

César FIEIRAS-CEIDE

University of Santiago de Compostela, Spain. cesar.fieiras.ceide@usc.es. <https://orcid.org/0000-0001-5606-3236>

Verónica CRESPO-PEREIRA

University of A Coruña, Spain. veronica.crespo@udc.es. <https://orcid.org/0000-0001-7373-7204>

Miguel TÚÑEZ-LÓPEZ

University of Santiago de Compostela, Spain. miguel.tunez@usc.es <https://orcid.org/0000-0002-5036-9143>

Innovation and metaverse: first experiences and use cases in European Public Service Media

Innovación y metaverso: primeras experiencias y casos de uso en los medios públicos de Europa

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Abstract

This study seeks to provide a comprehensive overview of the first approaches and the current relationship of public service media (PSM) with the metaverse, analysing the perceptions of these broadcasters with regard to their real usefulness in approaching young audiences, and the development of new environments for the shared consumption of information and entertainment or Immersive Social Spaces (ESI). It also delves into the nature and characteristics of the first experiences and projects, their usefulness, purpose and performance. To this end, 19 in-depth interviews are conducted with senior management professionals linked to the technology, innovation or strategy sections of 15 public broadcasting corporations, including those in Germany (ARD and BR); Austria (ORF); Belgium (VRT); Denmark (DR); Spain (RTVE); Finland (YLE); France (France TV); Great Britain (BBC); the Netherlands (NPO); Ireland (RTÉ); Italy (RAI); Portugal (RTP); Sweden (SVT); Switzerland (RTS), and the EBU. A four-level implementation scale is formulated to frame the position of the broadcasters studied, finding that the degree of implementation and interest differs substantially among the corporations, with none of them reaching the maximum level of the proposed scale and most of them still at the preliminary level. It is concluded that the metaverse is not a priority for most of the cases analysed, and that the first approaches are focused on entertainment content and formats and on sports and cultural themes. The metaverse is largely used to recreate scenarios that are difficult to access or past experiences, as well as to generate digital twins in which corporations bring their structure closer to citizens and enable them to interact with them.

Keywords

Innovation; metaverse; public service media; extended reality; artificial intelligence; marketing.

Resumen

Este estudio trata de ofrecer una panorámica completa de las primeras aproximaciones y relación actual de los medios de servicio público (PSM) con el metaverso, analizando las percepciones de estas emisoras con respecto a su utilidad real para la aproximación a las audiencias jóvenes, y el desarrollo de nuevos entornos de consumo compartido de información y entretenimiento o de Espacios Sociales Inmersivos (ESI). También se profundiza en la naturaleza y características de las primeras experiencias y proyectos, en su utilidad, finalidad y rendimiento. Para ello se realizan 19 entrevistas en profundidad a profesionales de alta dirección vinculados a las secciones de tecnología, innovación o estrategia de 15 corporaciones de radiotelevisión pública de Alemania (ARD y BR); Austria (ORF); Bélgica (VRT); Dinamarca (DR); España (RTVE); Finlandia (YLE); Francia (France TV); Gran Bretaña (BBC); Países Bajos (NPO); Irlanda (RTÉ); Italia (RAI); Portugal (RTP); Suecia (SVT); Suiza (RTS), y de la EBU. Se formula una escala de implementación graduada en cuatro niveles en los que se enmarca la posición de las emisoras estudiadas, identificando que este grado de aplicación e interés difiere drásticamente entre las corporaciones, sin alcanzar ninguna de ellas el nivel máximo de la escala propuesta y localizándose la mayoría de ellas todavía en el nivel preliminar. Se concluye que el metaverso no es una prioridad para la mayoría de los casos analizados, y que las primeras aproximaciones se enfocan a contenidos y formatos de entretenimiento y a temáticas deportivas y culturales. Se recurre al metaverso para recrear escenarios de difícil acceso o experiencias pasadas, también para la generación de gemelos digitales en los que las corporaciones aproximan su estructura a la ciudadanía y les permiten la interacción con ella.

Palabras clave

Innovación; metaverso; medios de servicio público; realidad extendida; inteligencia artificial; marketing.

1. Introduction

The metaverse is perceived today as an instrument with the potential to promote innovation in the media and reformulate part of the relationship between the media and their audiences, thus, implementing it in public media can help overcome the barriers to reaching young audiences far from their services. Therefore, this research project delves into the first approaches or experiences by Public Service Media in virtual environments, trying to specify the nature and characteristics of these first projects and the real interest or usefulness perceived by the professionals of these corporations.

Innovation refers to the process of generating and applying new ideas, techniques, products or technologies in order to improve and progress in various areas of companies, organizations and societies as a whole (García-Avilés et al., 2023). The gradual implementation of the metaverse or extended reality technologies in people's lives can have a notorious social impact, providing possibilities for immersion and experimentation, but with the risk that this fictitious proximity may end up distancing citizens from behaviors or habits with greater physical interrelation. It is therefore essential that its use is intended for the benefit of users, generating added value, and in the case of *Public Service Media (PSM)*, to complement its offer with new immersive and interactive formats, to recover past or distant events and experiences, or to solve spatial, capacity or logistical limitations.

Innovation has been considered a key element of the public value strategy of Public Service Media (Cañedo et al., 2024), linked to the use of technological tools, such as the metaverse, to optimize the content production process, as well as to the design of new business models adapted to the digital context (García-Avilés et al., 2023). Innovation is of relevance for any company as it enables its survival and growth in a constantly changing and highly competitive environment. However, the innovative process should focus on users, not merely on technology; strategies should be oriented towards the implementation of technologies without forgetting the promotion of concrete actions to encourage audience participation (Donders & Direito-Rebollal, 2023).

The current scarcity of research projects and academic reports that analyze in detail the media's early forays into virtual worlds could be matched by the trend observed among Public Service Media outlets around the creation of metaverse proposals or initiatives. Although these initiatives are at an early stage of development and implementation, they reflect a growing interest on the part of operators to consider and implement metaverse-related strategies.

Although the metaverse is going through a phase of uncertainty, it is possible that the XR (extended reality) model will contribute to the implementation of the immersive web, so experts suggest that the media be attentive to the development of metaverse and as a strategy implement some immersive experiences in those spaces that bring value to users. It is worth remembering that it is Generation Z and Alpha that are the main expected users of the metaverse in the next decade, given their current consumption of platforms such as Minecraft, Fortnite and Roblox. Reports point to a gradual adoption of the metaverse until 2025, with the expectation that by 2026 success stories will already be observed in the media sector, taking advantage of its potential for product commercialization and revenue generation (García-Avilés, 2023).

The main objective of this research is to provide a complete overview of the first approaches and current relationship of the PSM with the metaverse, which includes both the perceptions of corporations regarding the usefulness of its use and implementation, as well as whether they consider its incorporation to renew and reposition their digital proposal and the relationship with their audiences. It also delves into the nature and characteristics of the first experiences and projects, their usefulness, purpose and performance.

To this end, interviews are conducted with 19 senior management professionals linked to the technology, innovation or strategy sections of 15 of Europe's leading public broadcasting corporations and these pioneering projects are analyzed. The research questions guiding this study are as follows:

Q1. What are the perceptions of these corporations with respect to the metaverse and how do they conceive its potential usefulness and benefits for their current and future proposal?

Q2. How does the PSM consider that the metaverse can help them to reposition themselves in the sector, generate added value for their audiences and approach young audiences (16-25)?

Q3. Is the metaverse really a concept that the PSM takes into account to execute an immersive social innovation?

Q4. What level of importance does the metaverse have in the strategic line of these corporations and what degree of implementation do they show?

Q5. What are the first experiences of public media in Europe in the Metaverse? What is their objective, origin, operation and performance?

2. Theoretical framework

2.1. Metaverse and virtual worlds in the communication industry

Although Mark Zuckerberg's announcement of his metaverse project was made on October 28, 2021, generating considerable media buzz and widespread social awareness of the term, the origin of the metaverse concept dates back to 1992, when it is introduced in the science fiction novel *Snow Crash*. In addition, another novel entitled *Avalanche* mentions complementary elements for virtual humans, endowing, from the narrative, resources and infrastructure to the virtual universe (Wang et al., 2023). Virtual experiences have also been the subject of academic literature. In 1995, the first publication related to metaverse appeared in Scopus and in 1998, the first in Web of Science. In the initial publication stage, the articles are linked to arts and literature (Wang et al., 2023). However, the development of metaverse is necessarily linked to technological evolution, and certainly the first articles on the topic are approached from computer science (Crespo-Pereira et al., 2023).

Metaverse is defined as "a network of digitally mediated spaces that immerse users in shared, real-time experiences (Hadi et al., 2023: 143). The term comprises a set of elements that help to understand the phenomenon in its entirety: 3D virtual spaces (spatial element) of an interoperable nature (between various platforms and ecosystems and devices) mediated by digital technology (VR, AR, MR...) that enable immersiveness to different degrees (according to the technology employed: PC; VR, AR, IoT devices...), as well as the ability of users to socialize in real time and to participate and develop commercial activities of their own (Diwedi et al., 2022; Hadi et al., 2023; Lu & Mintz, 2023; Schöbel & Leimeister, 2023).

The Internet is the first technology necessary for their existence. At the beginning of the 21st century, the development of virtual reality and computer graphics in the form of video games laid the foundations for metaverses. In 2021 Roblox incorporates the term metaverse and goes public with very positive results; the metaverse debate continues. Today, the convergence of extended reality (XR), BCI (*brain computer interface*), video games, artificial intelligence, security and safety technologies and the internet infrastructure needed for metaverse, 5G/6G, IoT, VR viewers or cloud computing, among other advances, will enable the metaverse at its most advanced stage (Wang et al., 2023).

The metaverse will provide new ways to tell stories, moving from *storytelling* to active immersion through avatars that interact with the content. Although it is already possible to experience it on devices such as PCs and smartphones, the extended reality (XR) resulting from the combination of augmented and virtual reality will foreseeably be the main driver of the metaverse (García-Avilés, 2023).

Although there are still technological challenges to be overcome for the development of metaverse in its most complete version (Web 3.0 philosophy), it is expected to empower users and redefine the company-user relationship (Table 1). The decentralization of platforms will make it easier for players to create their own content and monetize it (McKinsey, 2022). This opens a great debate on the role of the media company in this new context, where competition does not come from other operators but from independent users with the capacity to act as media, create loyal communities and offer closer experiences with their audiences.

Table 1: Web 2.0 and Web 3.0 characteristics

Features	Web 2.0	Web 3.0
Examples of virtual worlds	Second Life Roblox Fortnite World of Warcraft	Decentraland The Sandbox Somnium Space Cryptovoxels
Organizational structure	Centralization Decisions are based on adding value for shareholders	Governed by the community, usually through a decentralized autonomous organization (DAO). Native tokens. Participation in governance. Decisions are based on user consensus.

Features	Web 2.0	Web 3.0
Data storage	Centralized	Decentralized
Platform format	PC/console Hardware VR/AR Mobile/app	PC/console Hardware VR/AR Mobile/app (to come)
Payment infrastructure	Traditional payments (credit/debit card...)	Crypto wallet

Source: adapted from JP Morgan (2022)

A transition period of 4-5 years is expected between the use of current devices and fully immersive experiences, where the media will play a crucial role in educating audiences through the use of existing screens (García-Avilés, 2023).

Although the metaverse has a gaming component, the social aspect has a great depth in its conception. In this sense, the media should develop products that encourage socialization and the creation of valuable experiences for new generations, through games, co-creations and branded content formats that incorporate narratives and immersion in AR and VR (García-Avilés, 2023). Metaverse opens opportunities in the sphere of experiences and *engagement* (Barta et al., 2023) that positively impact the recall of content and brands. So much so that video game platforms (Fortnite, Roblox...) are incorporating social experiences in the form of events (concerts) and shopping spaces. Video game players find it highly attractive to attend live events (concerts, sports, festivals, museums and watching movies) and make purchases in these environments (McKinsey, 2022). Studies estimate that by 2030 more than 50% of live events will take place in the metaverse (McKinsey, 2022).

One of the big challenges for the media when integrating into the metaverse is to transform the expectations of the TV consumer who is used to a 2D experience away from gaming environments (CSI Magazine, 2022). Engaging in native 3D approaches requires a lot of effort that the media are not willing to undertake according to the Reuters Institute report (Newman, 2023). Most publishers say that there is less interest in developing applications for the metaverse (5%) versus formats such as podcast and digital audio (72%) due to the difficulty in identifying use cases. However, in 2024 the trend could be reversed, as experimental interfaces are closer thanks to the improved user experience with AR and VR glasses.

This will deepen their potential for journalistic and narrative use. Content distribution formulas will also benefit from the development of new tools (Newman, 2024), by speeding up the creation process and allowing new standards such as Web XR to make it easier for content to be published once and to be accessible through various devices: smartphone, Apple Vision Pro (Newman, 2024). Press initiatives in the face of the metaverse phenomenon are diverse. Newspapers such as The New York Times have created 3D and immersive experiences in relation to NASA's InSight mission to Mars, among other actions (Newman, 2024). It is also worth mentioning the creation of a correspondent in the metaverse by the media outlet El Economista (Lorenzo, 2021).

Although the scientific literature is scarce regarding the uses of metaverse in media industries (Crespo-Pereira, et al., 2023), according to the consulting firm McKinsey (2022), the main initiatives already implemented are related to marketing campaigns; product design or digital twins and events or conferences. Media and entertainment will devote a significant portion of the digital investment budget to the metaverse (15%) between the next three and five years (McKinsey, 2022).

Additionally, the Academy has addressed potential uses for the media industry in relation to: the collection, analysis, and interpretation of biometric data that facilitates the creation of personalized data-driven experiences (Diwedi et al, 2022); the use of alternative displays and augmented reality holograms for television viewing (Lu & Mintz, 2023; Rauschnabel et al., 2022); the possibility of monetization of new products (Park & Kim, 2022); in addition to opportunities for branding, enhanced awareness, and advertising space management (Rauschnabel et al., 2022).

The media are now competing for the attention of platforms such as Fortnite and Roblox, which have loyal audiences thanks to content that meets the demands of today's young people. For their part, public operators, legitimized by their social value, must transfer their mission to educate, inform and entertain to any content they produce across the full range of existing platforms. In virtual worlds, public broadcasters must also ensure the existence of safe spaces for children and young people by including

quality educational and informative content (Medina-Laverón & Ojer-Goñi, 2011). This represents an additional challenge to that assumed by other media in their entry into the metaverse.

Immersive 360-degree content could become products of social interest thanks to the inclusion of holographic videos in mixed reality. The case of the BBC's "The Green Planet" project provides, through augmented reality, new narrative possibilities and viewing experiences (CSI Magazine, 2022). Some technology companies are already exploring these options and, certainly, television networks are well suited to implement these digital experiences in line with their values. However, the isolated use of extended reality technologies, without the additional elements discussed above, means that the development of metaverse experiences by public television is in an early stage of development.

2.2. Strategic and technological innovation in Public Service Media

Since the arrival of the main Video on Demand (VOD) platforms in the media sector, there have been profound changes in the industry that directly affect consumption habits, financing models and production and distribution priorities and dynamics. In this renewed digital context, Public Service Media must plan growth and repositioning strategies that are closely conditioned by the reality of their respective countries, the regulations in force, as well as by cultural factors such as the level of acceptance of PSM in each territory (D'Arma et al., 2021).

Innovation is articulated as the strategic driver of Public Service Media for the renewal of their structure and catalog of services, with a fundamental role yet to be played (Habermas, 2021), for which they need, at least, to maintain budget levels due to increased private competition (Donders, 2019). In this sense, in order to make their services compensate, add value and be relevant to their audiences, they must focus on reinforcing their characteristic public value, although this must translate into a significant contribution to society and not a mere marketing tool (Puppis & Ali, 2023).

It is in the implementation of new technologies where the PSM must show its ability to keep up with the competitive pace of private operators through qualitative and differential contributions. Artificial intelligence will be a protagonist in the media sector, however, a diverse panorama is identified in the use of AI in Public Service Media, with a leading group of corporations demonstrating more innovative attitudes and investing larger budgets in this concept (Feiras et al., 2022). The same is true with respect to proposals for content personalization or recommendation for which European public broadcasters have not followed the same roadmap when building or acquiring their algorithmic recommendation systems, varying between acquisition from third parties and elaboration by their own workers (Feiras et al., 2023), which is subject to the difficulty expressed by corporations to incorporate professionals specialized in AI (Feiras et al., 2023).

The linear one-to-many conversation continues to exist, but PSM explores another innovation path based on the establishment of an active bidirectional conversation from which value contributions from users derive and can crystallize in content co-creation actions (Vaz et al., 2021). This co-creation process finds an ecosystem conducive to its implementation and optimization in immersive social spaces (ESI), which consist of virtual worlds in three dimensions and accessible through virtual reality in which users can interact with each other, play, debate and share content represented in their avatars (France Tv, 2022).

In these spaces, extended reality (XR) technologies make their way and allow the recreation of events, facts and situations that otherwise could not be retrieved by the media. All these technological expressions are part of the strategic foresight of the PSM and are integrated as key elements in the development of metaverse projects.

3. Methodology

This research explores the possibilities offered by the metaverse to the public media sector in Europe for the approach to young audiences and the development of new environments of shared consumption of information and entertainment or Immersive Social Spaces (ESI). It was decided to work on the experiences of PSM in metaverse as these environments are considered as a possible solution to the difficulty of these media to establish stable and relevant relationships with new audiences usually far from their services. For this purpose, this study is proposed as an exploratory descriptive study with a blind hypothesis and the following main objectives are set:

Objective 1: to determine the real usefulness, possibilities and benefits currently offered by the metaverse to the media, as well as the perceptions of professionals linked to these technological proposals in corporations.

Objective 2: to determine the level of importance given by the main public broadcasters in Europe to the metaverse within their strategy and the current level of implementation.

Objective 3: to learn about the experiences and metaverse projects developed by these corporations so far two years after the announcement of the concept by Meta.

To meet these objectives, qualitative methods were used and in-depth personal interviews were conducted with the directors of innovation, technology or strategy responsible for managing metaverse initiatives in 15 of the main public broadcasting corporations in Europe. Thus, the sample is made up of public broadcasters from Germany (ARD and BR); Austria (ORF); Belgium (VRT); Denmark (DR); Spain (RTVE); Finland (YLE); France (France TV); Great Britain (BBC); the Netherlands (NPO); Ireland (RTÉ); Italy (RAI); Portugal (RTP); Sweden (SVT); and Switzerland (RTS), and from the European Broadcasting Union (EBU) .

The interviews were conducted in two rounds through Microsoft Teams between May 20 and December 20, 2023, with an average duration of over 30 minutes and in English, except in the case of RTVE. In the first of the meetings with each professional, the main volume of information was collected, while in the second round, details of the information collected were clarified and other notes of interest were completed. The Atlas.ti software, version 9.1.7 designed for the Windows operating system, was also used to carry out the content analysis, which was developed in four successive stages: 1) Acquisition of information through the transcription of the interviews; 2) Coding of the data; 3) Thematic identification of the information collected associated with each of the aspects linked to the objectives; and 4) Conclusion with the interpretation of the results obtained. It is important to emphasize that explicit authorization was obtained from the sources to divulge their statements in a non-anonymous manner.

A purposive convenience sample was selected and expanded using the "snowball" method based on the assessments of the interviewees, and a second round of questions was completed to clarify details of the information gathered. To this end, we worked with a semi-structured questionnaire whose main blocks were the degree and level of implementation of each corporation, the perceptions of professionals on the usefulness and real benefits of these environments, the operation and origin of the metaverse experiences developed so far by these broadcasters, and their future forecasts regarding the importance of these spaces in their strategic proposals.

Thirty-five contacts were made and finally a sample of 19 professionals from 15 corporations belonging to the three media models described by Hallin and Mancini (2004) was validated. Among these 19 professionals, a significant gender imbalance was identified (16 men to 3 women), reflecting the fact that technological initiatives in public media still have an important male managerial component.

Table 2 below shows the final panel of interviewees participating in the study.

Table 2: Purposive convenience sample

Abbreviation	Professional	Corporation	Post
(CR/ARD)	Christian Radler	ARD-Tageschau	Strategy and Innovation. Research and Development Director
BT/BBC)	Bill Thompson	BBC	BBC Research and Development
(UK/BR)	Ulrike Köppen	BR	Head of AI + Automation Lab Co-Director of BR Data
(SS/DR)	Sofie Sand Romsdal	DR	Head of Product Management
(PS/EBU)	Paola Sunna	EBU	Director of Projects, Technology and Innovation
(KB/France TV)	Kati Breme	France TV	AI Insights Director
(BV/NPO)	Bob van de Velde	NPO	Data and Personalization Manager
(DK/NPO)	Daan Kruijs	NPO	Machine Learning Engineer
(EV/NPO)	Egon Verharen	NPO	Innovation Director
(KP/ORF)	Karl Petermichl	ORF	Director of Distribution and Governance
(GA/RAI)	Gino Alberico	Rai	Innovation Director

Abbreviation	Professional	Corporation	Post
(GC/RTÉ)	Conrad Gouws	RTÉ	Technical architect
(GM/RTP)	Gonzalo Madail	RTP	Innovation Director
(LB/RTS)	Léonard Buchet	RTS	Head of Digital Data and Archives
(DC/RTVE)	David Corral	RTVE	Innovation Manager
(JL/SVT)	Johan Linden	SVT	Innovation Director
(GY/VRT)	Gregg Young	VRT	Snackbar Video Manager
(TK/YLE)	Timo Kämäräinen	Yle	Online Executive Producer. News and current events
(WA/YLE)	Wesa Aapro	Yle	Metaverse Leader. Yle Innovations Department

Source: own elaboration

The methodological triangulation is achieved through the review of corporate releases and internal reports of the corporations to analyze the presence of the metaverse concept in their priorities or interests. These documents were mostly located through a tracing in the corporate releases section of these media, although in other cases it was the interviewed professionals themselves who shared internal documents of interest for the research. We also observed their social networks and proposals in virtual environments through an initial review at the beginning of the research and a permanent monitoring of these channels to detect and analyze cases of use, the functioning of these projects and their usefulness, as well as to check the validity of the information collected.

4. Results

4.1. Possibilities of PSM for immersive social innovation in the Metaverse

Since Mark Zuckerberg announced the Metaverse concept on October 28, 2021 through a virtual Facebook conference, all the productive sectors with a digital presence have included in their roadmap the monitoring of the benefits emanating from these new virtual scenarios. In the case of the media, this journalistic tool is conceived as a proposal for innovation that will be able to bring citizens closer to real remote places with restricted access, such as France TV's initiative to allow viewers to play a virtual tennis match at the Roland Garros tournament in Paris, or to environments that did not exist until now. However, the initial hype following the presentation of the Meta brand has faded, and the professionals interviewed say that this expectation has not translated into immediate results in its first two years of operation, slowing down the implementation times initially expected by the population.

In the case of the 15 public broadcasting corporations consulted, they agree that PSM should be positioned in those spaces where their audiences are located, so that when the metaverse offers relevant services and has a real impact on citizens, they will multiply their efforts to enhance their virtual proposals. However, most of the analyzed media do not see the metaverse as a safe value at the moment, which limits current investments. For the Belgian corporation VRT, the role of the media in the metaverse to inform, inspire and transmit culture will be crucial, but they understand that any prediction is currently purely speculative and will need more time to settle in.

The barrier to entry for users to virtual worlds remains high. Device costs, autonomy, content quality, creator diversity and access to the digital economy are major obstacles, and while generative artificial intelligence adds a new dimension to the market, making codeless creation of 3D content an imminent possibility, the public service broadcasters involved in this research face the challenge of targeting the entire population with cultural, social and generational diversity in mind, with audience segments that are still strong advocates of linear television.

All these changes are taking place in a context where these corporations report limited budgets, forcing them to vary certain strategic approaches to pinpoint precisely which platforms the younger generations actually spend their time on, with the purpose of offering high quality content tailored to those platforms, exploring innovative methods of audience interaction and establishing a safe space for democratic discourse.

The first experiences of these media in the metaverse are based on new formats focused mainly on cultural and sports experiences, as they have identified that these are the most effective topics to generate added value for their audiences in these spaces. Interactive storytelling or the consumption of traditional formats, but within the Metaverse, are the first proposals that are being established and that can begin to alleviate the existing information fatigue, presenting new models of information representation, although their effective implementation is still in an initial stage.

Wesa Aapro, a member of Yle's innovation department and currently in charge of the corporation's Metaverse, was the first professional from a European PSM to hold a position strictly linked to this concept, which is due to the Finnish company's firm commitment to integrating it into its innovation proposal. For Aapro, virtual worlds are not having the expected success due to the original unrealistic expectation of transferring the entire human existence to these spaces, as proposed by the top executives of the development companies, which did not achieve the expected level of acceptance or adoption.

There is consensus in the analyzed PSM that both journalism and the public media themselves will play a relevant role in the metaverse if it is considered as a space for social immersion, similar to existing gaming platforms such as Fortnite, Roblox and Minecraft, where young generations not only gather to play, but to participate and interact through their avatars, which are augmented extensions of their own identities.

The professionals consulted point out that the news industry needs to use all the significant channels available to reach its audience, as may be the case of integrating synthetic media in all its varieties (text, images, videos or interactive material) into the metaverse, thus making it possible to create news experiences that are fully customized according to individual needs and preferences and without being tied to physical reality.

According to Karl Petermichl, Director of Distribution and Governance at ORF Austria, virtual worlds have an outstanding potential to start from scratch and overthrow traditional concepts such as the idea of gender, transactions, ownership and democratic processes. In this sense, there is the possibility for any user to adopt the position of creator and for news or reports to be created algorithmically by aggregation of collective creations and emotions, without the need for formal filtering, which encourages misinformation and is at the same time one of the main limitations for transferring journalistic work to the metaverse, together with the conservatism that has historically affected news distribution in the PSM.

4.2. Degree of importance and implementation of the metaverse in European public broadcasters

The 19 professionals interviewed state that within their corporations they are aware of the metaverse concept, monitor its progress and pay attention to possible specific tools that can be easily implemented in their structures, although more than half of these media (8 out of 15) state that they currently maintain a position of passive followers with reduced efforts, and 4 of the 15 corporations are in the development phase of a strategy or line of action in parallel to specific initiatives in an initiation stage. Only three of the companies studied (France Tv, Yle and VRT) report working more frequently on proto-metaverse initiatives, with tangible results and with a strategy or line of action already defined. From the EBU, Paola Sunna, Director of Technology and Innovation Projects, reinforces this idea by pointing out that only a few broadcasters are deploying virtual reality experiences and experimenting with gaming platforms such as Roblox, Minecraft and Fortnite.

Of the corporations that are devoting greater efforts and resources to the metaverse, France Tv is experimenting with the dissemination of attractive sports and cultural content through various virtual platforms, while VRT is working specifically on Roblox to find practical use cases in which aspects of the metaverse are already being implemented and in which it can have concrete results. In the case of Yle, the capital allocated to metaverse is not relevant in budgetary terms, but this does not prevent them from carrying out permanent experiments for young people in which they explore and successfully exploit these resources.

With respect to the 12 corporations that claim that the current importance of the metaverse for their strategy is low or nil, they predict that its hypothetical future implementation will coincide with the progressive level of adoption by society in general, which is yet to be defined. Most of these broadcasting companies have not yet worked on shaping the concept or integrating it into their structure, and most of them explain that their leaders have not made any pronouncements on the usefulness of the metaverse for their strategic future either, so the metaverse is not a current priority for most of the cases analyzed.

While at Rai the metaverse is occasionally linked to their movie content proposal, at RTS they explain that they are looking forward to how it can help them and how it can move forward, but in the background.

Gonzalo Madail, RTP’s innovation director, believes that virtual worlds will land in PSM through one-off successful initiatives, rather than through a corporate structural strategy. This is echoed by Egon Verharen, innovation director at NPO, who argues that fully immersive environments will take much longer to settle in than web3D-based environments that can be used on smartphones or other screens, mainly because of a distribution problem stemming from the need to purchase specific devices.

Both ARD and ORF state that they have allocated to AI most of the innovation resources that could be directed to the metaverse, which is coupled with the impossibility of establishing a real market value and identifying effective applications to deploy the necessary journalistic efforts. In the Austrian company they have the impression that large gaming companies and commercial companies will be the first to develop applications in the metaverse, while media proposals will come at a second stage as they have a strict mandate of efficiency and savings, so they are not in a position to use public money for risky tests or to be an “early adopter”. They also believe that in 2024 the metaverse will take on greater relevance when combined with AI and together evolve into a new scheme of digitization, entertainment, knowledge and business combined.

The public media should analyze whether the metaverse will have a strategic value in the loyalty and search for relevance for young audiences, and make a decision about the degree of implementation they assume in this regard. Based on the assessments and evaluations of the professionals interviewed, an implementation scale is proposed to situate the level of development of each corporation participating in this study. This scale ranges from inaction, reduced interest and superficial monitoring of the progress of the concept (low implementation); the design of strategies and concretion of future action plans, with timid practical approaches (incipient implementation); the consolidation of recurrent activities in proto-metaverse (Web 2.0) and metaverse (Web 3.0) with the digital replication of some of the station’s spaces (medium implementation), and a ‘high implementation’ level characterized by the creation of a digital twin of the corporation in the metaverse as a new distribution platform with a solid and constant offer inspired by the values of Public Service.

Table 3: Scale of implementation of the metaverse and virtual worlds in the media

Degree of implementation	Features
Under	Conceptual knowledge Inaction Reduced interest Surface monitoring of the concept
Incipient	Metaverse strategy design Practical initiatory approaches
Medium	Consolidation of recurring activities on third-party virtual platforms Digital replica of any of the corporation’s spaces or resources.
High	Own Metaverse Creation of a digital twin Solid and consistent supply

Source: own elaboration

Following the metaverse implementation scale formulated, Table 4 below shows the degree of application of the metaverse in each of the 15 corporations studied.

Table 4: Degree of implementation of the metaverse for European public broadcasters

Corporation	Degree of implementation	Corporation
ARD	Under	They focus their technological efforts on AI.
BBC	Incipient	They are developing the policy and determining general lines of action.
BR	Under	Their level of integration will depend on the democratization and usability of the linked devices.

Corporation	Degree of implementation	Corporation
DR	Under	They are in the process of becoming a fully digital corporation, so they believe that if the metaverse becomes relevant in the short term they will focus their efforts on it.
France TV	Medium	In exploration and experimentation phase. Development of new formats, mainly cultural and sports.
NPO	Incipient	First approximations. Expected growth over a 3-5 year period.
ORF	Under	ChatGPT and AI take the lion's share of the technology budget.
Rai	Incipient	First approaches through Rai Cinema.
RTÉ	Under	It is not a priority, they passively observe it.
RTP	Under	They believe it will come through a specific leading project rather than through a corporate structural strategy.
RTS	Under	They are waiting, without much interest.
RTVE	Incipient	First approaches through virtual concerts on Radio 3.
SVT	Under	No current interest.
VRT	Medium	They focus on proto-metaverse platforms such as Roblox to find practical use cases where aspects of the metaverse are already implemented and where they can have concrete results.
Yle	Medium	It is not important on a budgetary level, but they are constantly doing experiments on Metaverse for young people and exploring these resources.

Source: own elaboration

4.3. First experiences of the European PSM in the metaverse

The implementation of the metaverse in Europe's PSMs in the first two years since the launch of the concept by Meta is still in its infancy. The 15 media companies analyzed carry out a training distribution on this subject based on briefings, series or documentaries, which does not translate into a concrete offer of immersive interactive services in the metaverse for their audiences in most cases. This is reflected in the fact that in the proposed scale of implementation there is a predominance of low level of development and an absence of high level of integration.

More than half of the corporations in the sample have not planned any initiative linked to the metaverse nor have they recreated any part of their facilities or programs in virtual environments, being their closest approaches to this matter the coverage of *eSports* or *gaming*. The remaining corporations (Yle, France Tv, VRT, RTVE, NPO or Rai) have experimented in the creation of spaces, while the BBC signed an agreement with the specialized company Reality+ in May 2023 to create a metaverse experience in The Sandbox that they plan to premiere in 2024. In the case of the European Broadcasting Union (EBU), its Technical Committee created a working group called 'Media Technology in the Metaverse (Mediaverse)', in which they explore use cases on Web3, metaverse and NFT technologies for PSM.

At France Tv, the first test was carried out at the Beijing Winter Olympics in 2022, recreating the studio of the French broadcaster's sports program *Stade 2* as the first test of an Immersive Social Space (ESI). The initiative was developed by France Tv's Digital Innovation Department in collaboration with the French company specializing in the creation of virtual worlds VRROOM, and was available free of charge for use with virtual reality glasses and on PC via the VRChat virtual reality platform. The platform allows users to visit the *Stade 2* virtual studio, discuss current sports news and participate in activities such as ski racing, bobsledding, rifle shooting and treasure hunts.

The second of the French public broadcaster's tests, also related to the Stade 2 program, consisted of a collaboration with the French Tennis Federation to install the virtual set in the Roland Garros tournament stadium, next to the emblematic Philippe Chatrier center court. This space allowed users to visit various areas of Roland Garros and carry out activities such as playing on the center court itself against an opponent, tennis mini-games on the adjoining courts, a visit to the stadium museum, as well as attending daily meetings with journalists from the sports newsroom.

France Tv has also experimented with extending fiction storytelling to the virtual realm, which has a productive advantage since most modern fiction scenarios are already digitally created using software such as Unreal or Unity, so they can be easily transposed to a virtual reality experience. In the case of the French crime series Vortex, the main actor participated in the creation of an interactive investigation so that the viewer could assume the role of a detective and solve the crime. This actor gave up his voice, movements and facial expressions, which were captured and digitized to optimize the experience.

In Yle they focus their activity related to the metaverse in the realization of events in Roblox. The Finnish corporation has already organized three editions, the most successful being the one carried out in collaboration with the Finnish National Gallery, in which they established a musical cultural proposal with live performances to celebrate their independence day. They are currently in the development phase of a metaverse studio that will be intended for live discussion programs with the anonymity of avatars. They are also working on the prototype of a virtual correspondent in the metaverse who they anticipate could be a Roblox character or a virtual person.

The Dutch public corporation NPO has different lines of work with virtual reality and augmented reality. Strictly related to the Metaverse, it is developing three specific initiatives: MetaSarah, a virtual presenter who talks about technology through different channels; music events generated through the Spatial.io software, with which they reported different technical issues arising from the high system requirements; and RE:LIVE (VPRO), an online social event in a 3D world that allows users to re-experience a music festival after its physical celebration, which involves a joint release of festival content on demand in which through chat and other interactions the audience can come into contact with the attending avatars.

At VRT, they decided to integrate children's content into the metaverse, creating a world for children in which they share their PSM values in a playful way. They have also explored the concept of metahumans to create real avatars and experiment with them to create multimedia formats. For its part, the BBC plans to launch in 2024 a virtual world experience in The Sandbox where users will be able to interact with immersive content from the corporation's main brands, such as Top Gear and Doctor Who. Through this initiative, the British broadcaster will create a space for gamers to enjoy a continuous shared space in which to build, own and monetize their *blockchain* experiences.

Both RTVE and Rai have already taken their first steps in the metaverse, but with a lesser development than the rest of the aforementioned corporations. In the case of the Spanish channel, they have projected in an open virtual space some specials of Radio 3 concerts, the pilot experience being the one carried out with the group Carolina Durante. Rai has a metaverse for the Rai Cinema auditorium on The Nemesis, an Italian online 3D entertainment platform. In this space users can access a virtual environment with free movie content, experience *streaming* events and interact with iconic movie posters and objects. Table 5 below lists the metaverse projects developed by the main public broadcasters in Europe so far.

Table 5: Metaverse projects developed by public broadcasters in Europe and the EBU

Corporation	Metaverse projects developed
ARD	No projects so far.
BBC	With no current projects published, but with the anticipation of launching in 2024 a metaverse experience in The Sandbox where users will be able to interact with immersive content from its main series and programs.
BR	No projects so far.
DR	No projects so far.
EBU	They conduct studies on the advancement of these platforms in the industry. They also have an internal team working on 'Media Technology in the Metaverse (Mediaverse)', where they run a use case exploration on Web3, metaverse and NFT technologies for PSM.

Corporation	Metaverse projects developed
	First experience during the Beijing 2022 Olympic Winter Games. Recreation of the set of the Stade 2 sports program and possibility to participate in virtual activities and games.
France TV	Immersive experiences during the 2022 Ronald Garros tennis tournament in Paris, with the option for users to virtually play a match on the iconic center court and visit the museum or recreated facilities. Projects with culture and music: concerts and virtual events. Fictional narratives in virtual environments. Viewers were able to participate as detectives in the Vortex series and solve police cases.
NPO	MetaSarah: development of a virtual presenter to talk about the relationship between technology and human beings in various channels. Still in its initial stage. Musical event with virtual concert in a space generated by Spatial.io software. RE:LIVE (VPRO): live social event in a 3D world where people can (re)experience a music festival approximately one week after its physical celebration.
ORF	No projects so far.
RAI	Virtual space for the Rai Cinema auditorium on The Nemesis, an Italian online 3D entertainment platform. Possibility to experience streaming events and interact with iconic movie posters and objects.
RTÉ	No projects so far.
RTP	No projects so far.
RTS	No projects so far.
RTVE	Recreation of Radio 3 concerts in 3D for viewing with Meta Quest 2 virtual reality glasses and in 2D on Android devices through the Singulive application.
SVT	No projects so far.
VRT	Creation of a world for children in Roblox where they share their PSM values in a playful way. Meta Human: generation of real avatars, experimenting to make multimedia formats with them.
Yle	Roblox events to create shared experiences. Creation of a metaverse studio for live talk shows with anonymity through avatars. Metaverse correspondent (under development). It can be a Roblox character or a virtual person.

Source: own elaboration

5. Conclusions

The media industry is at a decisive point of reformulation of its dynamics, routines and strategies, in a scenario in which multiple possibilities, technologies, concepts and the irruption of large platforms converge. Innovation is articulated as the engine of change and the central axis on which broadcasting corporations plan the construction of their future version, which they project through incremental proposals in which they optimize their traditional processes, and disruptive approaches in which they work to renew, reposition and revolutionize their service offerings and the value attributed to them.

This research tries to shed light on an incipient issue such as the implementation of the metaverse concept by the main public broadcasting companies in Europe, especially to approach young audiences that are usually far from their services. The concept is known by all of them and is integrated into their monitoring agenda, although the level of implementation and real interest differs greatly from

one corporation to another, being outside the strategic priorities of most of them. This study manages to determine the nature, focus and functioning of these first initiatives, as well as the perceptions and interest of the professionals closest to the metaverse in each corporation, but it is limited by the scarcity of metaverse strategies or solid projects with continuity to extract a deeper reading of their implementation.

The commitment to the integration and development of metaverse initiatives is linked in most of the cases studied to the real relevance that virtual environments have for their audience groups, with the corporations stating that the investment in these environments, the efforts made and, consequently, the strategic interest in these digital worlds will grow in parallel to the importance they have for their audiences. This opens up a line of research that will be important to monitor, such as the follow-up of the participation and acceptance of the audiences, and whether this really translates into a proliferation of the PSM offer (Q1).

There is currently no generalized movement in PSM towards the metaverse, despite the fact that there are leading broadcasters in this field such as France Tv, Yle or VRT that consider the metaverse as a good opportunity to approach young audiences that usually do not frequent their traditional offer, and positively value the conversational, interactive and immersive possibilities offered by these environments, which generates an immersive social innovation by radically changing the position of the viewer, becoming an active subject who participates directly in the development of events and in the generation of value (Q2/Q3).

In this research we propose an implementation scale graduated in four levels in which we frame the position of the 15 corporations analyzed. Most of them (8 out of 15) are at the lowest level of implementation, still without real interest or direct application. Four corporations (RTVE, Rai, NPO and BBC) have advanced slightly, planning specific actions based on virtual environments and expressing a strategic approach at a preliminary stage. France TV, Yle and VRT (medium implementation) have worked more frequently and in greater depth on the concept, but it is not yet on their list of priorities and they have not yet recreated their own metaverse with a solid permanent offer, so none of the European WSPs is at the highest level of implementation of the scale formulated (Q4).

Finally, it is concluded that the metaverse has not yet been used as a channel or platform to project information content, at least in a stable or relevant way. The first experiences of the PSM in the metaverse are focused on entertainment contents and formats and on sports and cultural topics, without foreseeing in the short term a massive migration of information products or formats. So far, the initiatives proposed by the PSM of Europe in virtual environments have been punctual, with satisfactory internal results, but without a clear and immediate direct benefit, so it will be of interest to study in the next stage the evolution of these behaviors to anticipate the consumption and communication modalities that will settle in the global digital society, and if the public media manage to build a community of users around their initiatives in the metaverse (Q5).

6. Contributions

Task	Author 1	Author 2	Author 3
Conceptualisation	X	X	
Content curation	X		X
Formal analysis	X	X	
Acquisition of funds			X
Research	X	X	X
Methodology		X	
Project management	X		
Resources	X		
Software		X	
Supervision		X	X
Validation			X

Task	Author 1	Author 2	Author 3
Visualisation	X		
Drafting: original draft	X	X	
Writing: proofreading and editing	X		X

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9. Declaration of conflict of interest

The authors declare that there is no conflict of interest.

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