The metaverse and the law: aspects of a new technological regulation[1]

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1. Introdução

Digital technology has had a profound impact on traditional aspects of everyday life, such as culture, education, work-related tasks and even social interactions. However, a new service has emerged offering online

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users the capacity to experience virtual environments and to interact with others through digital representation of themselves called *avatars*, this is the metaverse. Such approach is not particularly new, having its earliest proposals in platforms such as *Second Life* of 2003.

However, the inclusion of new technologies delivers a unique experience with a particular feature: the actions have the capacity to produce effects on real scenarios. This is the result of a particular characteristic offered by different developers, which is the migration of real life services to the metaverse.

On a first view, this may appear to be positive: culture and education can be expanded, new form of business could be developed and even social interactions can take place through this platform, all of which can produce their effects in real life. However, the metaverse does present the same risks as any online site and it may even be subject to tailored threats.

This, due to two main reasons these platforms gather (and some concentrate) large volume of their users personal data for several purposes that cover from enhancing the user experience to increase operative features. Also, these platforms will deliver a new version of the online market, allowing not only the sell of digital objects but also the development of advertisement campaigns to attract clients. In this sense, identification and profiling will be carried out through personal data gathered from users.

Moreover, this platform allows users to perform legally relevant acts, which may require in a given moment the intervention of the legal sector to resolve disputes. For the law, however, this scenario presents a new set of challenges that need to be properly understood. During the early interactions between the law and the Internet, this technology served as platform, a location where legally relevant situations occurred. In the metaverse, these interactions may produce a legal effect but their composition may turn them incompatible with most legislations. Just like during the Internet first years, these services will require a new position of the law.

This will be addressed along with the role of relevant computational approaches such as artificial intelligence and their capacity to collaborate as a potential solution for this scenario.

2. Social life after the arrival of digital technology

During the second section of the 1990s the arrival and dissemination of digital technologies, particularly the Internet, had a reshaping effect on

society. This meant that activities traditionally considered of human reali-
zation only, adapted to particularities of this new environment. The result
was new forms of education, social interactions, working conditions and
even the conception of the market.[2]

From a merely technical aspect, the Internet is composed by a vast
volume of networks, which ensures that information can be produced,
accessed and distributed in a variety of formats.[3] With seemingly endless
source of data, the number of users has steadily grown through the years,
as the public perceives this platform as an environment where they can live
experiences that they would find restricted in physical scenarios through
new forms of interactions.

A development that delivered this is social media. Regardless its appar-
ent novelty, these platforms has been present since the 1979 with Usenet[4].
This service operated as discussion system, where users were able to address
particular topics and to express their opinion through constant update
information, known at the time as "news feeds". Eventually, this led to the
formation of the first cyber-communities, which were formed by people
that share similar interests and shared specific elements in their personal
lives. Other services that deliver social interaction through the Internet
were Listserv and Internet Relay Chat (IRC) in 1984 and 1988 respective-
ly.[5] Current versions of the metaverse will later adopt some of the elements
contained in social media.

Although technically limited and developed for reduced audiences,
these early platforms provided a first view of how social interactions may
occur through electronic environments. Current social media services go
beyond this, by offering interactive features and even expanding to other
sectors, such as businesses and education.

Nonetheless, these services would change exponentially after 2010,
when a new interest on virtual reality raised. After this year, companies such
Oculus Rift VR, Sony and Samsung presenting their on sets as to experience
this environment.[6] In 2016, Microsoft presented their HoloLens headsets,

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2 NIE; ERBRING, 2002.

3 HILBERT; LOPEZ, 2011.

4 BAYM, 1994.

5 EDOSOMWAN; PRAKASAN; KOUAME; WATSON; SEYMOUR, 2011.

6 MONICA; JACOPO, 2022.

which gave mixed experience by combining augmented reality and mixed reality. This derives in situations where users can experience being in a given environment with particular sensorial characteristics.

Regardless of its potential positive implications, after a few years it was evident that the Internet had a "gray" side. Here, illegal activities could be perform by ill-intentioned users that were trying to obtained an illicit gained through this technology. This led to the generation of several approaches and an eventual collaboration between the legal and developer sectors to increase. In the end, it became evident that a general approach was not feasible, companies will have to develop their own schemes according to their needs. The user would have to accommodate to this and to comply with techno-legal security parameters to be able to perform a pretended action.

The development of this technology has experienced significant advances as result of a renewed interest on the metaverse. In the following section, the technical particularities of this service will be delivered.

2.1. The return of the metaverse to the market

In 2021, technology giant Meta declared that they were planning on developing and presenting a new version of the metaverse. Traditionally speaking, this term refers to a series of technologies that deliver multisensory interactions with virtual environments, digital objects and people.[7] Regardless its apparent novelty, this concept has been present since 1992, when Neal Stephenson presented his novel *Snow Crash*. In fact, *Second Life* holds the title of being the first digital service that offered such experiences. Here, users are allowed to send messages to each other, visiting destinations alone or with co-users, attending multi-player games or creating, selling and buying virtual objects. The success of this game was such, that there a specific place for actual diplomatic representations was created, *diplomatic island*. This, however, was mostly about information about the countries that "had" an embassy there, such as the Maldives or Sweden. However, the experience offered by Second Life's scenario kept a relatively slow grow, with certain stages where it basically remained the same.[8] This problem may be caused by the lack of compatibility that this platform had when users wanted to make a transition to another network.

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7 MYSTAKIDIS, 2022.

8 SCHULTZ, 2018.

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Nonetheless, this may be on of Meta's strongpoints: by allowing users to migrate their already existing profiles, it would incentivise migration towards their service.

2.2. The new metaverse experience: Reproducing the real world

As the services that preceded it, most metaverse services aim to realistically reflect the real world through virtual technologies. It brings not only the experience of interacting in fantasy worlds, but to interact in digital representations of actual physical environments, such as cities, public places, private events, etc.

To develop these sets of experiences, these services rely on XR or extended reality, which is composed by AR (augmented reality) and MR (mixed reality). VR is implemented to deliver a three-dimensional expression of the scenario. This interaction relies on delivering experiences as if the user were in a particular area without physical limitations, as long as it fit the designed area.

AR operates by imposing virtual objects on real spaces (e.g. Pokemon GO). This encompasses sounds, videos, 3D graphics, computer generated images, etc. along with Global Positional System (GPS) information to properly map a specific geographic area. [9] It delivers a controllable and technically "light" scenario, in which digital elements are inserted to deliver an enhanced experience, according to the user's preferences.

On the other hand, MR combines elements of both, AR and VR. This approach is considered the most convenient, since it does not require the most expensive computer set up thus, making suitable for a wider section of the market.

Overall, the metaverse version presented by current developers aims to expand the user capacity to interact and explore digital scenarios. This, by creating scenarios (commonly refer as "maps") that complements its recreational aspect with professional and economic features, becoming a functional representation of the physical world. Nonetheless, these interactions will not only rely on digital representations of users (commonly known as "avatars"), but also through intelligent devices, whose main object is to obtain data related to specific aspects of the user. This information is then

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9 ODDONE, 2019.

used to refine the metaverse ecosystems, offering particular activities and allowing people with similar activities to interact. The result of this is more interactive environments that contain more (digitally) embodied features.

However, these interactions are not always entirely "free" or "autonomous", these can be influenced by digital objects specifically designed for this purpose. In the following section, the impact of intelligent technology in the metaverse will be delivered.

2.2.2 Artificial intelligence and the metaverse

Artificial intelligence (AI) is one of the most interesting yet complex areas of computer science. Developed to replicate human cognitive processes to allow devices to solve problems in the way a human would do, its techniques had evolve in the last decades.[10] In what it comes to the mataverse, AI results fundamental to merge other technologies, such as AR/VR, blockchain and networking to develop realistic experiences. AI guarantees not only the integrity and operability of the technical infrastructure, but also to constantly improve its performance and strengths technical integrity. Additionally, it enhances different elements of the user experience such as, voice commands, interactions with other players and non-playable characters.

AI holds a mayor role in terms of cyber security in the metaverse. Here, VR devices acquire large amounts of data, which are later transmitted through networks and store in data repositories. Naturally, this requires an adequate level of protection. For this purposes, AI (particularly machine learning) combined with blockchain not only protects data, but it does this with a minimum efficiency cost.[11] Additionally, this technology allow users to have control over their data on the metaverse facilitating, for example, transfer ownership to another party. Through this, users can exchange information without the necessity of presenting additional information (zero-knowledge proof method). Additionally, blockchain ledgers can be used for audit purposes, which deliver certainty to all transactions that occur in the metaverse under this scheme. This type of system not only enhances security, but it also results compatible with operational efficiency meaning that whilst it

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10 MIJWIL; ABTTAN, 2021

11 CANNAVÒ; LAMBERTI, 2021

would not compromise the quality of the data transactions in this platform. The proposed approach contributes in achieving data heterogeneity, which will allow proper management and disposition of data in the metaverse.

Overall, the combination of AI and blockchain will deliver protection to sensitive data acquired by AI systems. In relation to sensitive data, the will be better protected by this approach, since it only allow its manipulations by the proper parties. Yet, it is important to properly establish general ethical methods through which AI-blockchain approaches can be developed. By delivering these standards, public AI systems will become a much harder target for attackers allowing data interchange to be safer.[12] Blockchain may, in the near future, diminish the need for third parties to obtain trusted data and it has the capacity to keep contributing in mining and verification tasks.

Nonetheless, it is important to establish that the adoption of blockchain is gradual and its adoption by all the parties may be a complex challenges. Because of this, it is recommended as a complementary solution for already operative platforms. This should be seen as a positive feature, since it remains compatible with current metaverse architectures, creating the way for a vast number of potential applications.

2.3. Metaverse, artificial intelligence and the law

Nowadays, the relationship between technology and artificial intelligence is highly personalized. This can be particularly perceived in the metaverse. Here, user's representations (commonly known as avatars) are perceived as a valuable source of information, which makes it potentially vulnerable for unlawful actions. To grant this, the traditional implementation of the law results insufficient, requiring a new perspective that emphasizes preventive actions, but can also aid in corrective measures.

To achieve this, a close cooperation between the public and developer sectors to jointly to create and enforce ethical principles is required. As it occurred with the Internet during its early years, it is necessary to under-stand the technical compositions of legally relevant actions to create an adequate legal response. One of the most relevant positions is to combine four modalities: social norms, law, market and architecture.[13] Here, software

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12 GADEKALLU; HUYNH-THE; WANG; YENDURI; RANAWEERA; PHAM; DA COSTA; LI-YANAGE, 2022, pp. 7-9.

13 LESSIG, 1999.

is embedded with certain principles or directives that allow users to perform only those actions that result compatible. Basically, software is designed to allow specific acts by the user, with the intention of avoiding potential legal violations. In this sense, the metaverse has its own version of legally relevant actions, for example, users can perform contracts through their avatars, sensitive data could be gathered and digital objects can be created for selling purposes. These scenarios are not only recognized but also deemed necessary by developers as part of the real life experience offered by their services.

Additionally, specific legal areas, such as criminal and intellectual property had become subject of interest in the metaverse. In the first cases, digital assets may suffer criminal activities, i.e., they could stolen. From an IP perspective, users are allow to create their own digital art, and if they decide to, they can sell or to perform other commercial activities with it. To try to address the matter, several opinions have been presented, being one of the most important ones the provided by the Supreme Court of the Netherlands, which ruled that "intangible objects are considered property" and thus, economically valuable.[14] This made that the use of other users digital elements, which can go from cloth for the avatar or environmental elements, protected by law and of restricted use. Additionally, it delivers not only public recognition but a starting point to create legal strategies to deterrent any potential unlawful use.

The metaverse has led to the reconsideration of traditional legal terms, such as "ownership", which is composed of three equally relevant positions. First, all computer creations are subject of copyright protection. Second, it establishes that objects in the metaverse are property. Finally, the third one recognizes the autonomy of the subjects that converge in the metaverse, being the administrator of the platform, the owner of the digital store, the creator and consumer all different entities. This perspective also allows developers to properly design limitations based on legal positions to deliver a legally sound environment. It also allows establishing security limitations, like forbidden access for minors and the restriction of topics considered harmful for the community.

Parallel to this, artificial intelligence would be capable of performing commercial transactions on behalf of a particular user. Due to the immensity of the metaverse, the adoption of intelligent tools would be an interesting

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14 OLIVETTI, 2012.

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option to search for items without having to do it manually and also, without the risk of unwillingly performing copyright violations by detecting electronic license tags. These would contain relevant information, such as the author and the license status, which will be addressed as operational cues by the device.

From a merely technical position, researchers are analysing the potential benefits obtained by the adoption of neural networks. This consists in the adoption of machine learning algorithms to process a considerably large volume of data understandable in its raw form for humans. The objective of this technology is to operate based on predictions with an adequate level of certainty.[15] For the metaverse this means that the user experience could be enhance by including updated preferences.

Regardless the important role that intelligent technology has for legal purposes in the metaverse it is important to establish that it will not replace humans entirely. As it has been stated in several documents, as it is the case of the Recommendations to the Commission on Civil Law Rules on Robotics (2015/2103 (INL)), intelligent technology does have the capacity to replicate human cognitive features, however its far from avoiding operational mistakes. This applies to manufacturers, owners, software developers, users, military commanders, etc. are held responsible for the actions of autonomous and non-autonomous devices and embonied and non-embodied technology in general. However, there is only one legal act that defines liability for damage generated by works is the Council of Europe Directive 85/374/EEC, on the approximation of the laws, regulations and administrative provisions delivered by Member States related to liability for defective products.[16] It is worth mentioning that the lack of regulation regarding the use of AI in the commission of crimes, is simply because it is still considerable an extension of human conduct. The planning of a criminal action can be directly linked to an individual, which made the required set up for the device to perform in a given manner, *(mens rea)*. Consequently, the bond with the human element, whether it is the designer or the user, needs to be established in order to produce a criminal consequence.

One of the most relevant proposals to avoid or at least, to diminish potentially unlawful behaviour by AIs is to embedded ethical principles

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15 KOSTENKO, 2022, pp. 3.

16 EUROPEAN UNION, 1985.

since their design stage. The "human in the loop" approach is also a suitable option to assist the AI in cases where its proposal is not satisfactory enough. In here, the last decision is left to a human user who performs a role similar to a supervisor. This approach, however, may lead to a reduction in operation efficiency, causing the system to operate slowly. This last position will be developed in the following section.

2.4. The complexity of the collaboration between automated devices and humans in the metaverse

Without a doubt, artificial intelligence will play a major role within the Metaverse. This opens a wide scenario of potential applications most of which will be complemented without human intervention. Yet, there are certain scenarios, that cannot be entirely delivered by machines and that they require human intervention. This collaboration is usually productive, increasing operative certainness and increasing the number of cases that the same AI can attend.

To decide to which degree human and machine should interact can be complex. There are considerations relating to fairness and how a wrongly designed algorithm can influence in the decision making of the device. This bias issue has long been present since the early days of AI implementation into human settings and a wide variety of proposals have been presented. The real answer is to maintain close contact between the supervising human expert and the system.

In the metaverse, AIs will perform tasks that still require human interaction to be fully performed. In the case of a sales contract performed on this platform, the algorithm would be in charge of searching the item, locating it and selecting it. However, the contract should not be executed without the explicit consent of the human element.

The majority of existing regulations were created during a period that precedes the development of these technologies, which rends them incompatible with this scenario. In other cases, legislators seem incapable to understand the scenario they are trying to regulate. This is the case of the Mexican bill to update the Federal Law of Telecommunications and Broadcasting[17], which

17 FORBES, 2021.

allows the interception and even closure of the service if the authority conceives the service does not comply with the law. Due to its complexity, the metaverse is likely to experiment the same phenomena.

In the following section, the relation between the traditional regulative efforts and the metaverse will be delivered.

2.4.1 The complexity of the collaboration between automated devices and humans in the metaverse

As mentioned in section 1.3, most of the norms and legal schemes aimed to regulate the metaverse are designed as an equivalent of the physical world and are corporate it nature. Nowadays, a migration of moral values is currently taking place towards this platform by its users. This practice obeys two main factors: first, users are bringing their social customs to the metaverse. Second, the lack of state representation (its presence is not likely to be soon) on this platform forces them to implement parallel measures.[18] This complexity requires the general recognition and later adoption of fundamental regulatory elements, to define basic legal elements such as jurisdiction and boundaries for users.

The development of legal regulations for the metaverse aim to answer fundamental issues related to this technology, such as identification procedures, copyright, property rights, liability for damages and to include a list of crimes. Some current laws do deliver a certain degree of certainty, but in the majority of the cases their implementation is either narrow or ambiguous, having little to no effect in thse kind of scenarios. This has led to theIt is then stated that a degree of homologation is required within digital scenarios, including the metaverse. The law for this environment should be developed having in consideration electronic jurisdiction, universally accepted and with a defined position in relation to defining the applicable jurisdiction and define method to solve legal disputes as an *ex ante* measure.

This development requires a collaborative approach, where the law and information technologies work together to properly understand the social dynamics that would occur on this platform. Additionally, this approach

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18 KOSTENKO, 2022, pp. 11.

should benefit itself from its technical capacity: along with the already proposed preventive approach by intelligent devices, mediation should be considered when two or more of them enter in conflict. Along with this, the development of standardized regulative bodies should be implemented. These proposals should be implemented reasonably, allowing the continuity of development and the generation of knowledge proper of the metaverse.

Regardless the complexity of this effort, the creation of such proposal is a priority. Depending on traditional legal approaches, this would not only mean that actions occurred in this platform may not be compatible with the description within the law. It also mean that courts would be overload with cases that legal operators may not be capable to properly understand, negatively impacting on the quality of their resolutions and unnecessary extending legal processes.

2.4.2 Privacy on the metaverse: A main concern

The experience offered in the metaverse allows a user to properly displace around a virtual area. Then, the avatar may go to a public zone, i.e. the town square or to a social gathering. This feature aims to replicate the freedom that a regular person has in most societies nowadays. However, this posture results incompatible with configuration of this digital platform. First, a user can explore a particular zone without the necessity of locating his avatar there by simply moving the camera it is possible to know not only the characteristics of a given zone, but also who is there. Such feature could be used to spy or stalk other players and it can even be attach to other avatars without the consent of their holders, leading to privacy intrusions.[19] Of course, this description follows the operative aspect of online services presented as mere games, with considerable less impact on real life. However, the propose version of the metaverse aim to deliver exactly the opposite, allowing actions to properly replicate on physical environments. This rises security concerns and the need to define the mechanics to access personal data, its use for later purposes and whether their effects should transcend beyond these services.

Due to its operative nature, it is important to recognize that monitoring user's profiles, results to a certain degree desirable. Here, developers require

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19 LEENES, 2009, pp. 125.

real-time tracking to simulate realistic virtual interactions. However, providers should only be allowed to posses this data for short periods of time and then, erase it. The objective of this is to reduce profiling behaviours thus, providing a degree of privacy.

From a security position, it is considered necessary to confirm the identity of the user before delivering access to certain applications and services in the metaverse. This methodology will depend on the developer and the market approach implemented by the owners. In this context, traditional approaches like asking textual passwords are incompatible with the dynamic nature of the metaverse, where a multitude of digital objects may be of interest for the user. To avoid this, it is proposed the adoption of personal options like including a digital tag within the avatar that contains relevant permits. Besides eliminating the need for constant one to one confirmation, it would be relatively easy to increase o decrease the number of licenses contained there and it will be non-transferable. These activities and interactions will not necessary be erased from the metaverse. This is a major security concern, since it may lead to leakages or to scenarios where the data is compromised.

Due to the level of interaction and the kind of experience offered by the metaverse, personal and affective actions will be detected and used to enhance the user experience. In this sense, facial expressions, vocal inflections and even vital signs (these ones captured through accessories such as smart watches), will be provide sensitive information to developers without the explicit consent of its owners. To prevent this, legislation should be designed to limit the scope of *emotion-responsive advertising*[20].

Additionally, marketing will be placed as a regular element of the metaverse environment. This, with the objective of having a low profile that will allow users to unwillingly include it into their daily routine. The effect of this approach can go from acquiring specific products, political manipulation, disinformation and other forms of socially destabilizing forms of promotion. In this particular case, regulation seems to be the best *a prior* approach to prevent these abuses. Service providers and platform administrators should be required to present the type of advertising they will be inserting into their scenarios. Moreover, they should also define the cues that such information will have, so the users can identify them

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20 ROSENBERG, 2021, pp.8.

and properly navigate around them. Additionally, the insertion of artificial agents for marketing purposes should be regulated. Due to the nature of the metaverse, users should be capable of identifying when they are socializing with these developments to avoid being misled. This can be achieved by delivering identifying elements, which would allow users to distinguish artificial agents from other users.

Regardless the importance of advertisement as a source of income for metaverse companies, it should be notice its potential to produce privacy concerns. Advertisement companies rely on data processed by third parties, which operate on independent processing schemes. This may lead to potentially harmful situation for data owners whose information may be in possession of different parties. A proposal for this, relies on creating official channels and policies for data gathering purposes. Data mining services should operate following these provisions, which should be provided by a given metaverse service.

2. Conclusion

The meteverse is technological development that aims to permanently impact social life. Unlike its early versions, current metaverse platforms aim to expand the activities and interactions users could do as part of their services. Nonetheless, the technical aspect of this development may produce potentially unwanted legal violations by both, developers and users. This since the metaverse, in order to deliver an experience closely based on the user's preferences, may recur to gather data through approaches that go beyond the platform itself. In this case, it is not unlikely to state that these processes will support themselves through other devices or by mining data without the explicit authorization of the user.

Other legally relevant scenario is derived from the interaction between members of these services. Social interaction is a crucial aspect of the metaverse that can enhance positive attributed but also negative ones. It is important that service administrators set a series of ethical rules that all participants will follow. Additionally, surveillance is a key element that should be enforced on metaverse services.

This approach should be inserted depending on the relevancy of a given topic or scenario to avoid any unnecessary harm to the legal sphere of the users. Additionally, it is important to establish that the metaverse is by

no means a static environment on the contrary, it is in constant evolution, shifting from social to a revenue environment that changes legal priorities. In this case, the legal sector requires a dynamic position to be able to provide an adequate level of protection to users and service providers as well.

Besides the inevitable need to create new legal figures and to adapt traditional ones, this environment needs to include in its operational design particular ethical/legal principles that would allow to operate lawfully. This will not be a definitive answer, since users in the metaverse as their counterparts in real life, will be allowed to interact in ways that not necessary are law compliantly. The main challenge for the legal sector in the metaverse goes beyond regulation, it is about to prevent that those unlawful conducts occurred in this platform would expand to physical scenarios, becoming a real threat for society.

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RESUMO: o metaverso é um microcosmos onde os usuários interagem com seus pares de formas que não necessariamente replicam seu comportamento em cenários tradicionais. No entanto, esse ambiente traz uma série de desafios para o direito, o que requer uma nova perspectiva para regulá-lo adequadamente e coibir potenciais ações ilícitas. Esta colaboração afirma que precisa de se adaptar às particularidades técnicas desta plataforma para a regular adequadamente, reformulando os elementos jurídicos tradicionais. Além disso, é proposta uma comunicação mais próxima entre os setores jurídico e computacional, principalmente durante a fase de projeto, para evitar a operação ilegal desses ambientes.
Palavras-chave: metaverso, regulação digital, inteligência jurídica artificial.

ABSTRACT: the metaverse is a micro-cosmos where users interact with their peers in forms that not necessary replicate their behaviour on traditional scenarios. Nonetheless, this environment poses a series of challenges for the law, which requires a new perspective in order to properly regulate it and deterrent potential unlawful actions. This collaboration states that needs to adapt to the technical particularities of this platform to properly regulate it, reshaping traditional legal elements. Additionally, a closer communication between the legal and computational sectors particularly during the design stage is proposed to avoid unlawful operation of these environments.
Keywords: metaverse, digital regulation, artificial legal intelligence.