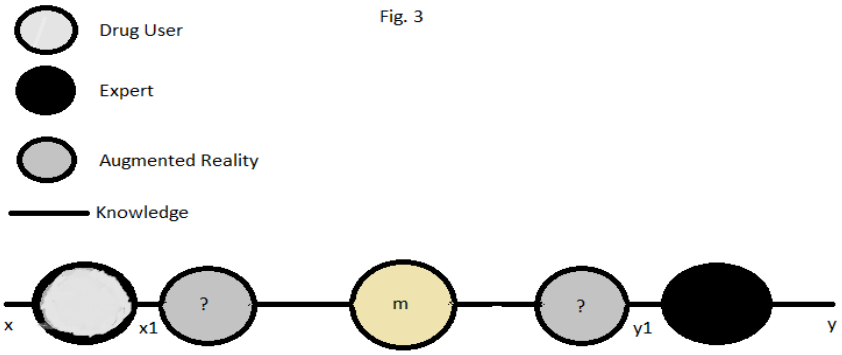
3.1.3. Legal Analysis

The epistemological effect of AR devices poses very interesting questions from a philosophical point of view; however, it also hinders the existing legal concepts that assess the epistemological responsibility of an individual for his/her beliefs/knowledge. This disruptive effect of *Augmented Reality* can be problematic if we look to the spectrum of the concept of *Reasonable Man* (fig. 1), mentioned in the first chapter of this thesis.

[138] *Ibid*, Palermos.

In this new spectrum (fig. 3), it is illustrated that *Augmented Reality* creates a Normative Disconnection in the Cognitive Field of knowledge, [139] assessed by the legal standard of the *Reasonable Man*. This lack of conceptual certainty, which lead to the disconnection,[140] places the subject (x1 or y1) in the extremes of the spectrum, depending on the situation. This dual effect on the user generates a challenge for both regulators and courts when assessing the behavior of a certain individual. A practical example translating this epistemological effect of AR and the influence of VR in consumer behavior will be given in the last chapter.

Fig. 3



m - Reasonable Man
x - Not Legally Accountable
y - Duty of Care
? - Conceptual Loophole
x1\y1 - Normative Disconnection

For now, it is important to determine the consequences of both technologies from a theoretical legal perspective while keeping in mind the epistemological theory of cognitive integration and the immersive potential effect of *Virtual Reality* in advertising and marketing future practices.

In subchapter 2.1.2., the concept of juridical facts[141] was deployed to better explain how and why the Law assesses one's consciousness and perception whenever there is a need to establish certain consequences, by granting protection, by requiring a certain duty of care or even by lowering the level of protection.

For Law, any juridical act, supported by human will, that is able to create, modify or extinguish a juridical relationship, presupposes a legal assessment of the individual's epistemological and behavioral responsibility.

That epistemological responsibility is, in fact, what we as individuals assume that is perceived in a certain situation – the individual and subjective responsibility of our own perception. If an individual is in an *altered state of consciousness*, such responsibility

[139] *Supra*, note 20.
[140] See Chapter 2.1.3.
[141] *Supra*, note 47.

would be automatically diminished or increased as per the case where such individual can be regarded as an expert in a specific subject matter, after being assessed by Law.

If it is clear that one's perception of his surroundings must follow a coherent level of responsibility, tt is also clear, as it was demonstrated in the scientific analysis,[142] that our sensorial internal and external feedback – cognitive perception – affects our behavioral patterns, hence shaping our everyday actions.

It is in view of this idea, that the Cognitive Integration theory [143] reinforces the applicability of a Capacitarian Approach described by Dr. Nicole Vincent.[144]

The Capacitarian hypothesis follows the idea that moral and legal responsibility is entailed with mental capacity.[145] Similarly, to the epistemological theory, it states that our behavior – as our beliefs – is intrinsically connected with our cognitive experiences and therefore with the way we interpret our reality, through our perceptive brain.

This approach has been questioned when assessing the possibility of an individual being cognitively enhanced. This thought acquires more relevance for this thesis if we consider the epistemological potential effect of *Augmented Reality* as a source of added knowledge to our biological perception system. If this technology is capable of cognitively enhancing the user, [146] then, according to the Capacitarian approach, if a certain juridical act conducted by an individual using an augmented reality device generates legal effects,[147] Law should consider that his legal responsibility could also be increased.

The idea that someone's responsibility should be increased through mental enhancement was already discussed in a scenario where an individual is under the influence of cognitive enhancing substances.[148]

However, the problem regarding *Augmented Reality*, as already mentioned, is the fact that this technology has the potential to either enhance an individual's cognitive performance or hamper it. This dual epistemological effect raises the question of whether the use of this technology indeed presupposes an increase in his/her responsibility.

Additionally, we must also consider one objection to the Capacitarian Approach that relates mainly with external means of enhancing mental capacity.[149] The ground for this argument, is that the relevant cognitive capacities – for example for Law[150] - enhanced

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[142] *Supra*, note. 118.
[143] *Supra*, note 137.
[144] Vincent, N.A. (2013). *Enhancing Responsibility. In Neuroscience And Legal Responsibility*, New York: Oxford University Press.
[145] *Supra*, note 116.
[146] *"For example, the new Google Glass might be thought of as a kind of enhancement that allows the user to see things and access information that he might not already have access to. At some point, the line between a non-biological enhancement versus an adjunct technology will be blurred."* on non-biological cognitive enhancement, Cohen I. G, (2014), *What (if anything) is Wrong With Human Enhancement? What (if anything) is Right with It?* 49 Tulsa L. Rev. 645.
[147] *Supra*, note 47.
[148] See Chapter 2.1.3.
[149] *Supra*, note 144.
[150] *Concrete* dimension of the Reasonable Man.

by any external means, – drugs or a technological device like AR – are detached from the physical cognitive system of the user. According to this critic to the Capacitarian hypothesis, the enhanced cognitive capacities should not be attributed to the user, since the post-enhanced behavior is not completely attributable to the individual but, in reality, to an *inauthentic self*, originated by the effects of external means.

If Law follows this interpretation and not the Capacitarian approach, then the Augmented Reality users will be considered to be below the *Reasonable Man* since the effects of their behavior lack the necessary agency or control which is required for a level of legal responsibility to be recognized.

Moreover, because the concept of enhancement is a rather relative one,[151] and, since the Capacitarian approach takes into consideration volatile normative elements, meaning elements that depend on the context and the relevant cognitive abilities of each specific situation, there is a pressing need for Law to assess the level of legal responsibility in an enhanced capacity state on case-by-case basis.[152]

Considering the above, together with the several mentioned hypotheses used to assess the behavior or perception of an individual under the influence of an AR device, the *normative disconnection* associated with this technology, demonstrated by either the Capacitarian approach or the theory of the *inauthentic self*, is undeniable. This, in conjunction with the epistemological effect of the technology and the Cognitive Integration theory, gives a clear answer to the third sub-question of this thesis and, subsequently, to the Research Question proposed, at least, regarding *Augmented Reality*.

Based on the above, regarding the latter, the concept of the *Reasonable Man* should be unequivocally updated in the face of new technologies capable of altering our cognitive processes. By showing the inherent normative disconnection caused by *Augmented Reality*, I was able to demonstrate that an individual under the influence of this technological means, can benefit in a specific situation from a higher level of legal protection or, on the other hand, that legal protection can be lowered. Specifically, depending on how Law assesses someone's behavior or someone's cognitive capacity, Law may conclude that a higher level of legal protection should be provided, or on the other hand, a certain duty of care should be demanded, and concomitantly the provided legal protection should be lowered. However, because such an assessment is based on the legal behavioral standard of the *Reasonable Man*, it seems inappropriate for courts to merely apply the standard when assessing an individual's behavior under the influence of AR.

Moreover, regarding the third sub-question, by taking into account the features of the technology itself and the impact of the technology on the user's cognition, from a scientific or epistemological point of view, the level of liability of the user is definitely not the same as the one of the *Reasonable Man*. In particular, the influence of the

[151] *Supra*, note 144.
[152] *I bid.*

technology on the user's cognitive experience is given. However, there is still uncertainty regarding the nature of the influence; enhancing or diminishing. Thus, the legal standard of the *Reasonable Man,* as it stands today, is not sufficient to assess liability.

One could argue that the concept itself is capable of self-updating in face of emergent realities such as the ones emerging from these technologies. Such remark, nonetheless, fails to take into account the rationale followed by philosophers and legislators in assessing who is the average person for the purpose of moral and legal responsibility. The concept, as proposed by Hannah Maslen, Filippo Santoni de Sio and Nadira Faber in *With Cognitive Enhancement Comes Great Responsibility?,*

"(1) *... serves as a yardstick against which to test preliminary normative conclusions: if the philosophers posit responsibility concepts and a theory about their relationship to enhancement that turn out to diverge from lay intuition then this divergence must be explored and explained: either the normative concepts and theory have to be revised or the lay intuitions have to be shown to be compatible through exposing biases or systematic differences in conceptual definitions. (2) The assessment of the average person allows insight to attributional biases. These insights are important for (a) providing a possible explanation for any divergence between the normative conclusions and lay attributions (...) and (b) predicting public responses to the policy approach normative conclusions suggest: the insights provide information that will help policy makers present and explain potentially controversial enhancement policy to the general public (...).".*[153]

Thus, the concept of the *Reasonable Man* should be updated to apply in cases of cognitive enhancement. However, the policy makers, when updating the term, should be able to explain their legislative policies and the recognized different levels of legal responsibility.

The same can be said about the potential effects of *Virtual Reality* in the behavior of a consumer. Although the complexity and uncertainty factors are not the same as *Augmented Reality*, this technology has the potential effect of altering the behavior of an individual in a manner that the *Reasonable Man* proves insufficient.

In contrast with AR, VR has a potential diminishing effect on cognition of the user, as it was mentioned in the second chapter. Keeping that in mind, the analysis required by Law to enact a consistent and coherent legal consequence to such a diminishing effect, presupposes that the effect is tangible; it does not raise any doubts. In other words, legal certainty should be ascertained for *conceptual loopholes* to be avoided.

As seen in the examples mentioned in subchapter 2.1.3, conceptual loopholes can trigger incoherent and unsuitable legal consequences that eventually hinder the way society adapts to the technology itself, leading to *ad hoc* manipulation of the teleological framework of the Normative Reality.[154] The possibility of VR creating a conceptual

[153] *Supra*, note 144, *on the philosophical inquiry of capacitarianism and the average person.*
[154] See subchapter 1.3.1.

loophole within the spectrum of the *Reasonable Man* justifies, as in the case of AR, the need to update either the concept or the way Law assesses patterns of behavior.

In what concerns the forth sub-question of the present, regarding the potential effects of VR and AR in Consumer Protection and Tort Law, what is of importance is the potential nudging effect. [155] If the technical features of AR, and especially the transmission of information in the actual reality, and the immersive experience generated by VR, are combined with advertising and marketing practices, one should consider possible dangers of this application. If unknown developers or well-known companies arbitrarily define without the intervention of the legislator the purpose of use, problems regarding data protection measures, consumer protection, purpose specification, and unfair competition may rise.

Moreover, in a recent survey conducted by the global law firm Perkins Coie LLP,[156] it was demonstrated that some of the abovementioned negative effects are already concerning the consumers. Namely, privacy and data security (44%) together with product liability, health and safety issues (42%) are the most common concerns, further justifying the urgency of an appropriate regulatory response.

This regulatory response requires a unitary consideration of both VR and AR technologies. This regulatory response takes into account the main and common feature of these technologies; their capacity to create an immersive experience based on their technical factors.[157] This immersive experience can alter the perception of individuals, underlining the need for an ontological update of the legal framework regarding behavioral patterns and standards relevant for Law.

Moreover, based on Article 38 of the Charter of Fundamental Rights of the European Union,[158] the necessary update in the current regulatory framework that addresses the potential problems related with consumer engagement techniques, specifically, advertising requires the development of appropriate safeguards towards the potential negative effects of these technologies in consumer behavior. Thus, an ontological reform of the concepts "*advertising and misleading advertising*," mentioned in Recitals (2), (4) and (7) and Articles 2(a) and (b) of Directive 2006/114/EC of The European Parliament and of The Council of 12 December 2006 concerning misleading and comparative advertising, is needed.[159] Towards this direction, the legitimate and interested parties

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[155] "*Nudge is a concept in behavioral science, political theory and economics which proposes positive reinforcement and indirect suggestions as ways to influence the behavior and decision making of groups or individuals."*. For the definition of *nudging* see Wikipedia, available at https://en.wikipedia.org/wiki/Nudge_theory and for further information see Hansen PG, (2016), *What Is Nudging?*, Behavioral Science & Policy Associaition, available at: https://behavioralpolicy.org/what-is-nudging/, and *supra*, note 104.

[156] Perkins Coie (2018), *Augmented and Virtual Reality Survey Report*, available at: https://www.perkinscoie.com/images/content/1/8/v2/187785/2018-VR-AR-Survey-Digital.pdf.

[157] (a) The quantity of information deployed by the technology; (b) The interface used by the technology to integrate the user in the fabricated environment and (c) The user's capacity to distinguish the real environment from the technological environment.

[158] The Article explicitly states that "*Union policies shall ensure a high level of consumer protection."*

[159] Articles 2 (a) and (b): *"(a)'**advertising**' means the making of a representation in any form in connection with a trade, business, craft or profession in order to promote the supply of goods or services, including immovable property, rights and obligations; (b) '**misleading advertising**' means any advertising which in any way, including its*

should advocate an addition to the scope of application of the Directive, to include of new technologies such as AR and VR, capable of changing the consumers' economic behavior.

In what concerns the revision of the concept of the *Reasonable Man*, we should ask whether the concept is sufficient by itself or, considering the last sub-question of this thesis, if there is a need to create a new legal concept capable of addressing these emerging realities in a more adequate way. Bearing in mind the role of language and legal concepts as a tool in regulating emerging technologies, one should consider whether it is time, in the light of AR and VR, to create a new legal concept capable of setting the normative framework that is needed for addressing these realities. In my opinion, to escape from the idea of technological determinism,[160] the regulation of these emergent technologies requires the formation of a new legal concept capable of assessing an individual's behavior, when under the influence of technological means, capable of changing someone's cognitive experience.

Chapter IV: Proposed Solution – The Poly-Analogical Reasoning & the New Cognitive Standard

In the present Chapter, I will propose a solution for regulators and Courts addressing the future challenges that Augmented and Virtual Reality will pose in the way Law assesses individual behavior and epistemological responsibility of an individual.

Such proposed solution should be done on the premise that relevant language, through legal concepts and analogical reasonings, is a pivotal tool in regulating emerging technologies as the ones addressed in this thesis. Moreover, the need for a coherent normative-framework must be recognized, in face of the potential ubiquitous and ambiguous effects these technologies will have in our perception and behavior, and, consequently, in the way Law assesses the level of liability for individuals as well as the protection of consumers.

Based on the above, I propose the creation of a new legal concept capable of addressing the potential effects of a technological immersive experience on a case-by-case basis. Additionally, I propose the application of the Poly-Analogical Reasoning theorized by

presentation, deceives or is likely to deceive the persons to whom it is addressed or whom it reaches and which, by reason of its deceptive nature, is likely to affect their ***economic behaviour*** *or which, for those reasons, injures or is likely to injure a competitor;"*

[160] "*Technological determinism is a reductionist theory that assumes that a society's technology determines the development of its social structure and cultural values.",* as it defined in Wikipedia, available at: https://en.wikipedia.org/wiki/Technological_determinism.

Luke Milligan,[161] adapted to the immersive effects of Augmented and Virtual Reality, as an analogical tool for the Courts to determine the legal consequences for each individual, under the influence of these technologies.

4.1 – *The New Legal Concept* – Ontological Approach to the New Cognitive Paradigm

In this subchapter, an ontological construction will be carried out based on Robert Van Kralingen's and Pepijn R. S. Visser's ontology theories,[162] and based on the *Concepts and Modern Analytical Jurisprudence* of Rudolf von Jhering, Professor John L. Austin and Ludwig Wittgenstein, as described by H. L. A. Hart.[163]

- *Ontological Construction*

The legal concept proposed in this Chapter, is inspired by the work of Robert Van Kralingen and Pepijn R. S. Visser concerning the legal knowledge systems. According to the authors, the conceptual and formal ontological framework of the legal system fulfils the purpose of reducing the task dependency between specific legal realms of knowledge. In lay terms, the usefulness of ontology is seen through the fact that we use concepts that are generally applied to different domains because those concepts follow a coherent terminological structure, only possible due to the deconstruction of their meaning. It is according to this relevance that I emphasize the need for an ontological construction of the concept that will be proposed.[164]

The first theory – *legal ontology* – concerns the ontological constructions that enable the generic applicability of a certain norm, act or concept description to the legal domain. In other words, it is the operation that enables a certain legal term to be generic. For the purpose of the concept that will be proposed, the entity that will be used in the ontological construction, is the concept description.[165] This ontological entity can be either a

[161] *Supra,* note, 40. Luke Milligan, in 2011, proposed, highlighted the need to depart from the mono-analogical reasoning and introduced a theory called *Poly-Analogical Reasoning*. He proposed the theory to be followed by judges in cases of Surveillance System technologies.
[162] Pepijn R. S. Visser and. Bench-Capon J. M. T. (1998), *A Comparison of Four Ontologies for the Design of Legal Knowledge Systems,* LIAL – Legal Informatics at Liverpool, Department of Computer Science, University of Liverpool.
[163] Hart H. L. A (102), *Essays in Jurisprudence and Philosophy,* Oxford Scholarship Online.
[164] *Supra,* note 162, p. 12 to 15.
[165] *Ibid*. Where regarding the division of legal knowledge over three distinct entities, it is stated that a "*concept descriptions deal with the meanings of the concepts found in the domain"*.

definition; a deeming provision; a factor or a meta concept. In the present case, the choice of the concept to be proposed, is a definition, because it determines the meaning of the situation of an individual's perception or behavior being influenced by technologies, providing as a necessary condition that the individual performs a juridical act, capable of creating, modifying, or extinguishing a juridical relationship, under the influence of a technology.[166]

The concept description, according to the authors, must comprise seven elements to be applicable in the legal domain; "*(1) the concept to be described, (2) the concept type (definition, deeming provision, factor, or meta), (3) the priority (the weight assigned to a factor), (4) the promulgation (the source of the concept description), (5) the scope (the range of application of the concept description), (6) the conditions under which a concept is applicable, and (7) an enumeration of instances of the concept.*".[167]

At this point, it should be noted that for the purpose of the concept that will be proposed, the 7th element of the concept description would be preferable not to be applied. The reason why I make such ascertainment concerns the applicability of the concept itself, which, as it will be explained, must not be a closed concept but rather an open one, with an equal open number of instances in accordance with the lack of foreseeability of the potential circumstances in which can be applied.

Starting from element (1) - *the concept to be described* – this concept concerns the situation where an individual's behavior or perception is altered by a technology. The element (2), as previously mentioned, is the definition type. The element (3) related to the priority given to the factors inherent to the concept to be described, is (a) the individual's behavior or perception, (b) that suffer an alteration (c) through the use of technological devices. The element (4) – *the promulgation* – related to the source of the concept, derives from the cognitive effects of technologies like Augmented and Virtual Reality; the epistemological theory of Cognitive Integration[168] and the Capacitarian approach.[169] The element (5) concerning the scope of application of the concept description is any legally relevant situation relating to consumer protection; tort law and behavioral standards. Finally, the element (6) comprises the conditions under which the concept is applicable, and, as already mentioned, requires that the individual performs a juridical act that creates, modifies, or extinguishes a juridical relationship.

The second ontology theory – *statute-specific ontology* – enables the construction of the concept that will be proposed and relates to the vocabulary in which the concept itself is based upon and the ontological questions necessary to justify such vocabulary.[170]

The legal concept proposed is the concept of *Technological Consciousness.* The choice of this terminology relates the situation to be described by the concept, i.e. element (1) of

[166] *Supra*, note 47.
[167] *Supra*, note 162.
[168] *Supra*, note 137.
[169] *Supra*, note 144.
[170] *Supra*, note 162.

the concept description. The term *Technological* can be easily justified since the situations addressed by the concept are intrinsically connected with the technological features of Augmented and Virtual Reality described in Chapter 2.2 of this thesis. Moreover, this term also takes into consideration the fact that the concept will only be applicable to situations where these technologies influence an individual's perception and his/her behavior.

Regarding the term *Consciousness*, the ontological meaning, and thus the applicability of the term, derives from the fact that the issue addressed by the legal concept is related to the way an individual's behavior and the way that individual perceives his/her surroundings, when he/she is under the influence of Augmented or Virtual reality devices.

Additionally, because this term entails an abstract ontological meaning, one should clarify how the legal actors should interpret the term, when applying the proposed concept.

For the purpose of the ontological construction of the concept, *Consciousness* must be understood as the state of a subject when perceiving a certain object.[171] The object, that can be either a material object part of the physical reality or an internal object represented in the subject's mind,[172] acquires a new dimension due to the effects of these technologies, since they also enable the perception of digital objects. The fact that the perception of digital objects will be a present reality with the use of these technologies justifies part of the ontological meaning of the legal concept of *Technological Consciousness*.

The other part of the ontological meaning of the concept derives from the dichotomy of the self and consciousness.[173]

This dichotomy is relevant because the term *Consciousness* follows the idea of an interactive process between subject and object while the term *self* relates only to the concept of a conscious or aware subject, independently of an object. This idea is more easily understood when one considers the state of self-consciousness. This state is "*the consciousness of the consciousness of objects, never the consciousness of self alone.*"[174]

Based on the above, it is possible to say that the *Technological Consciousness* concerns the process in which a subject perceives an object – physical or digital – not through his/her biological means, but through a technological apparatus enabled with the use of an Augmented or Virtual Reality device.

With the ontological construction completed, it is now time to explain how the legal concept of *Technological Consciousness* should apply.

[171] Feibleman J. K. (1982), *Technology and Reality,* p.p. 94 and 95.
[172] *Supra,* note 129.
[173] *Supra,* note 171.
[174] *Ibid.*

- Applicability

Considering the scope of application of the concept and the subject matter of this thesis related with the concept of *the Reasonable Man*, one might think that the creation of the concept of *Technological Consciousness* implies the inoperability of the former. This is not, however, the case. This new concept, in contrast with *the Reasonable Man*, is not a new standard of behavior for Law to define the level of liability of individuals. Instead, the proposed concept presupposes the application of the cognitive spectrum of *the Reasonable Man*,[175] and functions as a tool for Courts to apply a specific assessment to determine with conceptual and normative clarity what the level of liability regarding an individual's juridical act will be, when that individual is using an AR or VR device. This ancillary concept is the expression of the necessary update to the concept of *the Reasonable Man* itself in face of new emergent realities brought by AR and VR.

In the light of the above and considering the mentioned inapplicability of the 7th element of the concept description mentioned in the ontological construction, I will now clarify the applicability of the concept while resorting to the considerations made by Rudolf von Jhering, Professor John L. Austin and Ludwig Wittgenstein, in the *Concepts and Modern Analytical Jurisprudence,* described by H. L. A. Hart.[176]

In his book, Hart refers to one fundamental intellectual error pointed out by Jhering that concerns the nature of law and legal concepts and how they are applied. In a simplified manner, Hart states that "*the fundamental error consists in the belief that legal concepts are fixed or closed*",[177] in the sense that they are logically closed on the premise that every single situation to be attained by the Law is, in a godlike manner, predetermined in a set of exhaustive and necessary conditions. This is for instance demonstrated by the requirements of the 7th element described in the legal ontology theory. The lack of consideration of the individuality and specification of each single and potential future circumstance yet to emerge was scrutinized by Jhering and was further highlighted in Chapter 1.3.3 of the present, regarding *Ad Hoc and Post Hoc manipulation*.

Legal philosophers that were inspired by the modern ways of analytical jurisprudence also criticized the misconception of how legal concepts should operate. This philosophical trend, especially expressed by Professor John Austin and Ludwig Wittgenstein, reinforced the idea of refining and redefining legal concepts in the light of new emerging realities. The idea that a general concept that applies to many different situations, inevitably meant that those situations share exactly the same common characteristics is, in the words of the authors, a dogma. It is within this philosophical and legal criticism that the performative use of language started to be considered. This performative function of legal concepts encompassed the idea that whenever a certain

[175] See fig. 1 and 3, Chapter 1.1 and 3.1.3.
[176] *Supra*, note 163.
[177] *Ibid*.

concept was brought into action, it should call for the application of other rules in its operation, because this conceptual operability is what determines the function and the meaning of the concept in question.

It is with consideration to this performative function of language that the applicability of the concept of *Technological Consciousness* must be understood, because its application will always require the application of a 3-Step-Test by the competent Court, based on a Poly-Analogical reasoning, as it will be discussed in the next Chapter.

4.2 – The Poly-Analogical Reasoning Applied to Virtual & Augmented Reality – 3-Step-Test for Court Reasoning

This subchapter will demonstrate through two practical and hypothetical examples, how the concept of *Technological Consciousness* calls into action a 3-Step-Test to be applied by the competent Court in assessing a subject's liability under the influence of Augmented and Virtual Reality. Furthermore, a Poly-Analogical reasoning must be considered when applying the 3-Step-Test.

- *The Mono- Analogical and Poly-Analogical Approach*

When addressing emergent technologies such as Surveillance Systems, Courts usually take an analogical reasoning to determine certain legal consequences to the use and applications of technologies.[178]

The problem is not the need for an analogical reasoning in assessing legal consequences in the technological world. On the contrary, the problem lies on the type of analogical reasoning deployed, as described by Luke Milligan as the *"mono-analogical framework".*[179] According to the author, this analogical reasoning led by the Courts only takes in consideration the functional aspect of the technology in question, whereas a poly-analogical reasoning would have taken into account other technical aspects besides the functional aspect of a technology.[180]

The reason why Courts consider the functional aspects when they are before a new technology is mainly because it is the easiest technical aspect to be used to perform

[178]See, e.g., Warshak v. United States, 490 F.3d 455, 474-75 (6th Cir. 2007) regarding the analogizing screening of postal mail to screening of e-mail and concluding that persons have a reasonable expectation of privacy in the content of e-mails. And *supra*, note 38., *Quon v. Arch Wireless Operating Co., 529 F.3d 892, 905 (9th Cir. 2008) where the court said that, "we see no meaningful difference between the e-mails at issue in Forrester and the text messages at issue here [and] we also see no meaningful distinction between text messages and letters"*, and United States v. Arnold, 523 F.3d 941, 947 (9th Cir. 2008).

[179] *Supra*, note 40, p. 3.

[180] *Ibid*, p. 5, where the author exemplifies the analogical reasoning in law with an example portrayed by Professor Cass R. Sunstein in his book *On Analogical Reasoning*, as follows: "***(1)*** *Some fact pattern* ***A*** *has a certain characteristic X, or characteristics X,* ***Y,*** *and Z; (2) Fact pattern B differs from* ***A*** *in some respects but shares characteristics X, or characteristics X,* ***Y,*** *and Z;* ***(3)*** *The law treats* ***A*** *in a certain way; (4) Because B shares certain characteristics with* ***A,*** *the law should treat B the same way."*.

analogies with old, already known, technologies. Nonetheless, sometimes these limited analogies bring unsuitable legal consequences in certain cases, where the technologies, although sharing some functional aspects, differ in many other – sometimes even more relevant – technical aspects.

To support his thesis, the author mentions an example of how in a specific case this mono-analogical reasoning led to inappropriate legal consequences in the domain of privacy, triggering evasive and dangerous results for individuals.[181]

Besides individuals, the potential harmful consequences of these limited analogies can also hinder the technological industry itself as it was discussed in Chapter 1.3.3. In the present Chapter, the hindering effects of a mono-analogical reasoning were first mentioned, regarding a Court- generated Post Hoc manipulation of liability expectations regarding technologies.[182] As it was discussed, if a certain technology has specific features, the developers and manufacturers of such technology will probably expect a certain level of liability related with those features. If a Court, when using a mono-analogical approach, decides to apply a different level of liability than the one expected because of the common functional aspects that the technology in question shares with an older technology, disregarding of the different technical aspects of the new technology, then the liability expectations of the developers and manufacturers will be manipulated, after the development of the technology.

The faultiness of this approach by the Courts in regulating technologies is undeniable and justifies the shift to a poly-analogical approach.

Because the lack of consideration on the overall aspects of technologies can provoke legal uncertainty for both users and developers of emergent technologies, it does not seem reasonable to place judges in the role of determining the conceptual relevance of certain aspects of technologies nor their potential effects.

Notwithstanding the important and unequivocal considerations that judges must take on a case-by-case basis, the role of determining the potential effects of technologies and the technical aspects that can trigger legally relevant consequences in society should be done by legal scholars and policy makers, through a multi-and-inter-disciplinary approach based on every specific technology.

This kind of approach enables the Law to take into consideration other relevant aspects of emergent technologies when assessing potential legal consequences for the use and application of these technologies. Despite the relevance of the functional aspect of a technology, nowadays it seems rather unreasonable not to consider other features, such as the information processing capacity and efficiency of a technology; the purpose in processing this information; the entity determining the purpose or even the cognitive qualities affected by the technology.

[181] See Olmstead v. United States, 277 U.S. 438 (1928).
[182] *Supra*, note 38.

Although the author proposes a test according with a poly-analogical reasoning in the context of warrants and searches with surveillance technologies, [183] the test can be adapted to entail other technologies, provided that the Court asks questions regarding the relevant technical aspects and legal context based on which its assessment will be made.

In particular, regarding the technologies addressed in this thesis and based on the poly-analogical reasoning, the aspect that should be taken into account, when determining the level of liability of a user of Augmented and Virtual Reality when the user performs a juridical act, is the potential immersive experience offered by those technologies.

- *The 3-Step-Test*

Based on the poly-analogical reasoning that the Court should follow to qualify the potential immersive experience of a user of AR or VR, the following factors should be taken into account: (a) the quantity of information deployed by the technology; (b) the interface used by the technology to integrate the user in the fabricated environment and (c) the user's capacity to distinguish the *real* environment from the *technological* environment.[184]

These factors are essential to understand how the 3-Step-Test should be framed.

Moreover, as previously explained, the abovementioned factors presuppose a multi-and-inter-disciplinary study between Law, Neuroscience, and Psychology. Such requirement, nonetheless, was already addressed in recent literature, regarding the way Law should assess the responsibility and behavior of individuals. [185,186]

With the recent technological development of Neuroscience, scholars have proposed that Law should take advantage and use these developments, especially in the fields of civil and criminal procedural law. The discussion about a possible combination of different disciplines has risen in the last years, for instance, regarding the possible application of

[183] On the aspects to be considered by the Court when applying the Poly-Analogical reasoning, see *supra.* note 40, p.p. 17–21.
[184] These factors were mentioned in the end of Chapter 2.2.1, regarding the relevance of qualifying an immersive experience for the purpose of determining the liability of a user of Augmented and Virtual Reality. See pp. 26-27.
[185]Jones, D. O. and Shen, X. F. (2016), *Law & Neuroscience: What, Why, and Where to Begin*,. MacArthur Foundation Research Network on Law and Neuroscience, available at SSRN: https://ssrn.com/abstract=2881613.
[186] de Kogel C. H., Schrama W. M. & Smit M. (2013), *Civil Law and Neuroscience*, Journal of Psychiatry, Psychology and Law.

neuro-tests in the courtroom to facilitate the assessment of cognitive qualities of the human brain that have legal relevance.[187]

Whether for the purpose of determining criminal or civil liability, or for research in the areas where these cognitive qualities assume special relevance, e.g. the concept of the Reasonable Man and the M'Naghten Rule, the prospect of applying neuroscience in procedural law seems a plausible reality in the near future.

Considering this potential shift in procedural law, Neuroscience can also be used to assess which cognitive abilities relevant to Law are affected by the immersive experience offered by Augmented and Virtual Reality, thus helping Courts in determining the level of liability for their users.

In the light of the above, I propose a 3-Step-Test, where the competent Court should ask the following questions whenever the concept of *Technological Consciousness* is applicable:

(1) What is the nature of the information perceived by the user of the Augmented or Virtual Reality device and what is the purpose of using the device?

(2) Who defines the purpose of processing and imposing that information?

(3) Which cognitive qualities are altered due to the use of the device?

- *Examples*

Considering the proposed 3-Step-Test, the following hypothetical examples are given to demonstrate its applicability in a courtroom:

(1) Subject A enters in a virtual environment provided by a Virtual Reality interface of company B. Subject A is a potential consumer and Company B is a luxury store. Subject A becomes alienated from the real reality, entering in an immersive experience where is possible to interact with the products of Company B. Subject A's levels of attention and absorption are increased during the immersive experience. Company B knowing the consumer preferences, is able to increase Subject A's desire for a specific product generating a bonding experience between the product and subject A. Subject A decides to buy the product. Company B sells

[187]On the potential of Neuroscience in determining criminal responsibility, Ligthart S. (2018), *Neuro-tests and forensic evaluations of criminal responsibility: a legal perspective*, Conference Law, Science and Rationality - April 2018, Faculty of Law, Maastricht University.

the product while at the same time reads the data related to the conative, affective and cognitive effects of subject A's experience. One day later, the product arrives at subject A's house. After realizing that the product is not as good as it seemed, and provided that the virtual immersive experience was determinant in acquiring the product, subject A alleges that the juridical relationship created with Company B was created only due to the *Technological Consciousness,* returns the product and requests a refund. Company B refuses.[188]

(2) Subject C downloads an Augmented Reality application from Company D. Subject C is a potential consumer and Company D is a clothing store. The application enables Subject C to visualize his/her own feet with a product by overlaying digital information in the form of a pair of shoes. While Company D requires information on the potential consumer, subject C decides to acquire a certain product since the product appeared to fit perfectly in his/her feet. Subject C orders the product, which arrives one day later. Subject C, although it recognizes that the shoes are in fact his/her size and have the same features as seen in the application, tries them on and feels that they are somewhat tight, making it impossible to use them. Subject C goes to the physical store of Company D returns the product and requests a refund. Company D refuses to do so alleging that the application described the product perfectly and that Subject C was able to see the product overlaying his/her physical body. Subject C alleges that the juridical relationship with Company D only took place because he/she was deceived by the immersive experience.[189]

(3) Subject E uses an Augmented Reality device that overlays information about his/her surrounding environment. One of the features of the Augmented Reality device is to provide information about technological devices that appear in Subject E's environment. Company F, a technology developer, is launching a new gadget. Company G, a competitor of Company F, alleges that the patent is invalid due to lack of the inventive step. In Court, Company G brings Subject E, a law student, user of the AR device, to prove to the Court that even a layperson, such as Subject E, can reproduce the product of Company F, thus that the gadget is already part of the state of the art. Based on that, the Court decides to invalidate Company F's patent. Company F argues that the knowledge of Subject E, thanks to the AR device, is enhanced and therefore Subject E should be considered a person skilled in the art, hence that the patent application is valid, and the inventive step is fulfilled.

In example (1), when applying the 3-Step-Test, the Court should consider:

[188]MasterCard News, (2017), *Mastercard And Swarovski Launch Virtual Reality Shopping Experience*, YouTube, available at: https://www.youtube.com/watch?v=uFNFU4wgyNI.
[189] Engine Creative (2016), *LCST: Lacoste Augmented Reality Retail Campaign*, YouTube, available at: https://www.youtube.com/watch?v=JcMOyMudH88.

(1) That the information perceived by Subject A using the VR device was about a product and the purpose of using that device was to advertise that product.

(2) That Company B is the one defining the purpose of the information processed and imposed by the VR device.

(3) That, without an assertive answer, as the one that Neuroscience could offer, it can only be presumed that the altered cognitive qualities of the user were determinant for the user's capacity to distinguish the real from the virtual environment, in entering the contract.

In example (2), when applying the 3-Step-Test, the Court should consider:

(1) That the information perceived by Subject C using the AR device was about a product and the purpose of using the device was to advertise that product and allow the user to experience the product in his/her own reality.

(2) That Company D is the one defining the purpose of the information processed and imposed by the AR device.

(3) That, without an assertive answer, as the one that Neuroscience could offer, it can only be presumed that the altered cognitive qualities of the user were determinant for the user's capacity to distinguish the real from the virtual environment, in entering the contract.

In example (3), when applying the 3-Step-Test, the Court should consider:

(1) That the information perceived by Subject E using the AR device was about the surrounding environment while the purpose of using that device was to enhance the user's knowledge when interacting with the surrounding environment.

(2) That the Subject E is the one defining the purpose of the information processed and imposed by the AR device.

(3) That, without an assertive answer, as the one that Neuroscience could offer, it can only be presumed that the altered cognitive qualities of the user were determinant for the user to be considered enhanced.

The aforementioned examples demonstrate the practical applicability of the 3-Step-Test. while taking into account the epistemological and cognitive effects of Augmented and Virtual Reality. At the same time, these hypothetical scenarios highlight the need for regulating the potential effects of these technologies, as well as, the importance of the legal concept of *Technological Consciousness* and the poly-analogical reasoning in addressing emergent realities.

Chapter V: Conclusion

In the 21st century, a new era of economic and societal development emerged due to the influence of new technologies. Amongst these technologies, *Augmented and Virtual Reality*, although not yet ubiquitous, they are progressing in a fast pace, challenging how society and Law address the human cognitive experience as it was perceived before these technologies appeared in the market.

For Law to address these technologies and the emerging realities that they bring, it must equip with the necessary tools to create a proper normative framework. For this regulatory update, language, as a universal method of understanding our world, is the key. By adapting the legal concepts and the legal terminology, the pacing problem of regulating emergent technologies can be overcome. Moreover, by describing a certain technology in accurate terms or by using the right concepts and reasoning to address its potential legal effects, judges and other legal actors can avoid the potential arbitrariness and inaccuracy when regulating new technologies.

Towards this direction, the concept of *the Reasonable Man*, as the fictitious legal standard used to assess an individual's legal responsibility based on his/her cognitive experience, and its qualities, require a constant reflection and adaptation to the ever-changing societal needs, whenever these needs are disrupted by new cognitive realities.

This approach is not novel. Law already addresses different cognitive realities such as the ones caused due to the use of cognition-enhancing drugs, autistic disorder and psychopathic personality disorder. Notwithstanding, Law and its legal concepts sometimes fail to address efficiently or at least accurately these cognitive realities. The process of legally identifying in an efficient manner these cognitive realities is becoming more complex when they are brought by technologies whose effects and applications are not yet fully known.

However, the abovementioned uncertainty and perplexity does not diminish the potentially dangerous effects of these technologies, and thus, the necessity of law addressing them.

The dual cognitive effect of these technologies – enhancing and diminishing– can create normative disconnection and conceptual loopholes in the way Law frames the level of liability for the individuals under these effects. The uncertainty regarding the nature of the cognitive influence of these technologies demonstrate how the concept of the *Reasonable Man*, as it stands today, is incapable of addressing and assessing this new cognitive reality.

For instance, the cognitive effects of *Augmented and Virtual Reality* deployed in consumer engagement techniques justify, in light of the Article 38 of the Charter of Fundamental Rights of the European Union, an update in the current regulatory

framework that addresses the potential problems related with consumer behavior, and specifically advertising.

In particular, based on the epistemological effect of certain *Augmented Reality* devices, the *Cognitive Integration Theory* and the Capacitarian Approach, questions regarding the potentially enhanced legal responsibility of individuals that use these devices must be discussed by policy makers and addressed by future normative frameworks.

Bearing in mind the role of language and legal concepts as a tool in regulating emerging technologies, I propose the following solutions in assessing an individual's behavior under the influence of *Augmented and Virtual Reality.*

Firstly, regarding the ontological construction, I propose the applicability of a new *performative* legal concept defined as *Technological Consciousness.* Together with the concept of the *Reasonable Man*, this new concept will apply to any legally relevant situation where an individual, while using a technological device capable of producing an immersive experience, creates, modifies, or extinguishes a juridical relationship.

Secondly, since the concept of *Technological Consciousness* is a performative one, the Court should follow a *3-Step-Test* to determine in a more adequate and accurate way what should be the level of liability of an individual under the influence of an *Augmented or Virtual Reality* device, based on the cognitive experience of the individual. This *3-Step-Test* follows a *poly-analogical reasoning*, while considering a potential application of Neuroscientific tests in the courtroom, as part of procedural law.

More specifically, the *3-Step-Test* consists of two questions regarding (a) the information processed or imposed by the technology in the individual's reality and its purpose and (b) the legal person defining the purpose; the user of the technology or the entity providing the technology. Finally, as a final step, the use of Neuroscience together within the procedural law facilitates the process of determining which qualities of the *Reasonable Man* are affected by the technological device.

In conclusion, as the use of *Augmented and Virtual Reality* will increase in the future, it is crucial that the Law starts to adapt and update to the new cognitive paradigm emerging form these technologies. The potential positive and negative effects of these technologies create a legal conundrum that needs to be addressed as soon as possible. The aforementioned proposal, based on language, either through legal concepts or an analogical reasoning, takes into account the life-cycle and pace of *Augmented and Virtual Reality*, is deemed more dynamic than one focusing on creating new reactionary measures. Moreover, while bearing in mind the *Collingridge Dilemma*, concepts and terminology should be the preliminary regulatory tool for regulating emerging technologies, since language, both for Law and society, has always been the first step to understand, integrate, and, finally, regulate reality.

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