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ESCOLA DE DOUTORAMENTO
INTERNACIONAL DA USC

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Tese de doutoramento

Intelixencia artificial, innovación e novas tecnoloxías en medios de comunicación públicos e privados

Santiago de Compostela, 2024

Programa de Doutoramento en Comunicación e Información Contemporánea

ESCOLA DE DOUTORAMENTO
INTERNACIONAL DA USC

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INTELIXENCIA ARTIFICIAL, INNOVACIÓN E NOVAS TECNOLOXÍAS EN MEDIOS DE COMUNICACIÓN PÚBLICOS E PRIVADOS

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PROGRAMA DE DOUTORAMENTO EN COMUNICACIÓN E INFORMACIÓN CONTEMPORÁNEA

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Á miña avoa Ana,
polo seu amor incondicional

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Agradecementos

Sen estar eu afeito a este tipo de literatura, pretendo agradecer a todas aquelas persoas que me acompañaron en cada paso da miña formación persoal a medrar en todos os aspectos da vida. O maior agasallo que me levo de vós é a vosa compaña, o voso agarimo e apoio incondicional. No banal penso que está o transcendente, e a felicidade coido que se atopa aí, sen esperar moito máis que ter tempo de calidade con persoas que paguen a pena.

Por iso, síntome un auténtico afortunado. Teño unha familia á que quero con loucura; unhas amizades de anos coas que non deixo de vivir experiencias; e uns compañeiros e compañeiras de traballo brillantes cos que me enfrontaría a calquera novo reto. Se dentro duns anos o César do futuro revisa este documento e se seguen a cumprir estas últimas liñas, sentirase realizado.

A partir destes parágrafos poderedes ler a miña tese de doutoramento. Estou tranquilo ao saber que dei o mellor de min para preparala, sendo consciente da marxe de mellora que ten, e de que, máis que rematar un proxecto de investigación, comeza a partir de agora unha traxectoria que agardo que se estenda e me permita seguir aprendendo día a día para poder compartir ese aprendizaxe con outras persoas.

Gustaríame evitar mencións directas para non ser inxusto con tantas persoas que me acompañaron e me axudaron neste camiño. Por iso, antes de centrarme nos meus vínculos máis próximos, quérolle dar prioridade a todas as miñas amizades, familiares, persoal da universidade, compañeiros e compañeiras de departamento, profesores que me formaron ao longo da miña vida e a calquera persoa que achegase o seu gran de area para construír unha mellor versión deste individuo.

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Se fago mencións concretas, o maior recoñecemento débovolo a vós, mamá, papá. Creo que conseguistes educar a unha boa persoa, e teño a certeza de que nunca buscastes máis que iso. Hoxe é a tese e mañá será outro desafío, pero o importante é que me sinto respaldado en todo momento, tanto para acertar como para tropezar, e coa confianza de saber que estaredes en calquera das dúas situacións. Grazas por explicarme a importancia de ter criterio, de ter valentía para expoñer as miñas ideas e puntos de vista, e por inculcarme a cultura do esforzo para conseguir aquilo que queres. Sodes unha referencia para min polas persoas que sodes.

Avoa Ana, agora teño mellor puntería co balón, xa non temos que debater se esas xanelas formaban parte da portería. Grazas por coidarme sempre. Avó Julio, de tanto pasear contigo creo que adquirín unha pequena parte do teu inigualable don de xentes e da túa capacidade para manter a serenidade en momentos de tensión. Avoa Visita, o agarimo que sempre nos deches a todos 'os teus pequenos' axudounos a querernos como irmáns e a coidarnos como ti nos ensinaches. Todo iso creo que se traduce en como nos comportamos fóra da casa con calquera persoa.

Dentro da universidade, a figura de Miguel foi clave para que agora estea a escribir estas palabras. Grazas por apostar por min, por darme sempre oportunidades que tratei de aproveitar con honestidade, e por ensinarme tanto de tantas cousas. Nunca reparaches en investir nin un segundo do teu tempo en darme un bo consello e en orientarme no que crías que era o mellor para min, e por iso sempre che estarei agradecido.

Sábeme mal non nomear a todxs aquelxs compañeirxs cos que comparto e compartín experiencias na Universidade de Santiago de Compostela, pero voume centrar en agradecer directamente ás persoas do meu equipo, coas que me enfronto a novas probas día tras día. Por suposto, a Martín, por adoptar, sen acordalo en ningún momento, esa figura de 'irmán maior' dentro da academia; a Marta, por ser unha compañeira exemplar, unha persoa fantástica, e por recibirme desde o primeiro momento cos brazos abertos; a Isaac, por aconsellarme e axudarme en cada paso; e a Juanma, por ser o mellor compañeiro de despacho posible, e por todo o que me axuda diariamente.

Podería facer unha tese estendendo estes agradecementos, pero polo de agora cunha chega. Cito poucos nomes, pero toda persoa que lea estes agradecementos e se sinta aludida farao de forma acertada. Estes parágrafos foron pouco académicos ou protocolarios, pero xa que se me dá a oportunidade, gustaríame deixar fixado un texto que me permita lembrar este momento cando o volva ler, e co que poida recordar unha vez máis o ben acompañado que estou no día a día e o afortunado que me sinto.

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Apoios

Esta tese de doutoramento foi realizada no marco dos seguintes proxectos de investigación:

• Nuevos valores, gobernanza, financiación y servicios audiovisuales públicos para la sociedad de Internet: contrastes europeos y españoles (ref. RTI2018-096065-B-I00) do Ministerio de Ciencia, Innovación e Universidades.

• Medios audiovisuales públicos ante el ecosistema de las plataformas: modelos de gestión y evaluación del valor público de referencia para España (PID2021-122386OB-I00), financiado polo Ministerio de Ciencia e Innovación, AEI y FEDER, UE.

O doutorando foi, ademais, beneficiario dun contrato FPI do Ministerio de Ciencia e Innovación de España ca referencia (PRE2022-103954).

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Resumen

La inteligencia artificial se ha consolidado como una tecnología transformadora capaz de asistir, optimizar y renovar la mayor parte de las líneas organizativas, operativas, productivas y distributivas de los medios de comunicación. La creencia común es que sus posibilidades y prestaciones incrementarán exponencialmente en los próximos años, permeando y expandiéndose a todas aquellas tareas y procesos en las que los periodistas realmente no aporten valor, mimetizando su comportamiento y ofreciendo resultados prometedores con escaso margen de error. Esta prosperidad circula de la mano del riesgo de ceder el peso de la profesión a una herramienta fácilmente manipulable, sin conciencia crítica, y con una ética dependiente de su creador.

La dificultad de adaptar los ritmos de creación de los marcos normativos a la velocidad de desarrollo o innovación en prototipos de IA desemboca en diferentes posiciones que no alcanzan un consenso común. En este sentido, el 9 de diciembre de 2023 se aprobó la ley de IA de la Unión Europea, consolidando la primera regulación global sobre inteligencia artificial, la que por el momento no resuelve un contexto en el que no se debe permitir crear sistemas libremente sin ningún tipo de regulación que proteja a la ciudadanía, ni es conveniente ralentizar un brillante y alentador ritmo evolutivo para adaptarlo al proceso legislador.

En esta tesis doctoral se analiza el estado de la inteligencia artificial en los medios de comunicación públicos y privados, con una mirada particular sobre las dinámicas de implementación de esta tecnología, los profesionales y departamentos implicados, los usos específicos, así como las repercusiones y efectos generales que está teniendo sobre la profesión, sobre las redacciones y sobre el perfil del periodista, matizando las previsiones de crecimiento y los retos de futuro que se avistan con respecto a esta tecnología. El segundo prisma que se estudia de forma transversal en este proyecto es el concepto de innovación y las áreas y tecnologías prioritarias sobre las que estos agentes focalizan sus esfuerzos para construir su versión futura.

Para cumplir con los objetivos centrales de esta tesis se realizan y compendian 13 investigaciones secundarias que en su conjunto responden a las preguntas de investigación planteadas y que se enmarcan dentro de la misma línea de trabajo. Estos 13 proyectos parten de una misma metodología común, que consiste en una triangulación metodológica que combina la revisión de la bibliografía existente sobre las materias objeto de estudio, el análisis de contenidos, informes, páginas web y plataformas de VOD de las diferentes corporaciones, y entrevistas cualitativas en profundidad con expertos y profesionales del sector. No obstante, para cada proyecto se esboza una metodología específica que optimiza y adapta las técnicas de investigación a cada contexto,

y también se realizan dos estancias de investigación internacionales, una de tres meses en la Universidade Fernando Pessoa de Oporto, y otra de un mes en el Stockholm School of Economics de Riga, para complementar la investigación.

En total se realizan más de 100 entrevistas a 64 profesionales pertenecientes a medios de comunicación de 18 paises de Europa. Sus perfiles varían entre directores generales, de tecnología o estrategia, responsables de informativos, noticias, entretenimiento o sección digital, ingenieros, periodistas o corresponsales. 45 de ellos forman parte de corporaciones de radiotelevisión pública, tales como la ARD y ZDF (Alemania), BBC (Reino Unido), DR (Dinamarca), France TV (Francia), NPO (Países Bajos), ORF (Austria), RAI (Italia), RTBF y VRT (Bélgica), RTÉ (Irlanda), RTP (Portugal), RTS (Suiza), RTVE (España), SVT (Suecia), TVP (Polonia), UA (Ucrania); Yle (Finlandia), además de la European Broadcasting Union (EBU); 9 de ellos son personal de plataformas OTT privadas como Netflix, Movistar+, HBO, Vodafone TV, Orange TV, DAZN o Atresplayer; y 10 de ellos son integrantes de diarios de prensa de España como El País, La Vanguardia, Marca, La Voz de Galicia, As, ABC, El Mundo, El Correo, El Diario Vasco y Mundo Deportivo.

Los resultados muestran que la adopción de la inteligencia artificial en los medios públicos se puede dividir en cuatro áreas principales: producción (automatización de noticias, producción automatizada, gestión de metadatos); gestión de contenidos (archivo y recomendaciones); verificación; y expansión de servicios (traducción automática de contenidos, subtitulado automático para personas con discapacidad auditiva). En cuanto a los principales periódicos de España, estos se encuentran en una fase inicial de exploración del valor y la utilidad de la inteligencia artificial, centrándose principalmente en la automatización de tareas cotidianas. Salvo algunas excepciones, actualmente descartan el uso de IA generativa, a pesar de la existencia de sistemas avanzados capaces de generar lenguaje natural para la creación de noticias. La intención común es utilizar la IA de manera prudente para optimizar productos o servicios y alcanzar una diferenciación cualitativa, evitando su aplicación para ampliar la cobertura, lo cual podría distorsionar su modelo de suscripción basado en la diferenciación de contenidos de autor.

Las prioridades de innovación en los medios públicos se concentran en la digitalización de sus archivos para incrementar la interoperabilidad; la optimización de las rutinas de producción; el desarrollo e implementación de una estrategia de inteligencia artificial (IA) de manera transversal, con especial énfasis en la utilización de algoritmos de personalización para su distribución; y la modernización y renovación de sus plataformas de vídeo bajo demanda (VOD). En el caso de las principales platafromas OTT, basan sus estrategias en ultrapersonalizar los servicios y ofrecer experiencias inmersivas, además de optimizar la usabilidad de los sistemas. Asimismo, permiten el consumo compartido

entre usuarios remotos y facilitan una experiencia fluida entre diferentes soportes, además de maximizar la distribución en una amplia gama de dispositivos. Todo esto se lleva a cabo con el propósito de reinventar la experiencia del usuario, considerada como un valor prioritario y diferencial en el nuevo paradigma televisivo digital.

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Resumo

A intelixencia artificial consolidouse como unha tecnoloxía transformadora capaz de asistir, optimizar e renovar a maior parte das liñas organizativas, operativas, produtivas e distributivas dos medios de comunicación. A crenza común é que as súas posibilidades e prestacións incrementarán exponencialmente nos vindeiros anos, permeando e expandíndose a todas aquelas tarefas e procesos nos que os xornalistas realmente non achegan valor, mimetizando o seu comportamento e ofrecendo resultados prometedores cun escaso marxe de erro. Esta prosperidade circula da man do risco de ceder o peso da profesión a unha ferramenta facilmente manipulable, sen conciencia crítica, e cunha ética dependente do seu creador.

A dificultade de adaptar os ritmos de creación dos marcos normativos á velocidade de desenvolvemento ou innovación en prototipos de IA desemboca en diferentes posicións que non alcanzan un consenso común. Neste sentido, o 9 de decembro de 2023 aprobouse a lei de IA da Unión Europea, consolidando a primeira regulación global sobre intelixencia artificial, que polo de agora non resolve un contexto no que non se debe permitir crear sistemas libremente sen ningún tipo de regulación que protexa á cidadanía, nin é conveniente ralentizar un brillante e alentador ritmo evolutivo para adaptalo ao proceso lexislador.

Nesta tese de doutoramento analízase o estado da intelixencia artificial nos medios de comunicación públicos e privados, cunha mirada particular sobre as dinámicas de implementación desta tecnoloxía, os profesionais e departamentos implicados, os usos específicos, así como as repercusións e efectos xerais que está a ter sobre a profesión, sobre as redaccións e sobre o perfil do xornalista, matizando as previsións de crecemento e os retos de futuro que se albiscan con respecto a esta tecnoloxía. O segundo prisma que se estuda de forma transversal neste proxecto é o concepto de innovación e as áreas e tecnoloxías prioritarias sobre as que estes axentes focalizan os seus esforzos para construír a súa versión futura.

Para cumprir cos obxectivos centrais desta tese realízanse e compéndianse 13 publicacións secundarias que no seu conxunto responden ás preguntas de investigación formuladas e que se enmarcan dentro da mesma liña de traballo. Estes 13 proxectos parten dunha mesma metodoloxía común, que consiste nunha triangulación metodolóxica que combina a revisión da bibliografía existente sobre as materias obxecto de estudo, a análise de contidos, informes, páxinas web e plataformas de VOD das diferentes corporacións, e entrevistas cualitativas en profundidade con expertos e profesionais do sector. Non obstante, para cada proxecto esbozase unha metodoloxía específica que optimiza e adapta as técnicas de investigación a cada contexto, e

tamén se realizan dúas estadías de investigación internacionais, unha de tres meses na Universidade Fernando Pessoa do Porto, e outra dun mes na Stockholm School of Economics de Riga, para complementar a investigación.

En total realízanse máis de 100 entrevistas a 64 profesionais pertencentes a medios de comunicación de 18 países de Europa. Os seus perfís varían entre directores xerais, de tecnoloxía ou estratexia, responsables de informativos, noticias, entretemento ou sección dixital, enxeñeiros, xornalistas ou corresponsais. 45 deles forman parte de corporacións de radiotelevisión pública, tales como a ARD e ZDF (Alemaña), BBC (Reino Unido), DR (Dinamarca), France TV (Francia), NPO (Países Baixos), ORF (Austria), RAI (Italia), RTBF e VRT (Bélxica), RTÉ (Irlanda), RTP (Portugal), RTS (Suíza), RTVE (España), SVT (Suecia), TVP (Polonia), UA (Ucraína); Yle (Finlandia), ademais da European Broadcasting Union (EBU); 9 deles son persoal de plataformas OTT privadas como Netflix, Movistar+, HBO, Vodafone TV, Orange TV, DAZN ou Atresplayer; e 10 deles son integrantes de diarios de prensa de España como El País, La Vanguardia, Marca, La Voz de Galicia, As, ABC, El Mundo, El Correo, El Diario Vasco e Mundo Deportivo.

Os resultados mostran que a adopción da intelixencia artificial nos medios públicos pódese dividir en catro áreas principais: produción (automatización de noticias, produción automatizada, xestión de metadatos); xestión de contidos (arquivo e recomendacións); verificación; e expansión de servizos (tradución automática de contidos, subtitulado automático para persoas con discapacidade auditiva). En canto aos principais xornais de España, estes atópanse nunha fase inicial de exploración do valor e a utilidade da intelixencia artificial, centrando principalmente na automatización de tarefas cotiás. Agás algunhas excepcións, actualmente descartan o uso de IA xerativa, a pesar da existencia de sistemas avanzados capaces de xerar linguaxe natural para a creación de noticias. A intención común é utilizar a IA de maneira prudente para optimizar produtos ou servizos e alcanzar unha diferenciación cualitativa, evitando a súa aplicación para ampliar a cobertura, o cal podería distorsionar o seu modelo de subscrición baseado na diferenciación de contidos de autor.

As prioridades de innovación nos medios públicos concéntranse na dixitalización dos seus arquivos para incrementar a interoperabilidade; a optimización das rutinas de produción; o desenvolvemento e implementación dunha estratexia de intelixencia artificial (IA) de maneira transversal, con especial énfase na utilización de algoritmos de personalización para a súa distribución; e a modernización e renovación das súas plataformas de vídeo baixo demanda (VOD). No caso das principais plataformas OTT, basean as súas estratexias en ultrapersonalizar os servizos e ofrecer experiencias inmersivas, ademais de optimizar a usabilidade dos sistemas. Así mesmo, permiten o consumo compartido entre usuarios remotos e facilitan unha experiencia fluída

entre diferentes soportes, ademais de maximizar a distribución nunha ampla gama de dispositivos. Todo isto lévase a cabo co propósito de reinventar a experiencia do usuario, considerada como un valor prioritario e diferencial no novo paradigma televisivo dixital.

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Abstract

Artificial intelligence has established itself as a transformative technology capable of assisting, optimizing, and renewing most of the organizational, operational, productive, and distributive lines in the media industry. The common belief is that its possibilities and capabilities will exponentially increase in the coming years, permeating and expanding into all tasks and processes where journalists do not add real value, mimicking their behavior, and offering promising results with a narrow margin of error. This prosperity goes hand in hand with the risk of ceding the weight of the profession to a tool that is easily manipulable, lacks critical consciousness, and has ethics dependent on its creator.

The difficulty of adapting the creation rhythms of regulatory frameworks to the speed of development or innovation in AI prototypes leads to different positions that do not reach a common consensus. In this sense, on December 9, 2023, the European Union AI law was approved, consolidating the first global regulation on artificial intelligence, which for now does not resolve a context in which it is not advisable to create systems freely without any type of regulation that protects citizens, nor is it convenient to slow down a brilliant and encouraging evolutionary pace to adapt it to the legislative process.

This doctoral thesis analyzes the state of artificial intelligence in public and private media, with a particular look at the dynamics of implementing this technology, the professionals and departments involved, specific uses, as well as the general repercussions and effects it is having on the profession, newsrooms, and the profile of the journalist, detailing growth forecasts and future challenges regarding this technology. The second prism studied transversally in this project is the concept of innovation and the priority areas and technologies on which these agents focus their efforts to build their future version.

To meet the central objectives of this thesis, 13 secondary investigations are carried out and compiled, which together answer the research questions posed and are framed within the same line of work. These 13 projects are based on a common methodology, consisting of a methodological triangulation that combines a review of existing literature on the subjects under study, content analysis, reports, websites, and VOD platforms of different corporations, and in-depth qualitative interviews with experts and professionals in the sector. However, for each project, a specific methodology is outlined that optimizes and adapts research techniques to each context, and two international research stays are also carried out, one of three months at the Universidade Fernando Pessoa in Porto, and another of one month at the Stockholm School of Economics in Riga, to complement the research.

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In total, more than 100 interviews are conducted with 64 professionals from media in 18 European countries. Their profiles range from general directors, technology or strategy directors, heads of news, entertainment or digital sections, engineers, journalists, or correspondents. Forty-five of them are part of public broadcasting corporations, such as ARD and ZDF (Germany), BBC (United Kingdom), DR (Denmark), France TV (France), NPO (Netherlands), ORF (Austria), RAI (Italy), RTBF and VRT (Belgium), RTÉ (Ireland), RTP (Portugal), RTS (Switzerland), RTVE (Spain), SVT (Sweden), TVP (Poland), UA (Ukraine); Yle (Finland), as well as the European Broadcasting Union (EBU); nine of them are staff from private OTT platforms such as Netflix, Movistar+, HBO, Vodafone TV, Orange TV, DAZN, or Atresplayer; and ten of them are members of Spanish press dailies such as El País, La Vanguardia, Marca, La Voz de Galicia, As, ABC, El Mundo, El Correo, El Diario Vasco, and Mundo Deportivo.

The results show that the adoption of artificial intelligence in public media can be divided into four main areas: production (news automation, automated production, metadata management); content management (archiving and recommendations); verification; and service expansion (automatic content translation, automatic subtitling for people with hearing disabilities). Regarding the main newspapers in Spain, they are in an initial phase of exploring the value and utility of artificial intelligence, mainly focusing on the automation of daily tasks. With some exceptions, they currently dismiss the use of generative AI, despite the existence of advanced systems capable of generating natural language for news creation. The common intention is to use AI prudently to optimize products or services and achieve qualitative differentiation, avoiding its application to expand coverage, which could distort their subscription model based on author content differentiation.

The innovation priorities in public media are concentrated on digitizing their archives to increase interoperability; optimizing production routines; developing and implementing an artificial intelligence (AI) strategy in a transversal way, with special emphasis on the use of personalization algorithms for distribution; and modernizing and renewing their video-on-demand (VOD) platforms. In the case of the main OTT platforms, they base their strategies on ultra-personalizing services and offering immersive experiences, in addition to optimizing system usability. They also enable shared consumption among remote users and facilitate a smooth experience across different devices, as well as maximizing distribution across a wide range of devices. All of this is carried out with the aim of reinventing the user experience, considered a priority and differential value in the new digital television paradigm.

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ÍNDICE

1	Presentación	26
2	Introdución	30
	2.1. Listado de contribucións compendiadas	34
3	Presentación do marco teórico	66
	3.1. A innovación como motor estratéxico do futuro PSM	67
	3.2. Efectos, posibilidades e desafíos da intelixencia artificial na información e comunicación periodística	71
	3.3. Estratexias de IA nos PSM	75
	3.4. A recomendación e distribución automatizada de contidos nos medios públicos: en busca do algoritmo PSM	78

	3.5. Perfís profesionais, actividade empregadora e contratación nos medios públicos na era da IA	80
	3.6. Innovación social inmersiva nos medios públicos a través do metaverso e da realidade extendida	82
	3.7. Gamificación, plataformización e deportes electrónicos no PSM para a captación de novas audiencias	86
4	Hipóteses e obxectivos do traballo	88
5	Metodoloxía	93
	5.1. Metodoloxía xeral	94
	5.1.1. Triangulación metodolóxica	94
	5.1.2. Secuenciación e organización da investigación	98
	5.1.3 Mostras de conveniencia de profesionais entrevistados	100
	5.2. Metodoloxías específicas	106
6	Resultados e discusión xeral do traballo	112
	6.1. Prioridades e dinámicas de innovación no PSM de Europa	118
	6.2. Implementación da IA en medios públicos: repercusións, estratexia e retos	121
	6.3. O deseño de algoritmos nos medios de servizo público: personalización, recomendación e verificación de contidos	124

USC UNIVERSIDADE DE SANTIAGO DE COMPOSTELA

	6.4. Dinámicas de contratación e perfís profesionais demandados no PSM na era da IA	127
	6.5. A intelixencia artificial nas redaccións: efectos da IA na prensa nacional de España	129
	6.6. Metaverso e realidade estendida como innovación social inmersiva no PSM	132
7	Comprobación de hipóteses, conclusións e futuras liñas de investigación	135
	7.1. Obxectivos, preguntas e constatación de hipóteses	136
	7.2. Conclusións xerais	144
	7.3. Dificultades atopadas durante o desenvolvemento do traballo	149
	7.4 Futuras liñas de investigación	150
8	Referencias bibliográficas	151
9	Publicacións compendiadas	164
	9.1. Building the future of European Public Service Media: innovation priorities, key points and optimization areas in PSM	165
	9.2. Artificial intelligence strategies in European public broadcasters: Uses, forecasts and future challenges	182
	9.3. Designing personalisation of European public service media (PSM): trends on algorithms and artificial intelligence for content distribution	195
	9.4. Innovation analysis of national scale public media in the Iberian Peninsula: strategic, technological and youth audience engagement vision in RTVE and RTP	207

9.5. A new scenario in digital communication: eSports coverage on public broadcasters in Europe 229

9.6. Actividad empleadora en la televisión pública de la era de la automatización 255

9.7. Innovation and metaverse: first experiences and use cases in European Public Service Media 269

9.8. Tendencias y previsiones de innovación en la realización audiovisual y retransmisión de eventos deportivos: optimización de la experiencia de usuario en DAZN y Movistar Plus+ 285

9.9. AI Implementation Strategies in the Spanish Press Media: Organizational Dynamics, Application Flows, Uses and Future Trends 307

9.10. Verificación automatizada de contenidos en las radiotelevisiones públicas europeas: primeras aproximaciones al uso de la inteligencia artificial 330

9.11. Sistemas adaptativos basados en inteligencia artificial como nuevas soluciones personalizadas de tecnología educativa 346

9.12. Cocreación en el universo e-sport: estrategia de la RTP para captar a público joven 365

9.13. Cómo acelerar un periodismo de vanguardia: laboratorios de innovación en las noticias de BBC y VRT 387

10 Anexos 409

10.1. Autorizacións das editoriais para o compendio das publicacións na tese doutoral 410

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CHAPTER 1:
PRESENTATION

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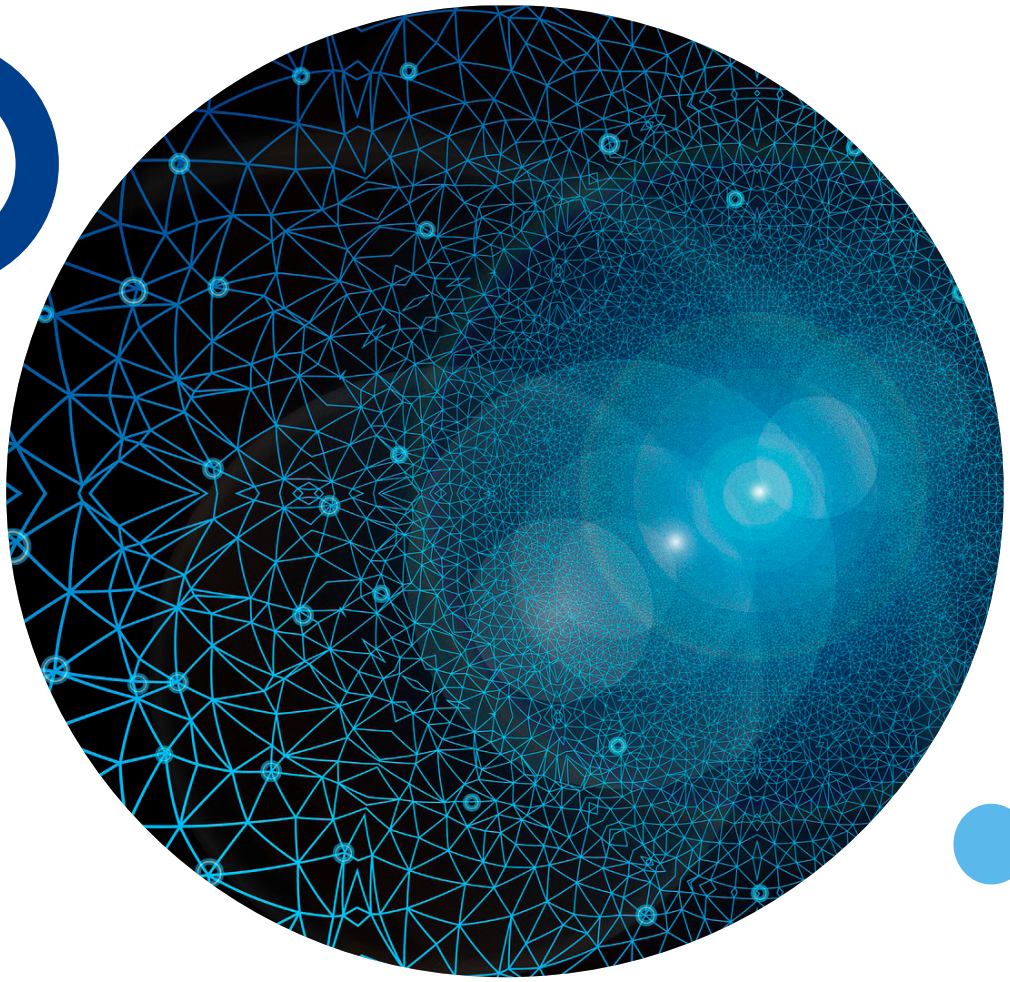

This project aims to provide a cross-disciplinary look at the repercussions of AI in the media

This **doctoral thesis** encompasses the research results from **over three years** dedicated to studying the dynamics of **artificial intelligence implementation** and the processes and **priorities of innovation** in the media. During this period, the author was supported by an **FPI contract** from the Ministry of Science and Innovation of the Government of Spain (PRE2022-103954) and conducted the project within the framework of the **Novos Medios research group** at the Faculty of Communication Sciences, University of Santiago de Compostela.

13 publications compiled

In addition to the **13 publications compiled** in this thesis, the author has accumulated **more than 10 participations** in national and international conferences and another **7 publications** spread between articles and book chapters related to other perspectives of media. He has also **edited two books** linked to the processes of innovation and technological renewal of public service media.

European Graduate Collaboration Conference
(Ausburg, Germany)

Research Stay 1

(Universidade Fernando Pessoa, Oporto -2022-)

Research Stay 2

(Stockholm School of Economics, Riga -2023)

To **complement** his doctoral training and provide an **international perspective** to the thesis project, the author undertook two research stays during which he visited state media facilities and conducted interviews with their executives.

From September 1 to November 30, 2022, the author completed a **three-month research stay at the Universidade Fernando Pessoa in Porto**, resulting in a study titled 'Radiography of Innovation in the Public Service Media of the Iberian Peninsula: Strategic, Technological, and Youth Audience Engagement Vision in RTVE and RTP' published in a **high-impact international journal.**

In June 2023, the author conducted a **second research stay at the Stockholm School of Economics (SSE) in Riga**, where he visited the structures of public media in the Baltic countries **(Estonia, Latvia, and Lithuania)** and interviewed their CEOs, international correspondents, and news directors to prepare a report on n**ews coverage during the Russia-Ukraine conflict**. This work was presented in May 2024 at the **RIPE international conference held in Lisbon.**

Before starting his doctoral studies, the author already started his specialisation in AI in his Bachelor's thesis and Master's thesis, both of which focused on the study of AI implementation processes in the media, and which received the highest **distinction with honors.**

GOBIERNO DE ESPAÑA · MINISTERIO DE CIENCIA E INNOVACIÓN · VALCOMM · MEDIOS AUDIOVISUALES PÚBLICOS ANTE EL ECOSISTEMA DE LAS PLATAFORMAS: MODELOS DE GESTIÓN Y EVALUACIÓN DEL VALOR PÚBLICO DE REFERENCIA PARA ESPAÑA · PROYECTO I+D+I PID2021-122386OB-I00

CÁTEDRA RTVE-USC · SOBRE MEDIOS DE SERVICIO PÚBLICO EN EUROPA

During his doctoral stage, the author participated in t**wo competitive national R&D projects:** 'New values, governance, funding, and public audiovisual services for the Internet society: European and Spanish contrasts' (ref. RTI2018-096065-B-I00) of the Ministry of Science, Innovation, and Universities; and 'Public audiovisual media in the platform ecosystem: management models and evaluation of public value for Spain' (PID2021-122386OB-I00), funded by MCIN, AEI, and FEDER, EU. He also **served as technology coordinator** for the RTVE-USC Chair on Public Service Media in Europe **and the proof-of-concept project** 'Creation of a chatbot-generating platform using AI for public service media communication' (PDC2023-145885-I00), funded by MCIN, AEI, and the European Union "NextGeneration EU"/PRTR.

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CHAPTER 2:
INTRODUCTION

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It is a reality that artificial intelligence has arrived to restructure, reorient, and reinvent a significant part of the operational lines in the journalism and communication sector. Its capacity to automate the routine aspects of the profession simplifies complex processes, enables the provision of personalized services and products, and frees professionals from tedious tasks, allowing them to dedicate their time to conceiving and optimizing the qualitative aspects of their work.

However, the implementation of new technologies has historically been conditioned by the difficulty of consolidating their ethical and responsible use, avoiding their application solely for the purpose of maximizing profits, and directing their effects towards a collective benefit that also allows users to experience an improvement in the services received.

In the case of AI, citizens can receive ultra-personalized services tailored to their specific needs, tastes, and interests. Audiences neglected due to their geographical location or having less common interests will be able to receive real-time assistance and comprehensive information about their realities in the short term. The productivity and efficiency of daily operations in newsrooms will be exponentially improved as algorithms are designed to address repetitive tasks where journalists do not add value.

The other side of the coin represents a citizenry that may also become isolated from new events, topics, or viewpoints; they may become content with standardized and repetitive products, discarding the value of authored content; and journalists may see their jobs replaced by software simply because the pieces it produces are sufficient for an audience with subdued expectations.

It is the journalism and information professionals who must assert their value by exploiting these automated tools, demonstrating to the public that their capabilities are being renewed in line with new technological waves and that they understand their utility and worth. Using artificial intelligence with ethical sense and sensitivity is helping, and will certainly continue to help, journalists achieve their purpose, which is to rebuild a profession that has not been destabilized but has been fragmented with the entry of new actors, systems, and realities in the sector.

The conjunction of journalists and new technologies will provide a qualitative leap for the profession, with a clear conversion and emergence of specialized profiles. However, if these systems are ignored, the profession may be in doubt, as without renewing and organizing new dynamics, an algorithm capable of mimicking and replicating the behaviors followed so far will emerge.

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This doctoral thesis aims to provide a comprehensive overview of the state and repercussions of artificial intelligence in both public and private media. This includes the organizational dynamics proposed, the implementation flows of applications followed, the impact on professional profiles, and the current uses and forecasts for incorporating this technology. The second aspect studied, which is closely related to the first, involves analyzing the innovation strategies of these agents to determine the priority areas or concepts and the new technologies on which the media plan to build and enhance their future version.

Based on this objective and central line of work, various secondary investigations are conducted, collectively allowing the primary questions posed to be answered. Thus, this project compiles a total of 10 research articles and three book chapters already published in high-impact international journals. The author of this thesis is the primary author of all these publications and has had a direct, significant, and relevant role in the development phases of each project. The complete list of contributions and their basic information, indexing, and participation details are provided in the following section, 'List of Compiled Contributions,' and all are presented in full in the eighth section: 'Compiled Publications'.

The first publication presented acts as an umbrella for most of the content of this doctoral thesis. It analyzes the innovation strategies and priorities of 15 of the main public broadcasters in Europe, allowing the identification of the concepts on which these corporations are focusing their efforts to renew and optimize their services and operations, highlighting AI as a key resource in all the proposals analyzed.

In the second, third, and tenth publications compiled, the focus continues on the segment of European public media, but with specific perspectives on the implementation of artificial intelligence in their structures. In the first of these three articles, the strategic integration of AI in their departments, tasks, and professional routines is explored in a transversal manner. The second article delves into the functioning of recommendation systems used by these broadcasters, their origin, dynamics, and results, as well as the concept of the public service algorithm. Finally, the third publication analyzes the processes and systems of automated content verification implemented in these public service media (PSM).

The impact of AI on journalistic professional profiles and the hiring dynamics and interests of public media in the context of automation is the subject of the sixth compiled article. In the ninth publication, the analysis shifts to the private media sector, specifically the national press in Spain, to determine the strategic position of the 10 printed newspapers with the highest daily circulation in Spain regarding artificial intelligence. The purpose of this research is to identify application dynamics, uses, departments, and professionals involved in handling AI, as well as future challenges. This research is currently being replicated on the main radio

25

and television stations in Spain, with a new edition of this study expected to be published in 2025.

The eleventh compiled text is a book chapter that seeks to leverage the knowledge gathered about the impact of artificial intelligence on communication and personalization and apply it to the educational field. In this context, it examines the functioning of AI-based adaptive systems as new personalized educational technology solutions, aiming to understand how AI can optimize the relationship between teacher, student, and performance through personalized attention in various facets and phases of the learning process.

The rest of the compiled articles aim to explore other perspectives or concepts closely related to innovation. Thus, in the fourth compiled article, the author takes advantage of a three-month research stay at the Universidade Fernando Pessoa in Porto to analyze the strategic, technological, and audience engagement innovation proposals of Portugal's public television (RTP) and Radiotelevisión Española.

Both the fifth and twelfth texts examine the phenomenon of gamification and the coverage or use of esports in media as an innovative tactic for attracting new audiences. Meanwhile, the seventh compiled text analyzes the initial experiences of public media in the metaverse as immersive social innovation, detailing the origin of these pilot projects, their purpose, utility, and performance. The thirteenth publication investigates the functioning of innovation labs through two of the most successful models on the international scene: the BBC News Lab and the NWSlab of Belgium's VRT.

Finally, in the eighth article of this doctoral thesis, the trends and forecasts of innovation in audiovisual production at DAZN and Movistar Plus+ are studied. This research is part of a broader project encompassing the 10 OTT platforms with the highest consumption share in Spain, analyzing their innovation priorities and strategies in the same way as for the European PSM. This content, developed during the doctoral stage, is part of the research conducted for this thesis and is currently under review in a high-impact international journal, with publication expected in late 2024.

Independently, the 13 publications compiled for this project aim to delve into and resolve some of the perspectives outlined in the work plan of this doctoral thesis, collectively achieving the central objectives set and opening new lines of research that have already begun to be explored to continue the study.

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2.1. List of compiled contributions

This section presents the list of 13 contributions compiled for this doctoral thesis, consisting of 10 research articles and three book chapters published in high-impact international journals, in which the author of the thesis has played a fundamental role, being the primary author of all of them. The full and original versions of all these publications are included in the section 'Annexes: Accepted or Published Works.'

For each project, a sheet is presented divided into two sections: the first section contains the basic information of the piece, including the title, the participating authors, the authors' universities, the publication date, the name of the journal, and the DOI; while the second part indicates the main indexing and quality data of the studies, such as the impact factor of the different journals (JIF and JCI -Web of Science-, SJR -Scopus-), the area or field of knowledge in which they are framed, the quartile to which they belong in reference databases such as Scopus or Web of Science, the number of citations they have accumulated so far, and the consultation link.

Finally, for each research piece, a section is provided detailing the specific participation and contribution of the author of the thesis in the study, despite the anticipation that his contribution has been key in all these projects, in which, in addition to coordinating the planning, development, and publication of the research, he has participated directly in all the phases carried out.

The following articles, which include the English version, have also been published in Spanish, with both versions available on the journal's website, indicated in the prepared record: 'Building the future of European Public Service Media: innovation priorities, key points and optimization areas in PSM'; 'Artificial intelligence strategies in European public broadcasters: Uses, forecasts and future challenges'; 'Designing personalisation of European public service media (PSM)': trends on algorithms and artificial intelligence for content distribution'; 'Innovation analysis of national scale public media in the Iberian Peninsula: strategic, technological and youth audience engagement vision in RTVE and RTP'; 'A new scenario in digital communication: eSports coverage on public broadcasters in Europe'; 'Innovation and metaverse: first experiences and use cases in European Public Service Media.' The following is the list of bibliographic references corresponding to the compiled publications.

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27

Table 1. List of compiled contributions.

PUBLICATION NUMBER	REFERENCE
1	Fieiras Ceide, C., Vaz Álvarez, M. & Túñez López, M. (2024). Building the future of European Public Service Media: innovation priorities, key points and optimization areas in PSM, Communication & Society, 37(3), 107-123. https://doi.org/10.15581/003.37.3.107-123
2	Fieiras-Ceide, César; Vaz-Álvarez, Martín; Túñez-López, Miguel (2022). "Artificial intelligence strategies in European public broadcasters: Uses, forecasts and future challenges". Profesional de la información, v. 31, n. 5, e310518. https://doi.org/10.3145/epi.2022.sep.18
3	Fieiras-Ceide, César; Vaz-Álvarez, Martín; Túñez-López, Miguel (2023). "Designing personalisation of European public service media (PSM): trends on algorithms and artificial intelligence for content distribution". Profesional de la información, v. 32, n. 3, e320311. https://doi.org/10.3145/epi.2023.may.11
4	Fieiras Ceide, C. F., Túñez López, M., & Sousa, J. P. (2023). Innovation analysis of national scale public media in the Iberian Peninsula: strategic, technological and youth audience engagement vision in RTVE and RTP. Revista Latina De Comunicación Social, (81), 353–374. https://doi.org/10.4185/rlcs-2023-1957
5	Fieiras Ceide, C., Túñez López, M. y Maroto González, I. (2022). A new scenario in digital communication: eSports coverage on public broadcasters in Europe. Revista Latina de Comunicación Social, 80, 88-113. https://www.doi.org/10.4185/RLCS-2022-1782
6	Fieiras-Ceide, C., Ufarte-Ruiz, M.J., & Vaz-Álvarez, M. (2023). Actividad empleadora en la televisión pública de la era de la automatización: employer branding, canales de contratación, procesos de selección, competencias y perfiles profesionales demandados. Estudios sobre el Mensaje Periodístico 29 (4), 855-868. https://dx.doi.org/10.5209/esmp.88582
7	Fieiras-Ceide, C., Crespo-Pereira, V., & Túñez-López, M. (2024). Innovation and metaverse: first experiences and use cases in European Public Service Media. Revista Mediterránea de Comunicación/Mediterranean Journal of Communication, 15(2), e26903. https://www.doi.org/10.14198/MEDCOM.26903

PUBLICATION NUMBER	REFERENCE
8	Fieiras-Ceide, C., Ufarte-Ruiz, M.J (2024). Tendencias y previsiones de innovación en la realización audiovisual y retransmisión de eventos deportivos: optimización de la experiencia de usuario en DAZN y Movistar Plus+. IC – Revista Científica de Información y Comunicación (20), pp. 253-274. ISSN: 2173-1071. https://dx.doi.org/10.12795/IC.2023.I20.11
9	Fieiras-Ceide, César; Vaz-Álvarez, Martín; Maroto González, Isaac. (2024). AI Implementation Strategies in the Spanish Press Media: Organizational Dynamics, Application Flows, Uses and Future Trends. Revista Trípodos (55), pp. 1-23. https://doi.org/10.51698/tripodos.2024.55.01
10	Fieiras Ceide, C., Vaz Álvarez, M., y Túñez López, M. (2022). Verificación automatizada de contenidos en las radiotelevisiones públicas europeas: primeras aproximaciones al uso de la inteligencia artificial, Redmarka. Revista de Marketing Aplicado, vol 26, núm. 1, 36-51. https://doi.org/10.17979/redma.2022.26.1.8932
11	Fieiras, C., & Túñez López, J. M. (2023). Sistemas adaptativos basados en inteligencia artificial como nuevas soluciones personalizadas de tecnología educativa. En Costa Sánchez, C.; López Golán, M.; Salgado, J.P. (eds.), Innovación docente en los estudios universitarios en comunicación (pp. 253-271). Valencia, España: Tirant lo Blanch. ISBN: 978-84-19825-26-1
12	Fieiras Ceide, C. (2022). Cocreación en el universo e-sport: estrategia de la RTP para captar a público joven. En Marzal-Felici, J., Moriano, J., Fieiras-Ceide, C., Vaz-Álvarez, M., & Lorigüillo-López, A. (Eds.), Participación ciudadana y medios de comunicación públicos 2 (pp. 49-70). Valencia, España: Tirant lo Blanch. ISBN 978-84-19226-74-7.
13	Fieiras Ceide, C.; Martínez Solana, Y. (2023): «Cómo acelerar un periodismo de vanguardia: laboratorios de innovación en las noticias de BBC y VRT». En Fieiras Ceide, C.; Túñez López, J.M.; Rodríguez Castro, M. (eds.), Innovar en innovación televisiva. Análisis de casos de éxito en los medios públicos europeos. Salamanca: Comunicación Social Ediciones y Publicaciones. ISBN: 978-84-17600-96-9

Source: Own elaboration.

*Click on the images below to read the full publications

COMMUNICATION & SOCIETY

Miscellaneous

Building the future of European Public Service Media: innovation priorities, key points and optimization areas in PSM

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Submitted
October 25th, 2023
Approved
March 18th, 2024

© 2024
Communication & Society
ISSN 0214-0039
E ISSN 2386-7876
www.communication-society.com

2024 – Vol. 37(3)
pp. 107-123

How to cite this article:
Fieiras Ceide, C., Vaz Álvarez, M. & Túñez López, M. (2024). Building the future of European Public Service Media: innovation priorities, key points and optimization areas in PSM, *Communication & Society*, 37(3), 107-123.
https://doi.org/10.15581/003.37.3.107-123

Abstract
The platformization and entry into the international television market of large video-on-demand (VoD) service providers has had an impact on all agents in the sector, as well as on operating rules, consumption habits, and financing, production and distribution models. In the case of public media, innovation is conceived as a strategic driver and the only sustainable alternative for their survival, repositioning and renewal in order to be relevant for citizens. This research analyzes 15 European public broadcasting corporations from Germany (ARD), Austria (ORF), Belgium (VRT and RTBF), 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). A total of 18 interviews were conducted with senior managers of these corporations and one EBU member to shed light on innovation priorities, key points and areas of optimization, which allows identifying the conceptual, strategic and operational lines that these media will follow in the next stage. It is concluded that these broadcasters focus their efforts on the transversal implementation of high technology, particularly AI, for the improvement of their production and distribution operational routines; on the settlement and improvement of their VOD platforms; on digital positioning and cybersecurity; on the creation of stable communities; on the optimization of the user experience (UX) and the attraction and search for relevance for a young audience (16-25) often distant from their performances.

Keywords
Innovation, journalism, public service media, strategy, user experience, artificial intelligence, metaverse, television.

1. Introduction

Innovation is articulated as the strategic engine or conceptual line of action that permeates all the sections, actions and ideas implemented in the media to build a better version of

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ISSN 2386-7876 – © 2024 Communication & Society, 37(3), 107-123

Artificial intelligence strategies in European public broadcasters: Uses, forecasts and future challenges

César Fieiras-Ceide; Martín Vaz-Álvarez; Miguel Túñez-López

Nota: Este artículo se puede leer en español en:
https://revista.profesionaldelainformacion.com/index.php/EPI/article/view/87035

Recommended citation:
Fieiras-Ceide, César; **Vaz-Álvarez, Martín**; **Túñez-López, Miguel** (2022). "Artificial intelligence strategies in European public broadcasters: Uses, forecasts and future challenges". *Profesional de la información*, v. 31, n. 5, e310518.
https://doi.org/10.3145/epi.2022.sep.18

Manuscript received on June 28th 2022
Accepted on August 13th 2022

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Abstract
As artificial intelligence (AI) gains space in the media, public broadcasters are testing and experimenting with these technologies to raise their services to the new standards of the audiovisual ecosystem. From algorithms that help recommend the most suitable content for users, to others that detect news and automate some of the tasks of journalists, these tools are increasingly present in public audiovisual corporations. The data were obtained from semi-structured in-depth interviews with a convenience sample of 15 corporations from 12 countries. The results reflect a heterogeneous application of artificial intelligence in corporations, oriented towards the automatic creation of content from structured data, the improvement of audience interaction through chatbots, and personalisation or verification. The implementation of these technologies also poses major challenges. Firstly, the economic cost of adapting these systems to each corporation and the difficulties in hiring experts to develop AI solutions prevent a complete deployment of these tools in public broadcasters. As main conclusions, we have understood that AI as a "culture" is believed to be vital for the public audiovisual services of the future, although its application is still far from being a standard and generally does not occupy a relevant strategic position in the innovation departments of corporations.

Keywords
Artificial intelligence; AI; Algorithms; Media; Automation; Journalism; Innovation; Public service media; News; Broadcasting; Audiovisual; Technology.

Designing personalisation of European public service media (PSM): trends on algorithms and artificial intelligence for content distribution

César Fieiras-Ceide; Martín Vaz-Álvarez; Miguel Túñez-López

Nota: Este artículo se puede leer en español en:
https://revista.profesionaldelainformacion.com/index.php/EPI/article/view/87298

Recommended citation:
Fieiras-Ceide, César; Vaz-Álvarez, Martín; Túñez-López, Miguel (2023). "Designing personalisation of European public service media (PSM): trends on algorithms and artificial intelligence for content distribution". *Profesional de la información*, v. 32, n. 3, e320311.
https://doi.org/10.3145/epi.2023.may.11

Manuscript received on 1st March 2023
Accepted on 09th May 2023

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Abstract
The migration of audiences to digital environments has motivated the media to develop a content distribution strategy that has a presence in these new spaces. In the case of European public broadcasters, they have strengthened their digital news services and have built video-on-demand platforms where they organise and screen their products. Even so, the overload of information and content reaching users forces corporations to look for new mechanisms to present an adequate, interesting and diverse offering to each of their followers. This research project analyses the use of artificial intelligence in the recommendation systems implemented by 14 European public broadcasters in Germany (*ARD* and *ZDF*), Belgium (*VRT* and *RTBF*), Denmark (*DR*), Spain (*RTVE*), Finland (*YLE*), France (*France TV*), Great Britain (*BBC*), the Netherlands (*NPO*), Ireland (*RTÉ*), Italy (*RAI*), Sweden (*SVT*) and Switzerland (*RTS*). The results reveal that there is no unanimity among the corporations with regard to the operation and origin of these systems, which vary between home-made developments, acquired from third parties, or collaborative solutions. Operators differentiate between news recommendation processes and those executed on their VoD platforms and aim to distance their systems from those of commercial media, for which they have already started working on a public service media (PSM) algorithm that includes traditional public media values, avoids filter bubbles, and pays special attention to the *European General Data Protection Regulation* (*GDPR*).

Keywords
Public service broadcasting; PSM; Recommendation systems; Artificial intelligence; AI; Public service media; Algorithms; Bubble filters; Video on demand; VoD; Journalism; Audiovisual communication; Content distribution; News; Trends; Europe.

RLCS, Revista Latina de Comunicación Social, 81, 353-374
[Research] https://www.doi.org/10.4185/RLCS-2023-1957 | ISSN 1138-5820 | Year 2023

Innovation analysis of national scale public media in the Iberian Peninsula: strategic, technological and youth audience engagement vision in RTVE and RTP.

Radiografía de innovación de los medios públicos de escala nacional de la península Ibérica: visión estratégica, tecnológica, y de captación de audiencias jóvenes en RTVE y RTP.

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This article is part of the activities of the project "Public audiovisual media in the face of the platform ecosystem: management models and evaluation of the public value of reference for Spain" (PID2021-122386OB-I00), funded by the Ministry of Science and Innovation (Micin, Spain), Agencia Estatal de Investigación (AEI, Spain), and European Regional Development Fund (EU). In addition to being integrated in the activities of the 'RTVE-USC Chair on Public Service Media in Europe'.

How to reference this article / Standard reference.

Fieiras Ceide, C., Túñez López, M., & Pedro Sousa, J. (2023). Innovation analysis of national scale public media in the Iberian Peninsula: strategic, technological and youth audience engagement vision in RTVE and RTP. *Revista Latina de Comunicación Social*, 81, 353-374. https://www.doi.org/10.4185/RLCS-2023-1957

Received: 19/12/2022. **Accepted:** 30/01/2023. **Published:** 17/04/2023.

RLCS, Revista Latina de Comunicación Social, 80, 88-113
[Research] https://www.doi.org/10.4185/RLCS-2022-1782 | ISSN 1138-5820 | Year 2022

A new scenario in digital communication: eSports coverage on public broadcasters in Europe

Un nuevo escenario en la comunicación digital: la cobertura de deportes electrónicos en las televisiones públicas de Europa

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This article is part of the activities of the project "Public audiovisual media in the face of the platform ecosystem: management models and evaluation of the public value of reference for Spain" (PID2021-122386OB-I00), funded by the MCIN, AEI and FEDER, EU.
In addition to being integrated in the activities of the 'RTVE-USC Chair on Public Service Media in Europe'. The author Isaac Maroto-González is a recipient of a Research Training Grant for PhD Training 2019 from the Spanish Ministry of Science, Innovation and Universities (ref. PRE2019-090667).

How to cite this article / Normalized reference

Fieiras Ceide, C., Túñez López, M. y Maroto González, I. (2022). A new scenario in digital communication: eSports coverage on public broadcasters in Europe. *Revista Latina de Comunicación Social*, 80, 88-113. https://www.doi.org/10.4185/RLCS-2022-1782

RESUMEN
Introducción: La investigación se centra en el análisis de la cobertura de deportes electrónicos por parte de las televisoras públicas europeas, prestando especial atención a sus contenidos principales, formatos producidos, dimensión y estructura de los equipos de trabajo, rutinas y perfiles profesionales, canales y estrategias de distribución, así como a las previsiones y retos de futuro que se esperan de los e-sports en ellas. **Metodología:** Se realiza un seguimiento online de la actividad de los medios de servicio público (PSM en inglés) con respecto a los ciberdeportes y se contacta con 16 de estas corporaciones europeas para determinar una muestra intencional de estudios de caso. A partir de sus aportaciones se deciden efectuar entrevistas en profundidad semiestructuradas con método Delphi a los

ESTUDIOS

Estudios sobre el **Mensaje Periodístico**
ISSN-e: 1988-2696
https://dx.doi.org/10.5209/esmp.88582
EDICIONES COMPLUTENSE

Actividad empleadora en la televisión pública de la era de la automatización: employer branding, canales de contratación, procesos de selección, competencias y perfiles profesionales demandados*

César Fieiras Ceide[1], María José Ufarte Ruiz[2] y Martín Vaz Álvarez[3]

Recibido: 5 de mayo de 2023 / Aceptado: 22 de julio de 2023

Resumen. Esta investigación profundiza en la actividad empleadora ejecutada por las radiotelevisiones públicas de Europa en el contexto actual de desarrollo de la inteligencia artificial generativa, analizando los canales de contratación empleados, los procesos de selección seguidos las competencias y perfiles profesionales más demandados, las ofertas laborales vigentes, y los procedimientos de creación de marca empleadora. El diseño metodológico para alcanzar estos propósitos requiere una ejecución por etapas a partir de la aplicación de una triangulación metodológica de técnicas cualitativas. Se analizan las propuestas de 10 emisoras públicas europeas, que se complementan con entrevistas semiestructuradas en profundidad a los responsables de innovación o tecnología de parte de estas corporaciones. Los resultados revelan que la proliferación de ofertas para puestos digitales no supone un desvanecimiento de las tradicionales, y que estas oportunidades de empleo tecnológicas se relacionan principalmente con procesos de ingeniería de datos, ciberseguridad, gestión de big data y cloud, y solo en casos aislados se vinculan a funciones concretas de aprendizaje automático o IA. Los hallazgos demuestran, igualmente, que las habilidades interpersonales como la adaptabilidad al cambio se imponen a las eminentemente técnicas, y que las emisoras buscan con la construcción de su marca empleadora y con la optimización de sus portales de contratación una ventaja competitiva en el disputado mercado del talento.
Palabras clave: Marca empleadora; perfiles profesionales; periodismo; medios de servicio público; automatización.

[en] Employer activity in public television in the age of automation: employer branding, recruitment channels, selection processes, skills and professional profiles in demand

Abstract. This research delves into the employment activity carried out by public broadcasters in Europe in the current context of development of generative artificial intelligence, analyzing the recruitment channels used, the selection processes followed, the most demanded professional skills and profiles, current job offers, and the procedures for creating an employer brand. The methodological design to achieve these purposes requires a phased execution based on the application of a methodological triangulation of qualitative techniques. The proposals of 10 European public broadcasters are analyzed, which are complemented by in-depth semi-structured interviews with those responsible for innovation or technology on behalf of these corporations. The results reveal that the proliferation of offers for digital positions does not imply a fading of traditional ones, and that these technological employment opportunities are mainly related to data engineering, cybersecurity, big data and cloud management processes, and only in isolated cases. they are tied to specific machine learning or AI functions. The findings also show that interpersonal skills such as adaptability to change prevail over the eminently technical ones, and that broadcasters seek a competitive advantage in the disputed market of talent by building their employer brand and optimizing their recruitment portals.
Keywords: Employer branding; professional profiles; journalism; public service media; automation.

Sumario. 1. Introducción. 1.1. El impacto de la automatización y de la IA en el perfil de los periodistas. 1.2. El impacto de la IA en las rutinas productivas de las radiotelevisiones públicas europeas. 2. Metodología. 3. Resultados. 3.1. Canales empleados, tipos y funcionamiento de los procesos de selección. 3.2. Ofertas de empleo vigentes y habilidades interpersonales y técnicas demandadas. 3.3. Creación de marca empleadora: lema de captación, recursos empleados, atributos y prestaciones promocionadas. 3.4. La opinión de los expertos. 4. Conclusiones. 5. Referencias bibliográficas.

Cómo citar: Fieiras-Ceide, C., Ufarte-Ruiz, M.J., & Vaz-Álvarez, M. (2023). Actividad empleadora en la televisión pública de la era de la automatización: employer branding, canales de contratación, procesos de selección, competencias y perfiles profesionales demandados. *Estudios sobre el Mensaje Periodístico* 29 (4), 855-868. https://dx.doi.org/10.5209/esmp.88582

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Revista Mediterránea de Comunicación
Mediterranean Journal of Communication

Revista Mediterránea de Comunicación (RMC)
Mediterranean Journal of Communication (MJC)
ISSN: 1989-872X

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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

Deadlines | Received: 29/10/2024 - Reviewed: 30/04/2024 - Accepted: 12/05/2024 - Published: 01/07/2024

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.

Fieiras-Ceide, C., Crespo-Pereira, V., & Túñez-López, M. (2024). Innovación y metaverso: primeras experiencias y casos de uso en los medios públicos de Europa [Innovation and metaverse: first experiences and use cases in European Public Service Media]. *Revista Mediterránea de Comunicación/Mediterranean Journal of Communication, 15*(2), e26903. https://www.doi.org/10.14198/MEDCOM.26903

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RETOS Y DESAFÍOS DEL PERIODISMO DE INMERSIÓN:
narrativas, formatos y prácticas profesionales

Tendencias y previsiones de innovación en la realización audiovisual y retransmisión de eventos deportivos: optimización de la experiencia de usuario en DAZN y Movistar Plus+

TRENDS AND FORECASTS FOR INNOVATION IN AUDIOVISUAL PRODUCTION AND BROADCASTING OF SPORTING EVENTS: OPTIMISING THE USER EXPERIENCE AT DAZN AND MOVISTAR PLUS+

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Resumen

El objetivo de este trabajo es identificar las tendencias y previsiones de innovación en la realización audiovisual, así como analizar la retransmisión y la experiencia de usuario en el consumo de eventos deportivos. El enfoque de la investigación es de carácter exploratorio y descriptivo con una metodología cualitativa basada en el estudio de casos enfocado a dos plataformas: DAZN y Movistar Plus+. El estudio se combina con entrevistas semiestructuradas en profundidad a directores

IC – Revista Científica de Información y Comunicación 20 (2023) • pp. 253-274 • E-ISSN: 2173-1071 •
https://dx.doi.org/10.12795/IC.2023.i20.11

Tripodos, number 55 | 2024| OnlineFirst
ISSN: 1138-3305

Received: 30/11/23
Accepted: 16/02/24
OnlineFirst: 12/04/24
Publicación final:

AI Implementation Strategies in the Spanish Press Media: Organizational Dynamics, Application Flows, Uses and Future Trends

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Martín Vaz-Álvarez
Pompeu Fabra University (Spain)
Isaac Maroto González
University of Santiago de Compostela (Spain)

This research analyses the artificial intelligence application strategies adopted by the Spanish press media at the height of the generative AI boom, extending previous studies on integrating AI technology into journalistic routines. We studied the dynamics of implementation of AI solutions in the main newspapers in Spain, determining the departments or professionals involved, the current uses, and how AI affects their organization chart and professional profiles, as well as providing insights into the future trends of this technology in the sector. For this purpose, a qualitative methodology was employed, based on interviews with a purposive sample of executives from the 10 newspapers with the largest circulation in Spain: El País, La Vanguardia, Marca, La Voz de Galicia, As, ABC, El Mundo, El Correo, El Diario Vasco *and* Mundo Deportivo. *The results reveal that AI is conceived in the Spanish press media as an assistant aimed at optimizing all kinds of mechanical processes and existing products, not at amplifying coverage or generating final pieces that reduce the standard of quality essential to their subscription model. Groups such as Prisa, Vocento or Unidad Editorial centralize their AI strategy, while Grupo Godó delegates this management to its headers. These newspapers consider that AI will boost the renewal of job profiles in their structures, despite the fact that they do not currently have strictly specialized professionals.*

Keywords: *journalism, automation, artificial intelligence, ChatGPT, news.*

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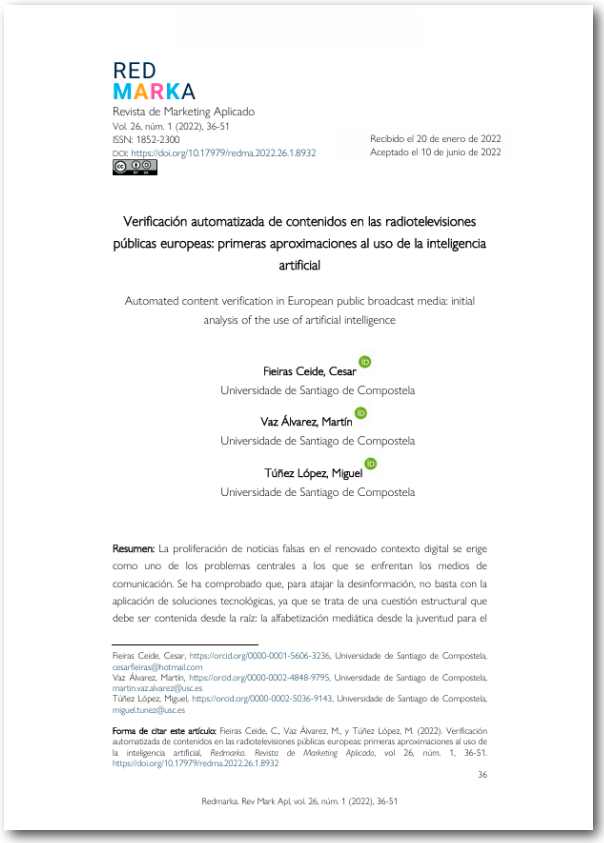

RED MARKA
Revista de Marketing Aplicado
Vol. 26, núm. 1 (2022), 36-51
ISSN: 1852-2300
DOI: https://doi.org/10.17979/redma.2022.26.1.8932

Recibido el 20 de enero de 2022
Aceptado el 10 de junio de 2022

Verificación automatizada de contenidos en las radiotelevisiones públicas europeas: primeras aproximaciones al uso de la inteligencia artificial

Automated content verification in European public broadcast media: initial analysis of the use of artificial intelligence

Fieiras Ceide, Cesar
Universidade de Santiago de Compostela
Vaz Álvarez, Martín
Universidade de Santiago de Compostela
Túñez López, Miguel
Universidade de Santiago de Compostela

Resumen: La proliferación de noticias falsas en el renovado contexto digital se erige como uno de los problemas centrales a los que se enfrentan los medios de comunicación. Se ha comprobado que, para atajar la desinformación, no basta con la aplicación de soluciones tecnológicas, ya que se trata de una cuestión estructural que debe ser contenida desde la raíz: la alfabetización mediática desde la juventud para el

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Forma de citar este artículo: Fieiras Ceide, C., Vaz Álvarez, M., y Túñez López, M. (2022). Verificación automatizada de contenidos en las radiotelevisiones públicas europeas: primeras aproximaciones al uso de la inteligencia artificial, *Redmarka. Revista de Marketing Aplicado*, vol 26, núm. 1, 36-51. https://doi.org/10.17979/redma.2022.26.1.8932

Capítulo 9

SISTEMAS ADAPTATIVOS BASADOS EN INTELIGENCIA ARTIFICIAL COMO NUEVAS SOLUCIONES PERSONALIZADAS DE TECNOLOGÍA EDUCATIVA

*César Fieiras Ceide**
*Miguel Túñez López***

Resumen

El avance y proliferación de soluciones tecnológicas ha permeado en el sistema educativo global para ofrecer nuevos recursos, herramientas y procesos que permiten la consolida-

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** Doctor en Periodismo por la Universidad Autónoma de Barcelona, es Profesor Titular de Comunicación organizacional y de Estrategias y planes de comunicación en el Departamento de Ciencias de la Comunicación de la Universidad de Santiago de Compostela.

5.

Cómo acelerar un periodismo de vanguardia: laboratorios de innovación en las noticias de BBC y VRT

César Fieiras Ceide
Universidad de Santiago de Compostela
Yolanda Martínez Solana
Universidad Complutense de Madrid

Resulta complejo predecir con exactitud cómo se desempeñará el periodismo en la próxima década. Más difícil se antoja precisar cuáles serán las tendencias o preferencias de consumo de los usuarios en un contexto extremadamente atomizado. Lo que es seguro es que ambos conceptos, productos periodísticos e intereses de la audiencia, irán aparejados, y la innovación, entendida ésta como una combinación novedosa de ideas, competencias y recursos existentes (Schumpeter, 1934), tendrá un papel protagonista a la hora de ensamblar las noticias y contenidos del futuro.

En esta transición y renovación incesante de rutinas y formatos, los laboratorios de innovación, también llamados *medialabs* o *labs*, se han consolidado desde 2010 como un fenómeno en expansión en los medios internacionales de referencia como *The New York Times*, *The Washington Post*, *The Boston Globe*, *BBC*, entre otros (Salaverría, 2015), suponiendo «una unidad interna de la empresa periodística, dotada de cierto grado de autonomía operativa y equipo humano propio, cuyo cometido es idear y promover innovaciones de carácter tecnológico, editorial y/o comercial, para la mejora competitiva de la organización» (Sádaba; Salaverría, 2016: 153).

El estudio de Salaverría (2015) apunta a que más de 30 medios a escala mundial han puesto en marcha estos departamentos, siendo más frecuentes en medios audiovisuales que en periódicos, con perfiles profesionales con una orientación

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Cocreación en el universo e-sport: estrategia de la RTP para captar a público joven

César Fieiras-Ceide
Universidade de Santiago de Compostela

Resumen:

La captación de público joven se antoja como uno de los mayores desafíos para los medios de servicio público en el nuevo ecosistema digital. En esta línea, la irrupción de realidades como los deportes electrónicos abren nuevas posibilidades de ganar y mantener la atención de este segmento de la población, acercándoles contenidos que reflejan el avance de sus gustos e intereses y con los que se sienten reconocidos. En el caso de la Rádio e Televisão de Portugal, la creación de su plataforma de deportes electrónicos, RTP Arena, les permitió volver a ser relevantes entre el público portugués de 16 a 34 años, siguiendo una estrategia basada en la cocreación de contenidos con los usuarios y los propios deportistas. Daniel Rodrigues, gestor de este producto, apunta que el carácter 360º de su proyecto desemboca en una interacción continua en redes sociales sobre las partidas en directo disputadas entre seguidores y profesionales, así como programas de entrevistas, sesiones formativas de tácticas, entrevistas, e incluso espacios en sus emisiones lineales. Esto ha llevado al canal de Twitch de la marca a ser el más seguido en el país en los últimos 3 años, lo que derivó en una migración inédita de los usuarios jóvenes a sus propios sitios web y canales tradicionales.

SUMARIO: 1. INTRODUCCIÓN.2. CONTEXTO. 2.1. La innovación como valor esencial de los medios de comunicación. 2.2. Fundamentos de las prácticas de cocreación. 2.3. Universo de los deportes electrónicos. 3. RESULTADOS. 3.1. Nacimiento, desarrollo y consolidación de RTP ARENA. 3.2. Cocreación de contenidos en el marco e-sport: captación de audiencias jóvenes. 3.3. Impacto de la Covid-19 sobre RTP Arena. 4. CONCLUSIONES.

Publication 1: Building the future of European Public Service Media: innovation priorities, key points and optimization areas in PSM

BASIC INFORMATION	
Title	Building the future of European Public Service Media: innovation priorities, key points and optimization areas in PSM
Authors	(1) César Fieiras Ceide (2) Martín Vaz Álvarez (3) Miguel Túñez López
Affiliation	Universidade de Santiago de Compostela
Publication Date	June 24, 2024
Journal	Communication & Society
DOI	https://doi.org/10.15581/003.37.3.107-123

QUALITY INDICATORS			
Impact Factor (2023)	JIF: 1.6	JCI: 0.81	SJR: 0.59
Area	Communication		
Quartile	JCI Q2 – Scopus Q1		
Number of Citations	-		
Link	Read here		

Specific contribution of the thesis author to the publication

The specific contributions of the thesis author to this article were fundamental and covered all phases of the development work, in addition to coordinating it. Firstly, the author participated in the conceptualization of the study, designing the specific questionnaire to analyze the innovation strategies, key points, and priority optimization areas of 15 public broadcasters in Europe. In this regard, he directed the observation focus towards identifying the forecasts and future challenges that these corporations foresee for the media sector in the coming years.

During the data collection phase, the author coordinated the first round of consultations with the broadcasters, identifying who is responsible for managing the innovation processes within their structures. Subsequently, he managed the request for interviews with professionals whose profiles were considered most valuable to the project, ensuring that the interviews were conducted efficiently and productively.

Additionally, the author made significant contributions to the analysis and interpretation of the data obtained, reviewing and evaluating the interview content to ensure its coherence and relevance to the study's objective. His participation was also crucial in writing the theoretical framework, developing the results, and drafting the conclusions, offering a critical and integrative perspective that enriched the final document.

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UNIVERSIDADE DE SANTIAGO DE COMPOSTELA

Publication 2: Artificial intelligence strategies in European public broadcasters: Uses, forecasts and future challenges

BASIC INFORMATION	
Title	Artificial intelligence strategies in European public broadcasters: Uses, forecasts and future challenges
Authors	(1) César Fieiras Ceide (2) Martín Vaz Álvarez (3) Miguel Túñez López
Affiliation	Universidade de Santiago de Compostela
Publication Date	October 17, 2022
Journal	Profesional de la información
DOI	https://doi.org/10.3145/epi.2022.sep.18

QUALITY INDICATORS			
Impact Factor (2022)	JIF: 4.2	JCI: 1.12	SJR: 0.87
Area	Communication		
Quartile	JIF Q1 – JCI Q1 – Scopus Q1		
Number of Citations	21 (Google Scholar)		
Link	Read here		

Specific contribution of the thesis author to the publication

In this project, the thesis author contributed significantly to formulating the study's approach, outlining a set of key research questions and objectives aimed at exploring the implementation of artificial intelligence in the newsrooms of 15 public corporations from 12 European countries. This questionnaire allowed for the assessment of not only the practical application of AI but also its importance within innovation strategies and the future challenges posed by this technology.

The author played a key role in coordinating and conducting virtual meetings with professionals from the studied corporations. Additionally, his work included adapting and contextualizing the questions to suit each interviewee and their professional environment. The methodological triangulation of the study was completed through a thorough review of the existing scientific literature on artificial intelligence and its role in innovation within public media. The author also conducted meticulous research on the platforms and websites of the participating corporations, which allowed for verifying responses and enriching the study's context.

The author's participation was not limited to data collection; he also played an essential role in the critical analysis of the information obtained, as well as in writing the theoretical framework and synthesizing the results. His work culminated in the development of well-founded conclusions

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UNIVERSIDADE DE SANTIAGO DE COMPOSTELA

Publication 3: Designing personalisation of European public service media (PSM): trends on algorithms and artificial intelligence for content distribution

BASIC INFORMATION			
Title	Designing personalisation of European public service media (PSM): trends on algorithms and artificial intelligence for content distribution		
Authors	(1) César Fieiras Ceide (2) Martín Vaz Álvarez (3) Miguel Túñez López		
Affiliation	Universidade de Santiago de Compostela		
Publication Date	May 24, 2023		
Journal	Profesional de la información		
DOI	https://doi.org/10.3145/epi.2023.may.11		
QUALITY INDICATORS			
Impact Factor (2023)	JIF: 2.6	JCI: 1.17	SJR: 0.97
Area	Communication		
Quartile	JIF Q1 – JCI Q1 – Scopus Q1		
Number of Citations	10 (Google Scholar)		
Link	Read here		

Specific contribution of the thesis author to the publication

The thesis author's contribution to this article was integral to all phases and stages of the research. Specifically, he participated in the study design, data collection, data processing, and publication of the results in a high-impact international journal.

The questionnaire prepared by the author focused on key aspects such as the functioning of recommendation systems in European public service media (PSM), their origin, the teams responsible for their maintenance, and the concept of the public service algorithm. Additionally, the author coordinated and conducted 14 interviews with technology managers from leading international public media organizations.

The analysis conducted by the author was crucial in identifying trends and patterns in the use of algorithms and recommendation systems. Moreover, the literature review he carried out was instrumental in directing the research objectives and in cross-referencing the information collected from the conversations with media representatives.

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Publication 4: Innovation analysis of national scale public media in the Iberian Peninsula: strategic, technological and youth audience engagement vision in RTVE and RTP

BASIC INFORMATION			
Title	Innovation analysis of national scale public media in the Iberian Peninsula: strategic, technological and youth audience engagement vision in RTVE and RTP		
Authors	(1) César Fieiras Ceide (2) Miguel Túñez López (3) Jorge Pedro Sousa		
Affiliation	Universidade de Santiago de Compostela Universidade Fernando Pessoa		
Publication Date	April 18, 2023		
Journal	Revista Latina de Comunicación Social		
DOI	https://doi.org/10.4185/rlcs-2023-1957		
QUALITY INDICATORS			
Impact Factor (2023)	JIF: 3.00	JCI: 1.17	SJR: 0.76
Area	Communication		
Quartile	JIF Q1 – JCI Q1 – Scopus Q1		
Number of Citations	4 (Google Scholar)		
Link	Read here		

Specific contribution of the thesis author to the publication

The study conducted for this article is based on a three-month research stay by the thesis author at the University Fernando Pessoa in Porto. During this stay, the author, under the supervision of co-authors Miguel Túñez and Jorge Pedro Sousa, organized various meetings and interviews with executives of Rádio e Televisão de Portugal (RTP), the country's state public media.

The author coordinated the execution of these in-depth qualitative interviews with the directors of strategic innovation, technology, and the main project manager for attracting young audiences at RTP and RTVE. These interviews were conducted following the Delphi methodology, in two rounds, to ensure the depth and relevance of the data obtained.

Before the interviews, the author conducted a thorough review of corporate communications and social media publications of both corporations, as well as a detailed analysis of the most impactful digital products on their different platforms. This work allowed for the definition of questionnaires and the establishment of the topics of interest to be addressed in the meetings.

Additionally, the thesis author performed a comparative analysis of the activity of the Playz and RTP Arena channels, evaluating the typical formats produced, the number of followers on their social profiles, the distribution channels, and the most prominent content.

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Publication 5: A new scenario in digital communication: eSports coverage on public broadcasters in Europe

BASIC INFORMATION	
Title	A new scenario in digital communication: eSports coverage on public broad-casters in Europe
Authors	(1) César Fieiras Ceide (2) Miguel Túñez López (3) Isaac Maroto
Affiliation	Universidade de Santiago de Compostela
Publication Date	July 28, 2022
Journal	Revista Latina de Comunicación Social
DOI	https://www.doi.org/10.4185/RLCS-2022-1782

QUALITY INDICATORS			
Impact Factor (2022)	JIF: 3.00	JCI: 0.97	SJR: 0.69
Area	Communication		
Quartile	JIF Q1 – JCI Q1 – Scopus Q1		
Number of Citations	1 (Google Scholar)		
Link	Read here		

Specific contribution of the thesis author to the publication

The specific contributions of the thesis author to this article, titled 'A New Scenario in Digital Communication: eSports Coverage on Public Broadcasters in Europe,' focused on identifying and analyzing the most relevant projects in public service media in Europe related to esports. The author played a transversal role in planning the study, which aims to assess how these projects are used as innovation tools to attract new audiences.

The author was responsible for examining the origin of these proposals and their activities, as well as the content formats produced, the teams involved, professional routines, and distribution strategies, both on their own platforms and on social media. For the study, the author selected a convenience sample based on the size of the work teams and the quantitative and qualitative production of content. The sample comprised three notable projects: RTP Arena in Portugal, Yle eSports in Finland, and SVT eSports in Sweden. Additionally, the author conducted a comparative analysis of the strategies and practices of the different work teams, identifying emerging patterns and trends in the esports sector.

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Publication 6: Actividad empleadora en la televisión pública de la era de la automatización: employer branding, canales de contratación, procesos de selección, competencias y perfiles profesionales demandados

BASIC INFORMATION	
Title	Actividad empleadora en la televisión pública de la era de la automatización: employer branding, canales de contratación, procesos de selección, compe-tencias y perfiles profesionales demandados
Authors	(1) César Fieiras Ceide (2) María José Ufarte Ruiz (3) Martín Vaz Álvarez
Affiliation	Universidade de Santiago de Compostela Universidad Castilla-La Mancha
Publication Date	December 12, 2023
Journal	Estudios Sobre el Mensaje Periodístico
DOI	https://dx.doi.org/10.5209/esmp.88582
QUALITY INDICATORS	
Impact Factor (2023)	SJR: 0.39
Area	Communication
Quartile	Scopus Q2
Number of Citations	1 (Google Scholar)
Link	Read here

Specific contribution of the thesis author to the publication

In this article, the thesis author designed a mixed methodology that combined interviews and qualitative content analysis. The author was responsible for defining the methodological framework, which included interviews with strategy managers from 10 European public service media and the application of qualitative content analysis techniques, following the approaches of Krippendorff (1990) and Ruiz (1996). This resulted in the creation of an analysis sheet with fourteen categories and five variables.

The author conducted the qualitative interviews, ensuring comprehensive and detailed data collection, and subsequently performed an observation of the gathered information to cross-check and compare it with the results obtained from the analysis sheet. This approach provided a complete overview of the employment activities in public television during the automation era, focusing on recruitment channels, the competencies and professional profiles in demand, the selection processes, and the practices for enhancing employer branding.

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Publication 7: Innovation and metaverse: first experiences and use cases in European Public Service Media

BASIC INFORMATION	
Title	Innovation and metaverse: first experiences and use cases in European Pub-lic Service Media
Authors	(1) César Fieiras Ceide (2) Verónica Crespo Pereira (3) Miguel Túñez López
Affiliation	Universidade de Santiago de Compostela Universidade Da Coruña
Publication Date	July 1, 2024
Journal	Revista Mediterránea de Comunicación
DOI	https://www.doi.org/10.14198/MEDCOM.26903

QUALITY INDICATORS			
Impact Factor (2023)	JIF: 1.00	JCI: 0.51	SJR: 0.364
Area	Communication		
Quartile	JIF Q3 – JCI Q3 – Scopus Q2		
Number of Citations	-		
Link	Read here		

Specific contribution of the thesis author to the publication

For the preparation of this research article, the thesis author dedicated himself to exploring and analyzing the initial experiences and use cases of the metaverse in the leading public broadcasting corporations in Europe. The author prepared the questionnaires and conducted in-depth personal interviews with the directors of innovation, technology, or strategy responsible for managing metaverse initiatives in the 15 selected corporations.

Additionally, the author handled the methodological triangulation, which included reviewing corporate notes and internal reports to analyze the presence of the metaverse concept in the corporations' priorities and interests. These documents were mainly located through a search in the corporate communications sections of the media, although in some cases, the interviewed professionals themselves shared relevant internal documents for the research.

Another significant contribution from the author was the observation and monitoring of the social media and virtual environment proposals of these corporations. This work began with an initial review at the start of the research and continued with ongoing monitoring to detect and analyze use cases, evaluate the functioning of these projects and their utility, and verify the validity of the information collected.

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Publication 8: Tendencias y previsiones de innovación en la realización audiovisual y retransmisión de eventos deportivos: optimización de la experiencia de usuario en DAZN y Movistar Plus+

BASIC INFORMATION	
Title	Tendencias y previsiones de innovación en la realización audiovisual y retransmisión de eventos deportivos: optimización de la experiencia de usuario en DAZN y Movistar Plus+
Authors	(1) César Fieiras Ceide (2) María José Ufarte Ruiz
Affiliation	Universidade de Santiago de Compostela Universidad Castilla-La Mancha
Publication Date	February 7, 2024
Journal	IC – Revista Científica de Información y Comunica-ción
DOI	https://dx.doi.org/10.12795/IC.2023.I20.11
QUALITY INDICATORS	
Impact Factor (2023)	SJR: 0.28
Area	Communication
Quartile	Scopus Q2
Number of Citations	-
Link	Read here

Specific contribution of the thesis author to the publication

The thesis author was essential in the production of this research project, directly participating in the selection and application of the case study technique to conduct the analysis, focusing on two specific projects: DAZN and Movistar Plus+. The author conducted an exhaustive observation of the data from each of the study units, extracting relevant information through in-depth searches. This process included reviewing reports, user data, and internal documentation of both platforms to better understand their strategies and innovative practices.

Additionally, the fieldwork conducted by the author included organizing and executing semi-structured in-depth interviews with various professionals from DAZN and Movistar Plus+, selecting complementary profiles with a qualified perspective on the topic. These interviews allowed the author to obtain a comprehensive and detailed perspective on innovations in audiovisual production and the broadcasting of sporting events, as well as strategies to optimize the user experience.

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Publication 9: AI Implementation Strategies in the Spanish Press Media: Organizational Dynamics, Application Flows, Uses and Future Trends

BASIC INFORMATION			
Title	AI Implementation Strategies in the Spanish Press Media: Organizational Dynamics, Application Flows, Uses and Future Trends		
Authors	(1) César Fieiras Ceide (2) Martín Vaz Álvarez (3) Isaac Maroto González		
Affiliation	Universidade de Santiago de Compostela		
Publication Date	April 15, 2024		
Journal	Trípodos		
DOI	https://doi.org/10.51698/tripodos.2024.55.01		
QUALITY INDICATORS			
Impact Factor (2023)	JIF: 0.5	JCI: 0.26	SJR: 0.25
Area	Communication		
Quartile	JIF Q4 – JCI Q4 – Scopus Q3		
Number of Citations	-		
Link	Read here		

Specific contribution of the thesis author to the publication

For the preparation of this research article, the thesis author was responsible for designing the interview questions for the technology managers of the 10 newspapers with the highest number of daily readers in Spain. The aim was to explore the current organizational and production dynamics related to AI, the implementation flows of automated tools, and the departments and professionals involved. Additionally, the interviews focused on identifying the current uses of artificial intelligence and its impact on existing and demanded professional profiles, as well as future forecasts that could anticipate the evolutionary trend of this technology in the sector.

In addition to conducting the interviews, the author participated in all phases of the project, carrying out an exhaustive analysis of the main content of these media and the functioning of their digital platforms. This analysis allowed for the detection of possible uses of automated techniques in their informational proposals and evaluated their impact on content production and distribution.

The author was also responsible for data triangulation, integrating the information obtained from the interviews with the results of the content analysis. This rigorous methodological approach ensured the acquisition of precise and relevant results, providing a comprehensive view of the implementation of artificial intelligence in the Spanish press.

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Publication 10: Verificación automatizada de contenidos en las radiotelevisiones públicas europeas: primeras aproximaciones al uso de la inteligencia artificial

BASIC INFORMATION	
Title	Verificación automatizada de contenidos en las radiotelevisiones públicas europeas: primeras aproximaciones al uso de la inteligencia artificial
Authors	(1) César Fieiras Ceide (2) Martín Vaz Álvarez 3) Miguel Túñez López
Affiliation	Universidade de Santiago de Compostela
Publication Date	June 30, 2022
Journal	Redmarka
DOI	https://doi.org/10.17979/redma.2022.26.1.8932
QUALITY INDICATORS	
Data base	Latindex
Area	Communication
Number of Citations	14
Link	Read here

Specific contribution of the thesis author to the publication

In the tenth compiled article, the contribution of the thesis author involved contacting and organizing interviews with the directors of artificial intelligence from various public broadcasters: ARD (Germany), ORF (Austria), VRT (Belgium), RTVE (Spain), BBC (Great Britain), RAI (Italy), RTS (Switzerland), and members of the EBU. The author also conducted these interviews in two rounds, using a semi-structured questionnaire with 12 questions.

The author designed the questions, adapting them specifically to each corporation interviewed, ensuring that relevant and particular issues of each entity were addressed. The main thematic blocks included in all interviews were: the application of artificial intelligence in content verification, systems for detecting and tracking fake news, the advancement and development of innovation strategies in broadcasting, and future forecasts and challenges regarding fake news.

The author also conducted a review of the existing literature on automated content verification and innovation strategies in public media, which allowed him to contextualize the interview findings within the theoretical framework.

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Publication 11: Sistemas adaptativos basados en inteligencia artificial como nuevas soluciones personalizadas de tecnología educativa

BASIC INFORMATION	
Title	Sistemas adaptativos basados en inteligencia artificial como nuevas solucio-nes personalizadas de tecnología educativa
Authors	(1) César Fieiras Ceide (2) Miguel Túñez López
Affiliation	Universidade de Santiago de Compostela
Publication Date	2023
Journal	Tirant lo Blanch
ISBN	978-84-19226-74-7
QUALITY INDICATORS	
Ranking	SPI Scholarly Publishers Indicators in Humanities and Social Siences (2022): Q1
Area	Humanities and Social Sciences
Link	Read here

Specific contribution of the thesis author to the publication

The eleventh compiled publication is a book chapter published by Tirant lo Blanch, focusing on analyzing the functioning, benefits, and drawbacks of personalized educational solutions based on artificial intelligence. In this chapter, the author of this doctoral thesis coordinated and participated in all phases of the research, from organizing resources and analyzing systems and success cases to writing the final document.

The analysis conducted by the author included an exhaustive evaluation of AI-based adaptive systems, examining their capacity to offer personalized educational solutions. This study covered both technical and pedagogical aspects, considering how these systems can enhance the educational experience and adapt to the individual needs of students.

Additionally, the author assessed the potential benefits of these technologies, such as improved academic performance, personalized learning, and support for educational decision-making. The disadvantages and challenges associated with the implementation of these systems were also addressed, including ethical issues, privacy concerns, and equity in access to technology.

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Publication 12: Cocreación en el universo e-sport: estrategia de la RTP para captar a público joven

BASIC INFORMATION	
Title	Cocreación en el universo e-sport: estrategia de la RTP para captar a público joven
Authors	(1) César Fieiras Ceide
Affiliation	Universidade de Santiago de Compostela
Publication Date	2022
Journal	Tirant lo Blanch
ISBN	978-84-19226-74-7
QUALITY INDICATORS	
Ranking	SPI Scholarly Publishers Indicators in Humanities and Social Siences (2022): Q1
Area	Humanities and Social Sciences
Link	Read here

Publication 13: Cómo acelerar un periodismo de vanguardia: laboratorios de innovación en las noticias de BBC y VRT

BASIC INFORMATION	
Title	Cómo acelerar un periodismo de vanguardia: laboratorios de innovación en las noticias de BBC y VRT
Authors	(1) César Fieiras Ceide (2) María Yolanda Martínez Solana
Affiliation	Universidade de Santiago de Compostela Universidad Complutense de Madrid
Publication Date	2023
Journal	Comunicación Social Ediciones y Publicaciones
ISBN	978-84-17600-96-9
QUALITY INDICATORS	
Ranking	SPI Scholarly Publishers Indicators in Humanities and Social Siences (2022): Q2
Area	Humanities and Social Sciences
Link	Read here

Specific contribution of the thesis author to the publication

In the final compiled publication, the participation of the thesis author was crucial in selecting the innovation labs to be studied. The analysis conducted by the author covered various dimensions, including the internal structure of the labs, the working methodologies, and the professional profiles that make up their teams. This analysis allowed for the identification of the motivations behind the creation of these labs, as well as the disparities in their approaches and working routines.

To carry out this observation, the author conducted in-depth qualitative interviews with Miranda Marcus, Executive Product Director at the BBC News Lab, and Chajá Libot, User Researcher at the NWSlab of VRT. Additionally, the author performed a comprehensive mapping of the BBC Innovation Lab's website, meticulously analyzing its activities and compiling a list of all the projects and events they have made public since their inception. In the case of VRT, a follow-up questionnaire was used to refine and clarify the data obtained, ensuring the accuracy and relevance of the collected information.

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CAPÍTULO 3:
PRESENTACIÓN DO MARCO TEÓRICO

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3.1 A innovación como motor estratéxico do futuro PSM

A aparición de plataformas de vídeo baixo demanda (VOD) como Netflix revitalizou a contorna mediática, impactando considerablemente ás emisoras tradicionais que existían antes do auxe da internet (Raats & Jensen, 2020). Neste escenario, a innovación nos medios de comunicación preséntase como unha estratexia esencial, permeando todas as accións e seccións co fin de proxectar unha versión mellorada cara ao futuro, sen descoidar as necesidades presentes. Este proceso de renovación e reposicionamento é particularmente importante para os medios de servizo público (PSM), cuxo valor radica no seu compromiso coa cidadanía, a credibilidade e o desenvolvemento económico rexional, diferenciándoos das operadoras comerciais (Cañedo; Rodríguez-Castro & López-Cepeda, 2022).

As estratexias de crecemento e renovación dos PSM dependen de diversos factores, incluíndo os contextos nacionais específicos, o apoio gobernamental, as prioridades políticas e reguladoras, o papel e o status do PSM en cada país, así como factores culturais e de mercado (D'Arma; Raats & Steemers, 2021). A transformación dixital alterou de maneira significativa a esfera pública (Habermas, 2021), e os PSM deben manter os seus niveis de financiamento fronte á competencia crecente das operadoras comerciais (Donders, 2019). Este cambio expón desafíos teóricos, políticos e estratéxicos para o futuro dos PSM, con niveis de confianza e de apoio cidadán que varían notablemente entre países e rexións (Donders, 2021).

Para que os PSM manteñan a súa relevancia, é crucial que traballen na súa contribución social, evitando que este valor se perciba unicamente como unha estratexia de márketing ou comunicación corporativa. No seu lugar, deben asegurar melloras operativas que beneficien ao público e xustifiquen o seu financiamento (Puppis & Ali, 2023). A innovación, un dos compromisos fundamentais dos PSM, foi definida como un dos seis valores esenciais que xustifican a presenza indispensable das radiotelevisións públicas en democracias funcionais (EBU, 2012).

Donders, Raats e Tintel (2020) argumentan que os PSM están nunha posición única para liderar a innovación por catro razóns principais: primeiro, posúen un historial de renovación apoiado polo principio de universalidade, que lles permitiu distribuír servizos a todos os públicos, requirindo desenvolvementos tecnolóxicos significativos. Segundo, a innovación é contextual, e os PSM, integrados nos tecidos históricos, políticos, económicos, sociais e culturais dos seus respectivos Estados, están mellor posicionados que os conglomerados internacionais para liderar estes procesos (Donders et al. 2021). Terceiro, contan con orzamentos relativamente estables, o que lles permite asumir os riscos específicos dos investimentos relacionados. Finalmente, os PSM priorizan o interese público sobre o desenvolvemento do mercado, os

resultados financeiros ou a eficiencia, consideracións fundamentais para a calidade, a diversidade e o acceso no desenvolvemento de innovacións tecnolóxicas (Donders, Raats & Tintel, 2020).

Nos últimos anos, o concepto de innovación no ecosistema dos medios foi impulsado principalmente polos avances tecnolóxicos. Inicialmente, o xornalismo de alta tecnoloxía (López-García & Vizoso, 2021), que empregaba drons e realidade virtual, foi pioneiro nesta área, pero recentemente, foi superado polos significativos avances en intelixencia artificial (IA), especialmente en IA xenerativa como ChatGPT. Esta tecnoloxía revolucionou numerosas tarefas xornalísticas tradicionais, impulsando aos medios para adoptar novas estratexias de reconversión e a buscar profesionais capacitados. Con todo, este fenómeno non impactou directamente na contratación de expertos en IA, probablemente debido á escaseza destes perfís no mercado laboral (Fieiras, Ufarte & Vaz, 2023). A incorporación destes novos perfís constituirá un dos maiores desafíos de innovación para os PSM europeos nos vindeiros anos.

Simultaneamente, a creación de estratexias para a innovación, influenciadas pola tecnoloxía e a intersección entre os valores de servizo público e a intelixencia artificial, foi un tema amplamente debatido na academia (Fieiras, Vaz & Túñez, 2022a; Sørensen & Hutchinson, 2018; Van den Bulck & Moe, 2018). A implementación de sistemas de recomendación algorítmica, a xestión de datos persoais e a automatización na distribución de contido varía entre os principais PSM europeos, sendo un tema controvertido. Aínda que un número crecente de PSM europeos empeza a integrar estas tecnoloxías, as corporacións con maiores orzamentos continúan liderando os avances máis significativos (Fieiras, Vaz & Túñez, 2022b).

Co avance inminente destas tecnoloxías, o informe Reuters sobre tendencias e predicións en xornalismo, medios e tecnoloxía (Newman, 2024) prevé que a maioría dos contidos en liña serán de creación sintética para 2026. Neste contexto, os PSM europeos deben desenvolver modelos metodolóxicos para prever e aplicar a innovación con axilidade. Un exemplo destes modelos é o enfoque dos tres horizontes de crecemento (Baghay, Coley & White, 1999), aplicado por Yle en Finlandia e NPO nos Países Baixos, que define tres escenarios de actividade para fomentar a innovación e preparar aos equipos para futuros avances:

1. **Horizonte 1 (H1):** Enfócase en mellorar o rendemento dos produtos e servizos actuais para xerar ingresos incrementais constantes. Son iniciativas de baixo risco que perfeccionan e amplían o modelo de negocio existente.

2. **Horizonte 2 (H2):** Consiste en oportunidades emerxentes con potencial de crecemento significativo, xeralmente en fases piloto e que requiren un investimento considerable, aliñadas cos obxectivos estratéxicos da corporación.

3. Horizonte 3 (H3): Comprende ideas para o crecemento futuro, como novos modelos de negocio ou tecnoloxías radicalmente innovadoras, cun alto grao de incerteza pero elevado potencial de crecemento. Requiren un investimento significativo en investigación e desenvolvemento.

Schumpeter (1975) foi un pioneiro na investigación da innovación como factor clave para as empresas, e Fageberg (2003) expandiu esta noción ao indicar que a innovación afecta tanto á tecnoloxía como á organización dos procesos de produción, influenciando tanto o produto como á súa elaboración. Con todo, a innovación estratéxica nos medios tradicionais frecuentemente limitouse á adopción de novas tecnoloxías sen un cambio real nos modelos operativos (Mitchelstein & Boczkowski, 2009; Ostertag & Tuchman, 2012; Spyridou et al., 2012). Por esta razón conclúese que a renovación e modernización dos medios públicos dependerá da combinación de servizo público, creatividade, innovación e interacción, utilizando experiencias relevantes e impactantes para o contido educativo e público (Glowacki & Jackson, 2013).

No ámbito informativo, o obxectivo principal é protexer ao xornalismo en termos de diversidade e calidade (Ferrel Lowe & Stavitsky, 2016), para o que as redes sociais convertéronse nun espazo esencial para o diálogo entre os medios de servizo público europeos e as súas audiencias. Todas as corporacións europeas están presentes nestas plataformas, con varios perfís e numerosos seguidores, o que demostra a súa comprensión da importancia destas ferramentas para crear un diálogo estable cos seus usuarios (López-Golán et al., 2019).

A pesar das dificultades financeiras, estruturais e políticas, estes medios tentan responder ao impacto das novas tecnoloxías e plataformas mediante a innovación estratéxica. Buscan unha maior interacción e formas de conversación social, especialmente coas audiencias novas, que están máis afastadas da programación das emisoras públicas (López-Golán et al., 2019). Actualmente, a maioría dos adolescentes utilizan o móbil como dispositivo principal para consumir información e noticias a través de redes sociais (Reuters Institute, 2016), recorrendo a plataformas dixitais para entretemento breve e intermitente.

A consolidación de comunidades estables de seguidores que xeren interaccións valiosas é unha prioridade para os entes de radiodifusión públicos europeos. Ofrecen servizos como a creación de listas de reprodución, a marcación e descarga de contidos, o que facilita a recompilación de datos necesarios para establecer sistemas de recomendación algorítmica. Aínda que esta personalización debe ter obxectivos distintos aos das operadoras comerciais, proporciona novas posibilidades para a xestión de contidos (López-Golán et al., 2019).

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Estes cambios na regulación, gobernanza, financiamento e implementación de novas tecnoloxías responden á necesidade de adaptación das corporacións ás demandas comunicativas dunha

sociedade dixital (Tambini, 2015; Khajeheian & Tadayoni, 2016; Van den Bulck et al., 2017). Estas adaptacións enmárcanse no debate sobre a actualización dos valores de servizo público e o cumprimento dos seus compromisos coa sociedade.

A Unión Europea de Radiodifusión (EBU, en inglés), con 73 membros en 53 países, interiorizou e vertebrou estas transformacións. Na súa Asemblea Xeral, a EBU acordou seis valores fundamentais que deben guiar aos entes públicos de radiodifusión: universalidade, independencia, excelencia, diversidade, responsabilidade e innovación EBU, 2014). Estes valores convertéronse nos atributos de referencia que marcan a folla de roteiro destas empresas de radiotelevisión.

A relación estreita coas audiencias permite aos medios entender mellor as súas preocupacións e preferencias, así como achegarse aos contextos cotiáns dos novos usuarios, ofrecendo servizos máis personalizados e relevantes. As radiotelevisións públicas europeas deben situar a innovación no centro das súas estratexias para renovar a súa cultura corporativa, optimizar os procesos de produción e distribución de contido, mellorar a comunicación empresarial e atraer novamente aos públicos novos que prefiren as plataformas de comunicación dixital privada (Ranaivoson et al., 2013).

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3.2. Efectos, posibilidades e desafíos da intelixencia artificial na información e comunicación periodística

A intelixencia artificial (IA) no xornalismo comezou coa automatización de tarefas básicas, evolucionando na última etapa cara a aplicacións máis avanzadas capaces de realizar reportaxes e análises de datos. Esta evolución reflicte tendencias tecnolóxicas máis amplas, onde o progreso en IA incrementou a súa aplicabilidade en diversos campos, incluída a comunicación. A optimización de tecnoloxías de IA desde simples algoritmos de clasificación ata ferramentas sofisticadas de xeración de linguaxe natural exemplifica un cambio significativo nas capacidades e o potencial da IA para a creación de noticias (Gondwe, 2023).

No xornalismo moderno, a IA emprégase cada vez máis para mellorar a eficiencia, precisión e profundidade das reportaxes. Os medios de comunicación de todo o mundo están a integrar a IA en todas as fases de produción de noticias, desde a xeración automatizada de contido ata o xornalismo de investigación complexo. As áreas de aplicación máis populares inclúen a automatización da xeración de noticias, a análise de grandes conxuntos de datos para descubrir tendencias e historias, e a mellora da participación da audiencia mediante contidos personalizados (Diakopoulos, 2019).

Charlie Beckett, profesor da London School of Economics (LSE) e director do Proxecto Journalism AI, afirma que as redaccións de todo o mundo están a adoptar a IA nos seus procesos de traballo para aumentar a produtividade e o impacto, nun contexto de redución de financiamiento e fontes de ingresos para o xornalismo (Euronews, 2023). Ferramentas de IA xenerativa como ChatGPT e Midjourney cobraron especial relevancia na produción informativa, xa que ofrecen oportunidades para aumentar a eficiencia e crear novos tipos de contidos semiautomatizados. Nesta liña, The Guardian, un medio recoñecido a nivel internacional no Reino Unido, declarou a súa intención de empregar IA xenerativa para mellorar a calidade do traballo xornalístico, asistindo aos xornalistas na exploración de grandes conxuntos de datos e na xeración de ideas para novas campañas de márketing (Euronews, 2023).

A velocidade coa que se desenvolven estas tecnoloxías expón desafíos éticos considerables (González Arencibia & Martínez Cardero, 2020). No ámbito da IA, o desenvolvemento de prototipos avanza máis rápido que a capacidade das institucións e organizacións para proporcionar respostas legais e deontolóxicas adecuadas (Pedrero-Esteban & Pérez-Escoda, 2021). Isto subliña a necesidade de abordar as implicacións éticas da nova contorna mediática dixital, onde os algoritmos aprenden das rutinas humanas para personalizar os contidos.

Neste marco, o Parlamento Europeo aprobou o 13 de marzo de 2024 a primeira Lei de IA, unha lexislación deseñada para regular a intelixencia artificial a través dun enfoque baseado no risco. Esta normativa clasifica os sistemas de aprendizaxe automática en catro categorías principais, determinadas segundo o nivel de risco potencial que representan para a sociedade. No caso dos motores de recomendación algorítmica, estes sistemas descifran as preferencias individuais baseándose no tempo de navegación e o rastro dixital, recoñecendo os gustos e filtrando de maneira selectiva as propostas de consumo (Le, 2018). Esta capacidade pode conlevar riscos de illamento, pero resulta particularmente útil en situacións de infodemia, concepto popularizado pola OMS (2020) durante a pandemia de Covid-19, definido como unha sobreabundancia de información, veraz ou falsa, que dificulta atopar fontes confiables.

No ámbito das noticias e os medios de comunicación, existe unha preocupación constante sobre a posible redución da diversidade informativa debido aos sistemas de recomendación algorítmica (Napoli, 2011). Este debate evolucionou cara á idea de "burbullas de filtro" (Pariser, 2011), xeradas por un filtrado colaborativo que tende a priorizar contido popular sobre contido específico de interese (Bozdag & Van-dean-Hoven, 2015). Con todo, investigacións recentes indican que os algoritmos poden ofrecer diversidade de maneira similar aos editores humanos (Möller et al., 2018), suxerindo que a preocupación polas burbullas de filtro podería estar esaxerada (Zuiderveen-Borgesius et al., 2016).

A IA xenerativa, baseada en redes neuronais adestradas mediante aprendizaxe automática e profunda, é unha das aplicacións máis penetrantes e controvertidas na produción de contido (Campesato, 2020). O seu uso expón implicacións en esferas laborais, económicas e educativas, o que levou á creación de iniciativas que promoven unha utilización ética e responsable, como o observatorio OdiseIA, o programa AI for Social Good de Google, e o proxecto OpenAI (Franganillo, 2023).

O xornalismo automatizado conleva riscos e desafíos éticos, legais e sociais (Davenport & Mittal, 2022) relacionados coa veracidade, autoría, transparencia, responsabilidade e influencia sobre a opinión pública. Isto crea un panorama complexo con múltiples posibilidades, pero tamén con obstáculos que deben ser monitoreados (Franganillo, 2023). As empresas tecnolóxicas deben garantir a transparencia e responsabilidade das súas propostas, e o Parlamento Europeo estableceu as bases da Lei de Intelixencia Artificial para regular o uso de datos en modelos xenerativos e protexer a privacidade dos cidadáns ante posibles vulneracións de dereitos ou usos malintencionados (Ayuso & Pascual, 2023).

Autores como Gondwe (2023) propoñen dividir a aplicación da IA Xenerativa en xornalismo en varias áreas crave:

1. Visión por Computador (VC): Esta tecnoloxía permite aos computadores extraer información significativa de imaxes dixitais, aplicándose no recoñecemento facial e a interpretación de imaxes.

USC UNIVERSIDADE DE SANTIAGO DE COMPOSTELA

2. Recoñecemento da Fala: Enfócase na conversión da fala humana en texto, sendo utilizado en aplicacións que obedecen ordes de voz ou responden a preguntas faladas.

3. Procesamento da Linguaxe Natural (PLN): Esta disciplina permite aos computadores manipular texto e palabras faladas de forma similar aos humanos, comprendendo e respondendo a datos de texto ou voz, e xerando textos lexibles.

A tecnoloxía de Generative Pretrained Transformer (GPT) revolucionou o campo do xornalismo e a produción de información, destacándose ChatGPT como un dos modelos máis influentes. En xuño de 2023, ChatGPT, baseado en GPT-3, alcanzou máis de 100 millóns de usuarios e 1.600 millóns de visitas mensuais, reflectindo a súa rápida popularización. Esta ferramenta ofrece unha nova vía de produción para diversos medios xornalísticos, suscitando debates sobre a propiedade intelectual e a ética no uso de intelixencia artificial xenerativa. A capacidade de ChatGPT para manexar unha ampla gama de consultas e xerar textos coherentes e contextualmente relevantes convérteo nun recurso valioso para o xornalismo, como sinalan académicos como Newman et al. (2022).

En España, observouse unha crecente apertura cara ao uso da IA na prensa, especialmente na recolección e distribución de información. Con todo, persiste certa reticencia respecto á súa aplicación na produción de contido, principalmente pola incredulidade e o descoñecemento acerca das opcións automatizadas que ofrece a IA (Fieiras et al., 2022b; Sánchez-García et al., 2023).

A medida que avanza a IA, aumentan as posibilidades de engano, xa que os sistemas sofisticados que xeran contidos artificiais con alta verosimilitude poden confundir á sociedade se non parten dun código de conduta apropiado. É fundamental fomentar a conciencia pública sobre o uso ético e responsable desta tecnoloxía, pois aínda que a IA xenerativa pode aumentar a produtividade, tamén pode ocasionar conflitos en termos de democracia, emprego, economía e cultura (Franganillo, 2023). Aínda que a IA está a democratizarse mediante a accesibilidade a ferramentas, unha formación e comprensión xeneralizadas sobre o seu funcionamento son necesarias para unha verdadeira democratización. Sen embargo, existen intereses privados que restrinxen ou condicionan este proceso (Franganillo, 2023).

A pesar destes avances, requírense estudos lonxitudinais para comprender plenamente a situación da IA xenerativa nos medios, considerando que a súa adopción varía internacionalmente e está influída por factores tecnolóxicos, políticas mediáticas e contextos culturais. A adopción da IA no xornalismo foi desigual, reflectindo a diversidade de avances tecnolóxicos e paisaxes mediáticas, e tendo en conta que a IA xenerativa esixe unha alta alfabetización, representando unha barreira de entrada significativa para o seu uso (Gilbert, 2021).

Nos medios públicos, a implementación da IA debe aliñarse cos valores públicos, priorizando aspectos éticos sobre as demandas do mercado (Sørensen, Van den Bulck & Kosta, 2021). Cuéstionase se o uso de IA e algoritmos, que implican personalización dixital, pode prexudicar a universalidade e privacidade dos usuarios (Van den Bulck & Moe, 2018). A incorporación de IA en medios de servizo público permite unha diferenciación respecto aos medios comerciais, desenvolvendo algoritmos de servizo público que evitan filtros burbulla e cámaras de resonancia, protexendo ao mesmo tempo os datos dos usuarios (Fieiras et al., 2023). Isto convida a reflexionar sobre se as propostas privadas comprometen en exceso a privacidade das audiencias e limitan o acceso a contidos plurais, universais e diversos.

Gondwe conclúe que a IA xenerativa aplícase no xornalismo principalmente de dúas formas:

- **Xeración de Contidos:** Algoritmos de IA crean automaticamente artigos de noticias, informes e outros contidos xornalísticos, producindo textos coherentes e relevantes contextualmente.

- **Análise de Datos e Perspectivas:** Algoritmos de IA analizan grandes conxuntos de datos, identifican patróns e extraen conclusións significativas para o xornalismo, facilitando o procesamento, visualización e interpretación automatizados de datos.

USC
UNIVERSIDADE DE SANTIAGO DE COMPOSTELA

3.3. Estratexias de IA nos medios de servizo público

A implementación de programas de intelixencia artificial (IA) nos medios de comunicación de servizo público conleva unha serie de decisións estratéxicas. En primeiro lugar, os medios poden optar por desenvolver un algoritmo propio, o que non só implica un considerable investimento económico, senón tamén a dificultade de recrutar persoal cualificado no mercado que posúa as habilidades necesarias para construír e xestionar unha infraestrutura de IA. Alternativamente, poden adquirir produtos desenvolvidos por terceiros. Con todo, esta opción pode ser problemática, especialmente para o PSM, debido aos seus requisitos específicos en canto a contido e procesamento de datos (Rojas-Torrijos, 2019).

Coa irrupción da internet, os medios de comunicación experimentaron unha transformación significativa. Xurdiron novas plataformas como os cibermedios, e incorporáronse novas dimensións ao perfil xornalístico, tales como a hipertextualidade, a interactividade e o multimedia (Túñez-López, Toural-Bran & Valdiviezo-Abad, 2019). Un desafío crucial nesta nova contorna é a posible substitución da parte cognitiva do traballo xornalístico por aplicacións de IA, ademais das tarefas rutineiras. Para aproveitar plenamente estas tecnoloxías, os xornalistas deben adaptarse a pensar como unha máquina (Lewis, Guzmán & Schmidt, 2019).

No ámbito dos medios de servizo público (PSM), existe un debate paralelo sobre a implementación da IA. Tradicionalmente, estes medios constituíronse co obxectivo de garantir dereitos como o acceso á información, á diversidade e á universalidade (Aslama-Horowitz & Nieminen, 2017). Por tanto, a integración de ferramentas intelixentes que seleccionen, filtren e distribúan contido resulta especialmente delicada, dado que estes mecanismos deben aliñarse cos valores do servizo público, evitando a creación de burbullas de filtros e a omisión de información relevante para unha sociedade democrática. Con todo, o alto custo asociado ás tecnoloxías de IA, tanto no seu despregamento técnico como na contratación de talento, representa unha limitación para moitos PSM, especialmente en aplicacións esixentes ou personalizadas.

A xestión da privacidade tamén constitúe un reto significativo para os medios que utilizan estas tecnoloxías. Os algoritmos requiren datos para executar as súas funcións, o que expón cuestións sobre a lexitimidade da posesión e uso de datos persoais da audiencia na creación de novos produtos. Os PSM deben cumprir coas normas do Regulamento Xeral de Protección de Datos (GDPR), vixente desde o 25 de maio de 2018, que amplía os dereitos dos usuarios en canto á protección da súa información persoal, incluíndo o dereito para ser informado sobre o tratamento dos seus datos e o dereito ao

esquecemento (Sørensen & Van den Bulck, 2018). Aínda que necesaria, esta normativa pode representar unha desvantaxe competitiva fronte aos xigantes dos medios que utilizan datos persoais de maneira máis habitual a través de servizos de subscrición.

En termos de distribución e interacción, os algoritmos ofrecen cada vez máis valor aos medios de comunicación. Yle Finlandia, pioneira na personalización a través da súa aplicación de noticias Yle NewsWatch en 2014, estableceu un referente para outras corporacións. Esta ferramenta recompila datos de tres fontes: as eleccións activas do usuario, o comportamento doutros usuarios e as decisións editoriais. Ademais, incorporou Voitto, o primeiro asistente persoal de noticias intelixente, que mostraba recomendacións directamente na pantalla de bloqueo (Yleisradio, 2018), e tamén asistiu aos editores na cobertura de eventos como eleccións municipais e partidos da NHL.

No ámbito da cooperación internacional, os organismos públicos europeos de radiodifusión uniron esforzos para desenvolver unha plataforma destinada a compartir os seus coñecementos en ciencia de datos e sistemas de personalización. Este proxecto, impulsado pola European Broadcasting Union (EBU) e coñecido como Peach (Personalización para Cada Un), opera cunha diversidade de algoritmos deseñados para ampliar o catálogo de contidos accesibles aos usuarios (EBU, 2019). A iniciativa foi orixinalmente lanzada por Bayerische Rundfunk (BR) en Alemaña e, posteriormente, continuou baixo a coordinación da EBU (Sørensen, 2019).

No marco do proxecto Peach, o sistema de recomendación vese complementado polo labor dos editores na sección de noticias. Os redactores teñen a capacidade de seleccionar contidos baseándose en categorías, seccións de noticias, fontes ou datas específicas. Unha vez realizada a selección, procédese á etapa final do proceso, que é a publicación en sitios web e aplicacións (Canavilhas, 2022). A EBU (2021) define esta iniciativa como “o contido adecuado no momento adecuado para a persoa adecuada no dispositivo adecuado”.

Esta tecnoloxía de intelixencia artificial, desenvolta de maneira colaborativa e de código aberto, ten como obxectivo adaptar a oferta informativa aos intereses dos usuarios, combinando as súas preferencias coas tendencias informativas prevalecentes (Canavilhas, 2022). O proxecto Peach inclúe algoritmos que procesan diversos tipos de contidos (texto, audio, vídeo), xestionando aproximadamente 20 millóns de elementos diarios. Cada contido é transformado nunha representación vectorial mediante modelos de aprendizaxe automática previamente adestrados, o cal permite asociar pezas similares aínda que os seus descritores difiran (Canavilhas, 2022).

USC UNIVERSIDADE DE SANTIAGO DE COMPOSTELA

Simultaneamente, a Radio Télévision Belge da Communauté Française (RTBF), unha corporación belga de servizo público, desenvolveu outro proxecto de software dirixido a crear solucións xenéricas de recomendación para os PSM. Do mesmo xeito que Peach, este proxecto aborda a necesidade de diversidade nos medios públicos (Sørensen, 2019).

En canto ao control de calidade dos contidos, a Österreichischer Rundfunk (ORF) en Austria implementou o sistema de medición e control de calidade máis estruturado e integral de Europa. A lóxica detrás do enfoque da ORF é clara: se o contido coincide cos intereses individuais do usuario, resulta máis relevante para el. Nos medios de servizo público, isto implica que deben axustar a súa oferta de contidos en consonancia cas recomendacións algorítmicas, tanto en temas como en enfoques (EBU, 2019). Este conxunto de iniciativas demostra un esforzo significativo por parte dos organismos de radiodifusión europeos para innovar na personalización de contidos, garantindo ao mesmo tempo a calidade e a diversidade informativa. Na seguinte táboa matízanse os posibles beneficios da aplicación da IA nos medios de comunicación.

Táboa 2. Beneficios da aplicación da IA nos medios de comunicación.

Detectar tendencias nas redes sociais
Obter suxestións de tendencias
Obter enfoques de historias, imaxes e persoas suxeridas a través dunha procura en liña
Comprobación de feitos
Verificar fotos e vídeos falsos
Limpeza e filtrado de datos
Creación de chatbots
Comprobar as falsificacións profundas
Atopar direccións de correo electrónico conectadas a sitios web
Asistencia de IA na edición de vídeo
Edición automática de audio
Automatización dos fluxos de traballo
Análise preditiva para xerar ingresos e aumentar a satisfacción do cliente
Transcrición de audio, tradución e corrección automática de textos.

Fonte: EBU (2019).

USC DE COMPOSTELA

3.4. A recomendación e distribución automatizada de contidos nos medios públicos: en busca do algoritmo PSM

Os medios de servizo público enfróntanse á necesidade de explorar novas alternativas que lles permitan manterse relevantes, mellorar a experiencia das súas audiencias e cumprir coa súa misión de servizo público. A competencia cos medios privados e os servizos que estes ofrecen impulsou aos radiodifusores públicos europeos a adoptar tecnoloxías disruptivas para reducir a brecha competitiva existente. Neste contexto, optaron por implementar sistemas de recomendación de contidos que permiten unha distribución eficaz na que os intereses dos usuarios converxen en plataformas de vídeo on demand (VoD) e aplicacións de noticias.

Estes sistemas de recomendación baséanse en algoritmos matemáticos que procesan grandes volumes de datos e que permearon diversas esferas da vida cotiá (Thurman, Lewis & Kunert, 2019). Con todo, a opacidade do seu funcionamento pode afectar á credibilidade dos seus procesos internos. Ademais, a rápida implementación de recursos baseados en intelixencia artificial expón tres grandes desafíos para a democracia: a polarización, a propagación de fake news, deepfakes e astroturfing, así como a creación de cámaras de eco e burbullas de filtro (García-Orosa, 2022).

Para que os PSM utilicen eficazmente estes sistemas de recomendación, deben asegurar unha masa crítica de información que permita aos motores de personalización xerar recomendacións relevantes para cada usuario. O uso destes sistemas nos PSM foi analizado por varios estudos. Fields, Jones e Cowlishaw da BBC (2018) discuten este tema, do mesmo xeito que Van den Bulck e Moe (2017), quen compara as estratexias organizacionais das corporacións públicas europeas, focalizando o seu estudo na VRT de Bélxica e a NRK de Noruega. Pöchhacker et al. (2017) e Schmidt et al. (2018) abordan a incorporación de sistemas de recomendación no ecosistema mediático alemán. Sørensen (2013) examinou as primeiras probas de personalización nos servizos en liña dos PSM, e Bodo (2018) xunto con Kunert e Thurman (2019) exploraron os tipos e usos da personalización tanto en medios privados como públicos.

A capacidade dos PSM para ofrecer opcións de personalización presenta unha proposta de valor significativa e unha alternativa competitiva fronte a outros medios. Con todo, Sørensen (2019) sinala que os analistas de datos, programadores e curadores de datos atopan complexo explicar estes sistemas aos editores e xornalistas, quenes a miúdo teñen dificultades para entender a importancia de xerar metadatos de calidade, o que inflúe directamente na eficacia das

recomendacións. As organizacións de servizo público tamén deben explicar aos usuarios o proceso de personalización e o uso dos seus datos persoais, a pesar da complexidade desta tarefa (Sørensen, 2019).

En canto á procedencia destes sistemas, a maioría dos PSM estudados por Sørensen (2019) utilizan software de código aberto para desenvolvelos. A DR en Dinamarca é unha excepción, xa que optou por unha solución propietaria ofrecida por un provedor externo, argumentando que deben centrarse na creación de contidos e non na tecnoloxía. Con todo, a tendencia xeral entre as corporacións é desenvolver sistemas propios para manter un maior control interno sobre a personalización e asegurar a súa independencia técnica no futuro (Sørensen & Van den Bulck, 2018).

A BBC, pola súa banda, enfronta o desafío de incorporar a condición de "servizo público" nos seus algoritmos. Na corporación británica segmentaron os seus servizos para diferentes audiencias, de maneira que a páxina de inicio do seu sitio web varía segundo a idade e a rexión de procedencia (EBU, 2019). Os bots de noticias da BBC, que ata o de agora foron básicos e non utilizaron machine learning, están a ser integrados na produción de información para crear formatos de noticias máis interactivos e cun ton máis conversacional que resalte a personalización (Jones & Jones, 2019).

USC UNIVERSIDADE DE SANTIAGO DE COMPOSTELA

3.5. Perfís profesionais, actividade empregadora e contratación nos medios públicos na era da IA

No contexto actual da dixitalización, o talento humano converteuse no maior activo dos medios de comunicación, o que está a motivar que as empresas informativas proxecten campañas permanentes para atraer, captar e reter a profesionais cualificados, elevando a importancia das súas actividades de recrutamento na súa escala de prioridades. O que antes se consideraba unha tarefa secundaria adquiriu un valor diferencial esencial, especialmente nas corporacións de radiotelevisión pública, que proxectan as súas principais fortalezas a través da súa marca empregadora ou employer branding, coa cal buscan destacarse no competitivo mercado do talento.

O concepto de marca empregadora, definido como unha estratexia a longo prazo para xestionar as percepcións dos empregados actuais e potenciais dunha empresa (Sullivan, 2004), aplica conceptos de márketing para posicionar a empresa como un empregador atractivo. Esta estratexia ten o mesmo obxectivo que unha marca comercial: atraer novos talentos e reter aos existentes, considerando aos empregados e candidatos como clientes internos (Blasco-López, Rodríguez-Tarodo & Fernández-Lores, 2014).

O xornalismo xerado mediante intelixencia artificial caracterízase pola súa transdisciplinariedade e multidimensionalidade, integrando diversas disciplinas para crear un xornalismo dinámico e adaptativo aos novos contornos. Esta modalidade utiliza intensivamente tecnoloxías disruptivas non só para a creación de novas, senón tamén para mellorar a produtividade e eficiencia (Papadimitriou, 2016), incrementar os beneficios empresariais (Mittal & Kumaraguru, 2014), reforzar a precisión (Silverman, 2013) e a obxectividade (Graefe, 2016), avaliar a credibilidade (Wölker & Powell, 2018) e a calidade das novas automatizadas (Sandoval et al., 2019), identificar patróns e tendencias (Lemelshtrich, 2018), reducir o impacto da desinformación e as novas falsas (Manfredi & Ufarte, 2020), localizar perfís nas redes sociais (Dickerson, Kagan & Subrahmanian, 2014) e personalizar as informacións (Newman et al., 2019).

Toural-Bran e Vizoso (2022) sinalan que aínda non é posible definir con precisión o perfil do xornalista que traballa con IA, xa que estes profesionais fóronse diluíndo a medida que a tecnoloxía creou novos roles nos medios, como os supervisores de contidos xerados por algoritmos (Diakopoulos, 2019). Estes profesionais aseguran a fiabilidade e a ausencia de erros nos contidos automatizados, desempeñándose como especialistas na supervisión do xornalismo artificial (Túñez, Toural & Valdiviezo, 2019), tamén coñecido como xornalismo robótico (Burrell, 2016; Kim et al., 2007; Levy, 2012; Van Dalen, 2012), xornalismo algorítmico (Anderson, 2013), xornalismo automatizado (Caswel & Dörr, 2018), ou xornalismo de alta tecnoloxía (Salaverría, 2016).

Aínda que existen diversas aproximacións sobre o perfil profesional do xornalista especializado en intelixencia artificial, hai poucas investigacións profundas sobre o concepto. O impacto da automatización no perfil dos xornalistas foi analizado por varios estudos no país, incluíndo os traballos de Salazar (2018), Peña-Fernández et al. (2023), Ufarte e Manfredi (2019) e Túñez, Toural e Valdiviezo (2019). A atención académica cara a este tema xorde tras a adopción de tecnoloxías que realizan tarefas previamente consideradas exclusivas dos humanos no ámbito xornalístico (Brennen, Howard & Nielsen, 2022).

Arias e Sixto-García subliñan que estes profesionais deben posuír habilidades previamente descoñecidas, mentres que Túñez, Fieiras e Vaz (2021) destacan que se caracterizan por habilidades cognitivas especializadas en tecnoloxía e xeración de linguaxe natural, así como por habilidades persoais e sociais que inclúen unha actitude receptiva cara aos bots e algoritmos e unha boa reputación persoal. Dörr (2016) e Marconi e Siegman (2017) enfatizan que as competencias necesarias inclúen o dominio da lingüística computacional e a computación científica, xunto con ferramentas e programas informáticos como TweetDeck, Hootsuite, SocialFlow, Dogtrack, Open Refine, Overview, e plataformas xeradoras de linguaxe natural como Wordsmith de Automated Insights, Quill de Narrative Science, OpenCalais e API Natural Language de Cloud.

Estas aplicacións desempeñan un papel crucial no novo perfil profesional, o que subliña a necesidade de formar aos futuros xornalistas nestas competencias a curto ou medio prazo, como advertiron Calvo-Rubio e Ufarte-Ruiz (2020). Isto é particularmente relevante considerando que na próxima década se anticipa unha nova onda tecnolóxica que impactará no sector da comunicación, protagonizada pola IA, o big data e novas interfaces visuais e baseadas na voz (Newman, 2020).

A especialización profesional en xornalismo con IA non substituíu a outros perfís xornalísticos, senón que ampliou as opcións do modelo xornalístico no ecosistema mediático actual (Sirén-Heikel et al., 2019). Introduciu o que Powers (2012) denomina formas de traballo tecnoloxicamente específicas, que requiren unha maior colaboración entre xornalistas e persoal técnico (De-Lara-González & García-Avilés; Arias, 2022), configurando un traballo híbrido (Deuze & Beckett, 2022) que combina os avances tecnolóxicos no procesamento da linguaxe natural e o deep learning cos coñecementos das ciencias humanas e sociais. Este enfoque busca asegurar que os seres humanos controlen o proceso en todo momento, rexeitando a idea de que as máquinas substitúan o traballo humano.

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3.6. Innovación social inmersiva nos medios públicos a través do metaverso e da realidade estendida

A adopción progresiva do metaverso e das tecnoloxías de realidade estendida na vida cotiá podería xerar un notable impacto social, proporcionando oportunidades para a inmersión e a experimentación. Non obstante, existe o risco de que esta proximidade ficticia conduza a unha diminución das interaccións físicas, polo que é crucial que a súa utilización se oriente cara ao beneficio dos usuarios, creando un valor engadido. No ámbito dos medios de comunicación de servizo público, estas tecnoloxías poden complementar á súa oferta con formatos inmersivos e interactivos, recuperar eventos e experiencias pasadas ou distantes, e superar limitacións espaciais, de capacidade e loxísticas.

A actual falta de proxectos de investigación e informes académicos que analicen en profundidade as primeiras incursións dos medios de comunicación nos mundos virtuais reflicte a tendencia observada entre os medios de comunicación de servizo público respecto da creación de iniciativas relacionadas co metaverso. Aínda que estas iniciativas se atopan nunha etapa inicial de desenvolvemento e aplicación, denotan un interese crecente por parte dos operadores en explorar e implementar estratexias vinculadas ao metaverso.

A pesar de que o metaverso se atopa nunha fase de incerteza, o modelo de realidade estendida (XR) podería facilitar a implementación dunha web inmersiva. Os expertos suxiren que os medios de comunicación deberían estar atentos aos avances no metaverso e incorporar experiencias inmersivas naqueles contextos que ofrezan valor aos usuarios. Asimesmo, agárdase que a Xeración Z e Alpha sexan os principais usuarios do metaverso na vindeira década, dado o seu consumo actual de plataformas como Minecraft, Fortnite e Roblox. Os informes anticipan unha adopción gradual do metaverso ata 2025, coa previsión de que para 2026 xa se observen casos de éxito no sector dos medios de comunicación, aproveitando o seu potencial para a comercialización de produtos e a xeración de ingresos (García-Avilés, 2023).

Aínda que o anuncio de Mark Zuckerberg sobre o seu proxecto de Metaverso o 28 de outubro de 2021 xerou un gran rebumbio mediático e unha ampla conciencia social sobre o termo, o concepto de metaverso ten as súas raíces en 1992, cando foi introducido na novela de ciencia ficción "Snow Crash". Ademais, outra novela, "Avalanche", menciona elementos complementarios para os humanos virtuais, dotando, desde a narrativa, de recursos e infraestrutura ao universo virtual (Wang et al., 2023).

As experiencias virtuais tamén foron obxecto de análise na literatura académica. En 1995 apareceu en Scopus a primeira publicación relacionada co metaverso, e en 1998, a primeira en Web of Science. Nesta etapa inicial, os artigos estaban vencellados

ás artes e á literatura (Wang et al., 2023). Non obstante, o desenvolvemento do metaverso está intrinsecamente ligado á evolución tecnolóxica, e os primeiros artigos sobre o tema abórdanse desde as ciencias da computación (Crespo-Pereira et al., 2023).

O metaverso defínese como "unha rede de espazos mediados dixitalmente que mergullan aos usuarios en experiencias compartidas en tempo real" (Hadi et al., 2023, p. 142). Este termo abarca un conxunto de elementos que permiten comprender o fenómeno na súa totalidade: espazos virtuais en 3D (elemento espacial) de carácter interoperable (entre diversas plataformas, ecosistemas e dispositivos) mediados pola tecnoloxía dixital (VR, AR, MR...) que posibilitan a inmersión en distintos graos (dependendo da tecnoloxía empregada: PC, VR, AR, dispositivos do IoT...), así como a capacidade dos usuarios de socializar en tempo real e participar e desenvolver actividades comerciais propias (Diwedi et al., 2022; Hadi et al., 2023; Lu & Mintz, 2023; Schöbel & Leimeister, 2023).

Internet constitúe a primeira tecnoloxía fundamental para a existencia do metaverso. A principios do século XXI, a evolución da realidade virtual e os gráficos por ordenador, particularmente no ámbito dos videoxogos, estableceron as bases para os metaversos. En 2021, Roblox popularizou o termo metaverso e saíu á bolsa con resultados altamente positivos, o que avivou o debate en torno a este concepto. Actualmente, a converxencia de tecnoloxías como a realidade estendida (XR), as interfaces cerebro-computadora (BCI), os videoxogos, a intelixencia artificial, as tecnoloxías de seguridade e protección, xunto coa infraestrutura de internet necesaria, como o 5G/6G, o Internet das Cousas (IoT), os visores de realidade virtual (VR) e a computación na nube, entre outros avances, facilitarán o desenvolvemento do metaverso na súa forma máis avanzada (Wang et al., 2023).

O metaverso ofrecerá novas formas de narración, evolucionando do storytelling á inmersión activa mediante avatares que interactúan co contido. Aínda que xa se pode experimentar en dispositivos como PC e teléfonos intelixentes, prevese que a realidade estendida (XR), resultado da combinación da realidade aumentada e virtual, será o principal motor do metaverso (García-Avilés, 2023).

Anticípase un período de transición de 4 a 5 anos durante o cal os dispositivos actuais coexistirán con experiencias completamente inmersivas. Neste contexto, os medios de comunicación xogarán un papel crucial na educación das audiencias, utilizando as pantallas existentes (García-Avilés, 2023). Aínda que o metaverso ten un compoñente lúdico significativo, a súa dimensión social é igualmente relevante, e por iso que os medios de comunicación deberán desenvolver produtos que promovan a socialización e a creación de experiencias valiosas para as novas xeracións, mediante xogos, co-creacións e formatos de contido de marca que integren narrativas e inmersión en AR e VR (García-Avilés, 2023).

O metaverso abre oportunidades significativas no ámbito das experiencias e o engagement (Barta et al., 2023), impactando positivamente na memoria dos contidos e as marcas. Isto é evidente en plataformas de videoxogos como Fortnite e Roblox, que están incorporando experiencias sociais en forma de eventos (concertos) e espazos de compra. Os xogadores atopan altamente atractivo asistir a eventos en vivo (concertos, deportes, festivais, museos e películas) e realizar compras nestes contornos (McKinsey, 2022).

As estimacións indican que para 2030, máis do 50% dos eventos en vivo levaranse a cabo no metaverso (McKinsey, 2022). Non obstante, un dos principais desafíos para os medios de comunicación ao integrarse no metaverso é transformar as expectativas dos consumidores acostumados á experiencia 2D da televisión, afastándoos dos contornos de xogo (CSI Magazine, 2022).

A adopción de enfoques nativos en 3D require grandes esforzos que os medios non están dispostos a asumir, segundo un informe do Reuters Institute (Newman, 2023). A maioría dos editores amosan un interese limitado en desenvolver aplicacións para o metaverso (5%) en comparación con formatos como podcasts e audio dixital (72%), debido á dificultade para identificar casos de uso. Diarios como The New York Times crearon experiencias 3D e inmersivas en relación coa misión InSight da NASA a Marte, entre outras iniciativas (Newman, 2024). Así mesmo, é destacable a creación da corresponsalía no metaverso por parte de El Economista (Lorenzo, 2021).

Aínda que a literatura científica sobre os usos do metaverso nas industrias mediáticas é limitada (Crespo-Pereira et al., 2023), segundo a consultora McKinsey (2022), as principais iniciativas implementadas ata agora están relacionadas con campañas de marketing, deseño de produtos ou xemelgos dixitais e eventos ou conferencias. Prevese que os medios de comunicación e o entretemento destinen unha parte significativa do orzamento de investimento dixital ao metaverso (15%) nos próximos tres a cinco anos (McKinsey, 2022).

Ademais, a Academia examinou os usos potenciais para a industria mediática en relación coa recollida, análise e interpretación de datos biométricos, xa que estes procesos facilitan a creación de experiencias personalizadas baseadas en datos (Diwedi et al., 2022). Entre as innovacións tecnolóxicas, destaca o uso de pantallas alternativas e hologramas de realidade aumentada para a visualización televisiva (Lu & Mintz, 2023; Rauschnabel et al., 2022). Tamén se exploran novas oportunidades de monetización de produtos emerxentes (Park & Kim, 2022), así como a creación de marca, o incremento da notoriedade e a xestión de espazos publicitarios (Rauschnabel et al., 2022).

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Actualmente, os medios compiten por captar a atención de plataformas como Fortnite e Roblox, que conseguiron audiencias leais mediante contidos que satisfacen as demandas da mocidade actual. Neste contexto, os operadores públicos, lexitimados polo seu valor social, deben trasladar a súa misión de formar, informar e entreter a calquera contido que produzan a través dunha ampla gama de plataformas existentes.

Nos entornos virtuais, as televisións públicas tamén teñen a responsabilidade de garantir espazos seguros para nenos e mozos, integrando contidos educativos e informativos de calidade (Medina-Laverón & Ojer-Goñi, 2011). Este reto é adicional ao que enfrontan outros medios ao adentrarse no metaverso. Contidos inmersivos de 360 graos, incluíndo vídeos holográficos en realidade mixta, poderían transformarse en produtos de interese social.

Un exemplo significativo é o proxecto “The Green Planet” da BBC, que a través da realidade aumentada, ofrece novas posibilidades narrativas e experiencias de visualización (CSI Magazine, 2022). Algunhas empresas tecnolóxicas xa están explorando estas opcións e as cadeas de televisión atópanse nunha posición ideal para implementar estas experiencias dixitais, aliñadas cos seus valores. Non obstante, o emprego illado de tecnoloxías de realidade estendida, sen os elementos adicionais mencionados, suxire que o desenvolvemento de experiencias no metaverso por parte da televisión pública aínda se atopa nunha fase inicial.

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3.7. Gamificación, plataformización e deportes electrónicos no PSM para a captación de novas audiencias

As televisións públicas de Europa atoparon na gamificación e nos contidos relacionados cos videoxogos unha estratexia eficaz para atraer ás novas audiencias, abordando así o problema do envellecemento dos seus espectadores e a perda de relevancia entre o público xuvenil. En consecuencia, os ciberdeportes incorporáronse á axenda mediática para a produción de novas, a retransmisión de eventos e a creación de formatos de entretemento relacionados. Con todo, os proxectos de gran envergadura aínda son limitados. A plataforma 'RTP Arena' da Radio e Televisión de Portugal (RTP) destaca entre as iniciativas das corporacións públicas, xa que é a única cun sitio web propio e ofrece formatos en plató que se transmiten tanto en emisións lineais como en Twitch (Fieiras, Túñez & Maroto, 2023).

Os ciberdeportes xorden da actividade organizada, competitiva e profesional de certos videoxogos que inicialmente só se xogaban por diversión (Hamari & Sjöblom, 2017; Taylor, 2012). Así, diversas competicións adoptaron dinámicas similares ás dos deportes tradicionais. Segundo DEV (2016), os videoxogos con maior competencia a nivel global inclúen League of Legends, Dota 2, Counter Strike, FIFA e Call of Duty. En Europa, aínda que estes xogos son recorrentes, existen preferencias rexionais, como Counter-Strike nos Países Nórdicos, Call of Duty en Italia, e en España, ademais dos mencionados, Clash Royale, FIFA e Hearthstone (BBVA, 2021).

Numerosos estudos exploraron a relación entre os e-sports e os deportes tradicionais, analizando aspectos clave para determinar as súas similitudes e diferenzas. ONTIER (2018) identifica seis razóns que os conectan: (i) o rendemento é principalmente mental e tamén físico; (ii) a participación está organizada; (iii) as competicións teñen regras; (iv) existen adestramentos; (v) están suxeitos a normativas e (vi) teñen un carácter competitivo. Ademais, demostrouse que xogar a videoxogos regularmente mellora a percepción, a atención e a cognición espacial (Bediou et al., 2018).

Os e-sports son unha modalidade deportiva onde os participantes desenvolven capacidades cognitivas como o tempo de reacción e a toma de decisións, habilidades mentais como a motivación e a autoconfianza, capacidades físicas como a resistencia á fatiga, e valores tradicionais como o esforzo e a superación (García-Naveira et al., 2018). Respecto ás motivacións para ingresar no ecosistema dos e-sports, Fuster et al. (2013) determinaron que os xogadores adoitan ser persoas curiosas, desexosas de explorar e establecer novas relacións sociais, xa que os videoxogos proporcionan un espazo de experimentación e pertenza a un grupo que ofrece recoñecemento, apoio social e entretemento, afastándose do estereotipo do xogador solitario.

A intersección entre os escenarios virtual e físico captou o interese dos académicos, quenes buscan definir os límites de ambas realidades. A organización dos e-sports adoita centrarse en xéneros específicos de xogo, como areas de combate multixogador en liña (League of Legends, Dota 2), shooters en primeira persoa (Counter-Strike: Global Offensive), estratexia en tempo real (Starcraft 2), xogos de cartas coleccionables (Hearthstone ou Ultimate Team) e xogos deportivos (serie FIFA). Aínda que algúns xogos representan deportes convencionais, os e-sports non se consideran versións electrónicas destes (Hamari & Sjöblom, 2017).

Tendo en conta o anterior, os e-sports poden definirse como unha modalidade deportiva onde os elementos principais son facilitados por sistemas electrónicos, e a participación de xogadores e equipos está mediada por interfaces humano-ordenador (Hamari & Sjöblom, 2017). En termos xerais, a práctica dos e-sports pode considerarse superficialmente similar á de calquera deporte.

En España, a investigación sobre os e-sports abordou diversas disciplinas, aínda que non se realizaron estudos exhaustivos sobre a súa presenza ou desenvolvemento nos medios públicos. González e Pérez (2018) examinan os ciberdeportes desde unha perspectiva educativa e a súa relación co desenvolvemento de habilidades. Dilek (2019) ofrece un enfoque desde a industria turística, destacando os eventos de e-sports como atractivos turísticos. Muñoz e Esteban (2021) sinalan a consolidación dos deportes electrónicos como un mercado de lecer e entretemento. Outros autores analizaron os ciberdeportes desde a socioloxía, enfocándose no perfil dos xogadores (Lárez, 2012) ou no patrocinio na industria do deporte (Cuesta-Valiño et al., 2022).

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CAPÍTULO 4:
HIPÓTESES E OBXECTIVOS DO TRABALLO

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Con este proxecto de investigación preténdese dar resposta á seguinte pregunta principal: *que efectos está a ter a intelixencia artificial no sector dos medios de comunicación atendendo a perspectivas organizativas, estruturais, de produción ou distribución de produtos e servizos? Ademais da IA, que outros procesos de innovación ou novas tecnoloxías están sendo prioritarias nos medios públicos e privados e que accións están a acometer estes axentes para xerar valor e ser relevantes para as novas audiencias?*

DÚAS DIMENSIÓNS CLAVE

REPERCUSIÓNS DA IA NOS MEDIOS

A intelixencia artificial está a impactar con transcendencia sobre todos os apartados e prismas do sector da comunicación, tanto na planificación e organización de recursos infraestruturais e humanos, como en aspectos de optimización administrativa, de eficiencia, coordinación, produción de formatos ou servizos de información e entretemento, e de distribución, verificación ou manexo da relación coas audiencias.

Neste estudo trátase de analizar estes enfoques cunha mirada descriptiva, analítica e crítica, valorando tanto os beneficios derivados da implementación da IA como os posibles riscos e desafíos éticos e laborais derivados da súa incorporación nas redaccións.

INNOVACIÓN E NOVAS TECNOLOXÍAS

A segunda dimensión clave deste proxecto ten unha estreita e directa relación coa IA e consiste en analizar as estratexias de innovación, puntos clave e áreas prioritarias de optimización dos medios de comunicación, para o que se tratan de concretar os procesos e dinámicas de innovación e as novas tecnoloxías que previsiblemente terán un papel protagonista na versión futura dos medios, como é o caso da realidade estendida e o metaverso, o desenvolvemento e optimización da experiencia de usuario nas plataformas de vídeo baixo demanda (VOD), ou a integración de novas modalidades comunicativas horizontais, como as establecidas nas dinámicas de gaming, a través das que as corporacións comezan a aproximarse a públicos novos frecuentemente afastados das súas propostas.

Con esta intención de examinar baixo unha mirada transversal os efectos da IA no sector da comunicación, e as prioridades, áreas e tecnoloxías clave dentro das estratexias de innovación destes axentes, plantéanse as seguintes hipóteses de partida:

H1. A intelixencia artificial está a ser implementada polos medios de comunicación públicos e privados nas tarefas de organización, produtividade, xestión empresarial, documentación, produción, distribución e verificación de contidos.

H2. Esta tecnoloxía está a alterar as dinámicas organizativas e de traballo dos medios de comunicación, reformulando aspectos clave do seu funcionamento e reorientando parte dos seus esforzos a comprender e integrar estes sistemas.

H3. Polo momento non se consolidou un perfil de xornalista ou comunicador especializado en intelixencia artificial, senón que as habilidades e aptitudes requiridas para o manexo dos sistemas automatizados estanse asentando progresivamente nos profesionais máis próximos ao uso destas ferramentas nas súas corporacións.

H4. As áreas clave de innovación dos medios de comunicación audiovisuais oriéntanse cara a dixitalización dos seus arquivos para aumentar a interoperabilidade con eles; á optimización de rutinas de produción; ao desenvolvemento dunha estratexia de IA e á súa implementación transversal (particularmente da IA xerativa na creación e dos algoritmos de personalización na distribución); á actualización e renovación das súas plataformas de VOD; ao aumento da súa presenza en redes sociais de impacto e á creación de comunidades estables; ás propostas de cocreación e participación das súas audiencias; á ciberseguridade; á optimización da experiencia de usuario (UX); á aplicación da alta tecnoloxía para reforzar os seus servizos principais e renovar a súa oferta, así como ao uso da realidade estendida (realidade virtual [VR], realidade aumentada [AR] e realidade mixta [MR]), ou á implementación do metaverso.

Por conseguinte, o obxectivo central desta investigación consiste en examinar a repercusión transversal que está a ter a IA no sector de medios de comunicación e as previsións de implementación ou crecemento que se espera na próxima etapa, así como detallar como se están a executar os procesos de innovación nestas corporacións e as áreas clave e novas tecnoloxías sobre as que están a focalizar os seus esforzos.

A partir deste obxectivo principal, xorden unha serie de obxectivos específicos sobre os que se asenta a investigación e que se resumen na seguinte Táboa 3.

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Táboa 3. Obxectivos específicos da investigación.

O1. Identificar as áreas principais de innovación sobre as que as emisoras públicas de Europa centran os seus esforzos, así como coñecer como estas corporacións xestionan e executan a posta en marcha de ideas e procesos innovadores, determinando as prioridades de innovación específicas de cada unha destas emisoras para extraer tendencias comúns para o sector, e concretando as súas previsións de futuro e os retos que prevén para o sector de medios públicos nos vindeiros cinco anos. Este obxectivo alcánzase na primeira, terceira e decimoterceira publicación compendiada.

O2. Trazar unha panorámica da situación e uso das tecnoloxías de IA nos PSM europeos, identificar as seccións e procesos produtivos nos que se utiliza a IA nas corporacións e expoñer os retos percibidos polos medios consultados respecto ao uso e implementación da IA nas súas empresas. Esta perspectiva cúbrese co segundo artigo compendiado.

O3. Extraer unha radiografía completa da situación actual do uso de sistemas de recomendación nas radiotelevisións públicas europeas, prestando especial atención ao funcionamento destes sistemas, á súa procedencia, equipos encargados do seu mantemento e posta en marcha, e ao concepto de algoritmo de servizo público. No terceiro artigo compendiado resólvese este obxectivo.

O4. Examinar o estado da intelixencia artificial na prensa nacional española, matizando as dinámicas organizativas plantexadas, os fluxos de implementación de aplicacións seguidos, o impacto sobre perfís profesionais, e os usos actuais e previsións de incorporación desta tecnoloxía nos 10 diarios con maior repercusión e número de lectores diarios. Este obxectivo cúmprese no noveno artigo compendiado.

O5. Analizar os canais de contratación empregados, os procesos de selección seguidos, as competencias e perfís profesionais demandados, as ofertas laborais vixentes nas televisións públicas da era da IA e a automatización. Este propósito lógrase no sexto artigo compendiado.

O6. Concretar como as principais radiotelevisións públicas de Europa están aplicando a intelixencia artificial para a verificación de contidos, cunha mirada particular nas ferramentas e estratexias proxectadas. Este obxectivo cúmprese no décimo artigo compendiado.

O7. Indagar como o uso da intelixencia artificial en comunicación pode traspasar ao ámbito educativo para ofrecer experiencias docentes personalizadas á situación do alumno. A undécima publicación compendiada cumpre con esta premisa.

O8. Avaliar as primeiras aproximacións e relación actual do PSM co metaverso e a realidade estendida, o que inclúe tanto as percepcións das corporacións respecto á utilidade do seu uso e implementación, como coñecer se plantexan a súa incorporación para renovar e reposicionar a súa proposta dixital e a relación coas súas audiencias. Este obxectivo alcánzase no sétimo artigo compendiado.

O9. Analizar como a gamificación e a cobertura de deportes electrónicos está a ser empregada por parte das televisións públicas de Europa para innovar na comunicación coas audiencias novas, establecer comunidades e relacións estables con elas e gañar relevancia para estes públicos. Esta premisa alcánzase ca quinta e duodécima publicación compendiadas.

O10. Concretar as estratexias, actuacións e dinámicas de innovación que as principais plataformas Over-The-Top (OTT) están plantexando na actualidade, co propósito de extraer tendencias comúns que permitan identificar os conceptos, tecnoloxías ou comportamentos que darán forma á televisión dos vindeiros anos, así como prever o sentido que tomará este sector na próxima etapa, puntualizando as prioridades de crecemento sobre as que traballan estas corporacións. Este obxectivo cúmprese co oitavo artigo compendiado e cunha investigación que se atopa en fase de revisión nunha revista de impacto internacional.

Fonte: elaboración propia.

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CAPÍTULO 5:
METODOLOXÍA

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Nesta investigación preténdense analizar os efectos da implementación da intelixencia artificial no sector dos medios de comunicación atendendo a diferentes eixes estratéxicos: usos e aplicacións actuais e futuras; evolución dos perfís profesionais xornalísticos; repercusións da IA sobre o sector; previsións de crecemento futuro, oportunidades, riscos e desafíos. Tamén se centra unha mirada particular sobre as prioridades e propostas de innovación e a xestión das novas tecnoloxías por parte dos medios públicos e privados. Para simplificar a comprensión da metodoloxía desta tese doutoral, realizada por compendio de publicacións, presentarase de forma diferenciada a metodoloxía común a todas as investigacións e os matices específicos de cada proxecto.

5.1 Metodoloxía xeral

5.1.1. Triangulación metodolóxica

Para cumprir cos propósitos xerais deste proxecto de investigación optouse por un deseño metodolóxico executado por etapas (Igartua, 2006), nas que se produciu unha triangulación metodolóxica (Gaitán & Piñuel, 1998), que é recomendada por Gómez-Diago (2010) e Soler e Enríquez (2012) para contrastar información entre distintas fontes para obter unha contextualización suficiente dos fenómenos estudados.

Cada fase do proceso descríbese a continuación de maneira clara para que os investigadores poidan replicar o procedemento en diferentes momentos e situacións (Ortega, Pereira & Igartua, 2016). Nunha primeira fase, realizouse unha revisión da literatura científica, que forma parte da investigación secundaria (Codina, 2017), e que permitiu coñecer as principais achegas sobre os temas obxecto de estudo.

En segundo lugar, delimitáronse as unidades de análise. En concreto, trabállase con tres mostras intencionais de conveniencia, correspondentes a medios públicos estatais europeos, principais plataformas OTT privadas internacionais que operan en España e medios de comunicación tradicionais do ámbito español.

Con respecto ás radiotelevisións públicas de Europa, a mostra componse por 18 PSM de Europa: ARD e ZDF (Alemaña), BBC (Reino Unido), DR (Dinamarca), France TV (Francia), NPO (Países Baixos), ORF (Austria), RAI (Italia), RTBF e VRT (Bélxica), RTÉ (Irlanda), RTP (Portugal), RTS (Suíza), RTVE (España), SVT (Suecia), TVP (Polonia), UA (Ucraína); Yle (Finlandia), ademais da European Broadcasting Union (EBU). Ademais fixéronse entrevistas en medios externos á Unión Europea, en concreto a directores de tecnoloxía nas corporacións ABC e SBS en Australia. Sobre este conxunto de corporacións publicáronse 8 dos artigos compendiados, sendo o bloque central desta investigación e o analizado con maior profundidade ata o momento.

En canto aos criterios de selección da mostra de compañías privadas, seleccionáronse as 10 OTT's con maior cota de pantalla en España no ano 2021, listado que se extraeu do informe 'Barómetro TV-OTT' da consultora Barlovento Comunicación, publicado o 21 de decembro de 2021. Así, estudáronse as propostas de Netflix, Prime Video, Movistar+, HBO, Disney+, Vodafone TV, Orange TV, Apple TV+, DAZN e Atresplayer. O artigo científico no que se analizan as prioridades de innovación e o uso da intelixencia artificial destas plataformas atópase actualmente en fase de revisión nunha revista de alto impacto internacional, mentres que xa se publicou un estudo que matiza as dinámicas de innovación na realización audiovisual destas empresas e que forma parte dos artigos compendiados. Na seguinte Táboa 4 detállase a cota de pantalla de cada corporación segundo a cuarta onda do barómetro de Barlovento (2021).

Táboa 4. Listado de OTT's con maior cota de pantalla en España en 2021

Corporación	Cota de Pantalla
Netflix	33.8%
Prime Video	18.4%
Movistar+	13.1%
HBO	8.7%
Disney+	6.0%
Vodafone	5.2%
Orange TV	3.3%
Apple TV+	2.2%
DAZN	1.7%
Atresplayer	1.5%

Fonte: Barlovento Comunicación (2021).

En relación aos medios tradicionais de España, estúdanse os 10 diarios impresos con maior difusión en España segundo o informe de setembro de 2023 da Asociación de Medios de Información (AMI), cuxos datos son aportados polas propias empresas, elaborados por KPMG e coteixados por OJD: El País, La Vanguardia, Marca, La Voz de Galicia, As, ABC, El Mundo, El Correo, El Diario Vasco e Mundo Deportivo. O estudo que profundiza nas estratexias de implementación da IA por parte destes medios xa foi publicado e forma parte desta tese doutoral. Actualmente estase expandindo este estudo ás principais radios e televisións que operan en España, con previsión de publicación das investigacións ao longo do ano 2025.

Táboa 5. Listado das 10 cabeceiras impresas con maior difusión diaria en España

Diario	Media diaria da venda de exemplares ao número + subscricións individuais (setembro 2023)	Peso relativo difusión diaria
El País	52.923	8'09%
La Vanguardia	49.213	7'53%
Marca	44.294	6'77%
La Voz de Galicia	38.292	5'86%
As	37.293	5'70%
ABC	35.768	5'47%
El Mundo	33.633	5'14%
El Correo	33.137	5'07%
El Diario Vasco	29.236	4'47%
Mundo Deportivo	20.564	3'14%
Total	374.353	57'24%
Agregado de exemplares ao día	653.954	100%

Fonte: Barlovento Comunicación (2021).

A técnica utilizada para examinar a actividade destes medios foi a análise de contido (Krippendorff, 1990; Ruiz, 1996), de natureza cualitativa, que permitiu recoller a información necesaria dos seus produtos, proxectos e servizos para coñecer en profundidade o seu labor, enfocar as conversacións cos profesionais das corporacións e

establecer comparativas entre as empresas de comunicación. Este estudo de contido executouse mediante diferentes fichas de análise cun formato específico en función das necesidades particulares de cada investigación.

Os resultados obtidos complétanse, en terceiro lugar, coa realización de entrevistas cualitativas en profundidade a profesionais con cargo directivo responsables dos departamentos de intelixencia artificial, innovación, tecnoloxía ou estratexia dos medios de comunicación. Esta ferramenta completa a triangulación metodolóxica e supón o eixo central sobre o que se asenta esta tese doutoral, obtendo a través dela os resultados e conclusións máis relevantes. As dinámicas de programación de entrevistas baséanse principalmente en dous métodos:

- **Método de bola de neve:** esta ferramenta implicou a obtención de novas entrevistas a través dos contactos das persoas previamente entrevistadas. Este enfoque, ao seguir e profundar nos temas tratados baixo a orientación dos propios entrevistados, permitiu que as investigacións progresasen de maneira máis rápida e coherente. A medida que aumentaba o número de entrevistas, tamén se incrementaban as conexións e comunicacións con profesionais tanto da mesma corporación como de entidades externas. Así mesmo, o aproveitamento dos recursos sociais dos entrevistados contribuíu a orientar a investigación de forma máis eficiente, evitando contactos indirectos ou exploracións con pouca relación cos obxectivos da tese.

- **Método de contacto por organigrama:** baseouse en identificar os perfís clave dos medios a través dos seus organigramas corporativos. Este proceso iniciouse mediante unha comunicación específica con cada departamento co obxectivo de obter unha entrevista, iniciando a difusión da mensaxe desde os niveis xerárquicos máis baixos, xa que estes adoitan ser máis accesibles nun primeiro momento.

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5.1.2. Secuenciación e organización da investigación

Para iniciar esta investigación realízase unha análise documental sobre as dinámicas e estratexias de implementación da intelixencia artificial nos medios de comunicación do contexto global, así como sobre os efectos que está a ter esta tecnoloxía sobre a empresa informativa, as redaccións e os xornalistas. Este estudo exténdese ás propostas de innovación dos medios co obxectivo de matizar as áreas prioritarias de optimización e crecemento, así como as novas tecnoloxías que comezan a cobrar relevancia nas súas estruturas.

O estudo das estratexias de innovación e de implementación de intelixencia artificial parte dunha combinación de métodos cualitativos e cuantitativos de análise. A metodoloxía cuantitativa mixta e para o estudo de casos incluíu os seguintes pasos: a) Identificación e interpretación das estratexias e prioridades de innovación, en xeral, e dos procesos de aplicación da IA, en particular, nos informes anuais e memorias de xestión, económicos, de Responsabilidade Social Corporativa destes medios e plataformas. b) Detección de formatos innovadores e de casos de uso da intelixencia artificial nestes axentes de comunicación a través das súas programacións e grellas de contidos. c) Revisión das páxinas web matriz corporativas para a extracción de informacións e de temáticas de interese que completaran o estudo e permitiran o reenfoque da investigación.

As técnicas de investigación cualitativas materializáronse mediante a realización de entrevistas semiestruturadas aos responsables de IA, innovación, estratexia ou novas tecnoloxías destas empresas. Realizáronse en diferentes roldas máis de 100 entrevistas a 64 profesionais pertencentes a corporacións de radiotelevisión pública de Europa (45); de OTT's que operan en España (9) e de diarios nacionais de España (10). Moitos dos encontros con estes profesionais repetíronse ao longo da investigación para actualizar os resultados, matizar información ou resolver novas inquedanzas que xurdiron nese prazo. En paralelo, mantívose un contacto permanente coas corporacións e os seus profesionais mediante correo electrónico para consultar detalles específicos dos seus proxectos ou desenvolvementos.

Optouse por manter estes encontros coas persoas responsables dos departamentos ao ter estas unha visión panorámica do funcionamento da súa sección e unha maior facilidade de acceso aos datos de interese. Tamén se realizaron entrevistas con xornalistas das redaccións que traballan de primeira man coas aplicacións de IA e que coñecen á perfección as necesidades e dinámicas do seu posto específico.

Estas entrevistas realízanse a modo de Delphi a través de Microsoft Teams, entre o 10 de outubro de 2021 e o 20 de abril de 2024, cunha duración media de 30 minutos por sesión e realizando como mínimo

unha rolda de entrevistas por cada investigación específica. Traballouse con diferentes cuestionarios semiestruturados que nunca superaron as 10 preguntas e no que se incluíron cuestións específicas en función dos obxectivos de cada estudo. As entrevistas foron gravadas e transcritas para proceder a unha análise de contido que permitiu unha interpretación en profundidade dos datos en relación cos obxectivos da investigación.

Durante as primeiras roldas de cada investigación, obtivéronse a maior parte da información, mentres que na segunda rolda profundouse en novas cuestións. Esta técnica foi clave para comprender as perspectivas e recomendacións dun grupo multidisciplinar de expertos sobre o obxecto de estudo.

A análise de contido desenvolveuse coa asistencia do software Atlas.ti na súa versión 9.1.7 para Windows e realizouse en catro etapas: 1) Rexistro da información a partir da transcrición das entrevistas; 2) Codificación dos datos; 3) Identificación da información recollida sobre cada un dos aspectos vinculados aos obxectivos; e 4) Interpretación final dos resultados obtidos.

Irvine, Drew e Sainsbury (2012) sosteñen que as entrevistas son útiles para coñecer as perspectivas dos suxeitos entrevistados, así como as súas interpretacións, sentimentos e prospectivas. Con esta combinación metodolóxica visualizouse o problema de investigación desde diferentes ángulos e evitáronse sesgos e fallas metodolóxicas para optimizar a validez e a consistencia dos resultados (Okuda & Gómez, 2005).

USC UNIVERSIDADE DE SANTIAGO DE COMPOSTELA

5.1.3. Mostras de conveniencia de profesionais entrevistados

Nas seguintes tres táboas concrétanse as mostras de entrevistados cos que se traballou na investigación. Do total de 64 entrevistados, 45 deles pertencen a corporacións de radiotelevisión pública de Europa (Táboa 6); 9 a empresas audiovisuais OTT (Táboa 7); e 10 delas a diarios nacionais de España (Táboa 8).

Táboa 6. Entrevistados de radiotelevisións e organismos públicos europeos

DATA	NOME	CARGO	MEDIO	PAÍS
Agosto 2022	Jonas Schlatterbeck	Xefe de contidos ARD Mediathek	ARD	Alemaña
Novembro 2021	Jonas Bedford	Manager de innovación	ARD	Alemaña
Novembro 2021	Robert Amlung	Director de Estratexia Dixital	ZDF	Alemaña
Novembro 2021	Jatin Aythora	Xefe de Arquitectos, responsable de IA	BBC	Reino Unido
Abril 2022	Judy Parnall	Xefa de estándares e industria	BBC	Reino Unido
Abril 2022	Bill Thompson	Enxeñeiro Principal BBC R&D	BBC	Reino Unido
Novembro 2021 Xuño 2022	Jakob Faarvang	Director de produto dixital	DR	Dinamarca
Novembro 2021 Abril 2022 Marzo 2023	Kati Bremme	Directora de estratexia de IA	France TV	Francia
Abril 2022	Bob van de Velde	Enxeñeiro xefe de IA	NPO	Países Baixos
Decembro 2021 Xuño 2022 Abril 2023	Egon Verharen	Líder de innovación	NPO	Países Baixos

DATA	NOME	CARGO	MEDIO	PAÍS
Decembro 2023	Thomas Schippers	Responsable de vídeo	NPO	Países Baixos
Decembro 2021 Xullo 2022 Abril 2023	Karl Petermichl	Xefe de gobernanza, estratexia e innovación	ORF	Austria
Decembro 2022	Stefan Kollinger	Coordinador de innovación	ORF	Austria
Novembro 2021 Abril 2022	Alberto Messina	Director de tecnoloxía	RAI	Italia
Xuño 2022	Gino Alberico	Director de innovación	RAI	Italia
Novembro 2021 Maio 2022	Loic de Visscher	Director de innovación	RTBF	Bélxica
Marzo 2022	Chaja Libot	Investigadora de usuarios	VRT	Bélxica
Novembro 2021 Abril 2022	Sarah Geeroms	Xefa de SandboxHUB	VRT	Bélxica
Novembro 2021 Abril 2022	Mike Matton	Responsable de colaboracións internacionais	VRT	Bélxica
Maio 2022	Dieter Boen	Xefe de estratexia, tecnoloxía e innovación	VRT	Bélxica
Novembro 2021 Maio 2022	Phillip Bromwell	Editor de contenidos nativos	RTÉ	Irlanda
Novembro 2021 Abril 2022	Richard Waghorn	Director de Tecnoloxía (CTO)	RTÉ	Irlanda
Decembro 2021 Abril 2022	Carlos Barrocas	Director de enxeñería, tecnoloxías e sistemas	RTP	Portugal
Setembro 2022	Alexandre Brito	Subdirector de información	RTP	Portugal

DATA	NOME	CARGO	MEDIO	PAÍS
Decembro 2021 Abril 2022	José Fragoso	Director RTP1	RTP	Portugal
Decembro 2021 Maio 2022 Febrero 2023	Gonçalo Madail	Director de innovación	RTP	Portugal
Maio 2022 Febrero 2023	Daniel Rodrigues	Director RTP Arena	RTP	Portugal
Novembro 2021 Maio 2022	Léonard Bouchet	Líder de datos e arquivos	RTS	Suiza
Setembro 2022	Christophe Schenk	Responsable de Innovación	RTS	Suiza
Maio 2022	Eric Borgo	Director de innovación	RTS	Suiza
Xuño 2022 Novembro 2023	Urbano García	Director de innovación	RTVE	España
Novembro 2021 Abril 2022 Marzo 2023	David Corral	Xefe de innovación en contidos	RTVE	España
Marzo 2023	Esteban Mayoral	Subdirección Centro de Innovación e Observación do Coñecemento	RTVE	España
Xuño 2022 Marzo 2023	Pere Vila Fumas	Director de estratexia dixital	RTVE	España
Xuño 2022 Marzo 2023	Carmen Pérez Cernuda	Subdirectora de estratexia dixital	RTVE	España
Novembro 2021 Maio 2022	Johan Linden	Director de estratexia	SVT	Suecia

USC UNIVERSIDADE DE SANTIAGO DE COMPOSTELA

DATA	NOME	CARGO	MEDIO	PAÍS
Agosto 2022	Sasha Scott	Director de Transformación Dixital	EBU	Suiza
Novembro 2022	Grzegorz Grzegorski	Xefe de equipos de investigación e desenvolvemento de produtos dixitais	TVP	Polonia
Decembro 2022	Mykola Chernotytstky	Director xeral (CEO)		Ucraína
Decembro 2021 Maio 2022	Jarno Koponen	Xefe de IA	YLE	Finlandia
Abril 2022 Marzo 2023	Wesa Aapro	Responsable Metaverso	YLE	Finlandia
Novembro 2021	Atte Jääskeläinen	Conselleiro da EBU	EBU	Suiza
Abril 2022	Lalya Gaye	Coordinadora de IA e actividades de data	EBU	Suiza
Novembro 2021 Abril 2022 Marzo 2023	Madiana Asseraf-jacob	Directora de	EBU	Suiza

Fonte: elaboración propia.

Táboa 7. Entrevistados de OTT's con actividade en España

DATA	NOME	CARGO	MEDIO	PAÍS
Decembro 2023	Jesús Moreno Pascual	Responsable de novos negocios dixitais de Atresmedia	AtresPlayer	España
Decembro 2023	Eugenio Blanco González	Director Editorial e de Programación no Sur de Europa (España e Italia)	DAZN	Inter.
Xaneiro 2024	Manuel Urrutia	Vicepresidente e Director de Marketing HBO Max Europa	HBO	Inter.
Decembro 2023	Javier Riloba Prada	Xefe de medios de produción de Movistar Plus+	Movistar Plus+	Inter.
Decembro 2023	Juan Andrés García Ropero	Director de entretemento de Movistar Plus+	Movistar Plus+	Inter.
Decembro 2023	José Manuel Úbeda-Portugués Santos	Xerente de Data & Insights TV de Movistar Plus+	Movistar Plus+	España
Xaneiro 2024	Anónimo	Portavoz de Netflix España	Netflix	Inter.
Decembro 2023	Jesús Villacorta	Director de estratexia, desenvolvemento de negocio e transformación	Orange TV	España
Xaneiro 2024	Jesús Rodríguez	Director de Vodafone TV España	Vodafone TV	España

Fonte: elaboración propia.

Táboa 8. Entrevistados de diarios nacionais en España

DATA	NOME	CARGO	MEDIO	GRUPO
Outubro 2023	Carlos Caneiro	Director adxunto	ABC	Vocento
Outubro 2023	Tomás de Cos Relaño	Director adxunto	As	Grupo Prisa
Outubro 2023	Aitor Alonso	Director de Estratexia Dixital, Novas Narrativas e Marketing Editorial	El Correo	Vocento
Novembro 2023	Eli Ugalde	Directora de Marketing	El Diario Vasco	Vocento
Novembro 2023	Vicente Ruiz	Director adxunto	El Mundo	Unidad Editorial
Novembro 2023	Mari Luz Peinado	Directora de Estratexia Dixital	El País	Grupo Prisa
Xullo 2023	Joel Albarrán	Subdirector	La Vanguardia	Grupo Godó
Setembro 2023	Xosé Luis Vilela	Director	La Voz de Galicia	Corporación Voz de Galicia
Xullo 2023	Emilio Contreras	Director adxunto e responsable de dixital	Marca	Unidad Editorial
Xullo 2023	Carlos Duart	Director de produto	Director de producto	Grupo Godó

Fonte: elaboración propia.

5.2. Metodoloxías específicas

A partir da metodoloxía xeral desta tese doutoral, establecéronse e adaptaronse diferentes metodoloxías específicas para cada unha das publicacións compendiadas para optimizar a recollida de información necesaria e a resolución dos obxectivos particulares de cada estudo complementario.

Desta forma, no **primeiro dos artigos** compendiados, titulado 'Building the future of European Public Service Media: innovation priorities, key points and optimization areas in PSM', preparouse un cuestionario específico para analizar as estratexias de innovación, puntos clave e áreas prioritarias de optimización de 15 televisións públicas de Europa e detallar as previsións e retos de futuro que ditas televisións prevén para o sector mediático nos próximos anos. Tamén se executou unha primeira rolda de consulta ás emisoras para identificar quen se encarga de xestionar os procesos de innovación na súa estrutura e solicitar deste xeito a entrevista ao profesional cuxo perfil fose máis valioso para o proxecto.

No **segundo dos artigos compendiados**, titulado 'Artificial intelligence strategies in European public broadcasters: Uses, forecasts and future challenges' mantéñense encontros virtuais con profesionais de 15 corporacións públicas de 12 países de Europa para os que se esbozou un bloque de preguntas para matizar a aplicación da IA nas súas redaccións, o peso relativo da IA na súa estratexia de innovación e as previsións e retos futuros con respecto a esta tecnoloxía. A triangulación metodolóxica completouse a través dun rastrexo da bibliografía científica sobre a aplicación da IA e a importancia da innovación no PSM e unha revisión das páxinas e plataformas web das corporacións contactadas para contextualizar as preguntas e verificar as respostas dos entrevistados.

O **terceiro dos artigos**, 'Designing personalisation of European public service media (PSM): trends on algorithms and artificial intelligence for content distribution' é unha investigación que parte do segundo artigo compendiado, xa que unha vez analizadas as estratexias de aplicación de IA nas corporacións identifícase un importante peso relativo da construción de sistemas de recomendación con valor público nas plataformas de vídeo baixo demanda destas emisoras. Por iso, nesta investigación planifícase extraer unha radiografía completa da situación actual do uso de sistemas de recomendación nas radiotelevisións públicas europeas, prestando especial atención ao funcionamento destes sistemas, a súa procedencia, equipos encargados do seu mantemento e posta en marcha, e ao concepto de algoritmo de servizo público, para o que se define un cuestionario de 10 preguntas que incluíu preguntas relacionadas con todos estes bloques e que se utilizou nun total de 14 entrevistas a responsables de tecnoloxía no PSM.

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Para complementar esta liña de traballo realizouse unha estancia de investigación de tres meses na Universidade Fernando Pessoa do Porto durante a cal se axendaron diferentes reunións e entrevistas con profesionais con cargo directivo da Rádio e Televisão de Portugal, o medio público estatal do país, para tratar de concretar as propostas de innovación estratéxica, tecnolóxica e de captación de novas audiencias desta corporación, e establecer unha comparativa coas mesmas liñas de traballo de Radiotelevisión Española.

Froito deste estudo xorde o **cuarto artigo compendiado,** chamado 'Innovation analysis of national scale public media in the Iberian Peninsula: strategic, technological and youth audience engagement vision in RTVE and RTP', para o que se realizan entrevistas cualitativas en profundidade aos directores de innovación estratéxica, tecnolóxica, e ao responsable do principal proxecto destinado á captación de audiencias novas en cada unha das compañías: Playz, no caso de RTVE; e a plataforma de esports RTP Arena, por parte da televisión portuguesa, a modo de Delphi, e en dúas voltas. Antes da realización das entrevistas efectúase unha revisión dos comunicados corporativos das corporacións e das súas publicacións en redes sociais, así como a análise dos produtos dixitais de maior impacto nas súas diferentes plataformas. Con esta información defínense os cuestionarios e identifícanse as temáticas de interese que se plantexan posteriormente nos encontros. No caso dos canais PlayZ e RTP Arena complétase unha análise da súa actividade para determinar os formatos habituais producidos, número de seguidores nos seus perfís sociais, canais de distribución e contidos punteiros.

O **quinto artigo compendiado** titúlase 'A new scenario in digital communication: eSports coverage on public broadcasters in Europe', nel preténdese identificar os proxectos máis relevantes nos medios de servizo público de Europa en relación cos ciberdeportes e o seu uso como ferramenta de innovación para a captación de audiencias novas. Deste xeito examínase a orixe destas propostas, a súa actividade, formatos de contidos producidos, equipos de traballo que os compoñen, rutinas profesionais, e as súas estratexias de distribución, tanto nas súas plataformas propias como o uso comunicativo que fan das redes sociais; e anticípase o avance do sector a partir dos comportamentos que xa comezan a intuirse. Atendendo a criterios de dimensión dos equipos de traballo, produción cuantitativa e cualitativa de contidos, optouse por unha mostra de conveniencia que respondeu satisfactoriamente ás propostas de participación e que quedou composta por tres proxectos: a RTP de Portugal -RTP Arena-, a Yle de Finlandia -Yle eSports- e a SVT de Suecia -SVT eSports-.

Ademais da realización de entrevistas cualitativas semiestruturadas cos responsables de cada proxecto, a triangulación metodolóxica complétase cun barrido bibliográfico da literatura científica existente sobre os ciberdeportes ou deportes electrónicos

e dunha análise descriptiva dos proxectos, consistente na lectura horizontal e vertical da plataforma online de cada corporación, facendo especial énfase nos contidos relacionados con e-sport e analizando a presenza de cada plataforma en redes sociais e o uso comunicativo que se fai destas. Para iso deseñáronse 3 fichas de análise específicas para este estudo.

Para o **sexto artigo compendiado**, titulado 'Actividad empleadora en la televisión pública de la era de la automatización: employer branding, canales de contratación, procesos de selección, competencias y perfiles profesionales demandados' combínanse as entrevistas aos responsables de estratexia de 10 medios de servizo público de Europa coa técnica de análise de contido (Krippendorff, 1990; Ruiz, 1996), de natureza cualitativa, que permitiu recoller a información necesaria a través dunha ficha de análise composta por cinco variables e catorce categorías.

En canto aos parámetros de análise, a variable canais (V1) analiza as plataformas ou ferramentas a través das que as corporacións executan a súa actividade empregadora. En concreto, estuda se se produce mediante unha páxina web independente (C1), unha sección en páxina web matriz corporativa (C2) ou a través da rede profesional Linkedin (C3). A segunda variable permite identificar as ofertas laborais vixentes (V2), analizando se hai candidaturas abertas para recibir currículos ou se lanzan ofertas pechadas para postos concretos (C4). Dentro desta variable tamén se examina se as ofertas están destinadas a cubrir postos tradicionais (C5) ou se son de corte tecnolóxico e dixital relacionadas coa automatización (C6). A terceira variable persegue detectar as principais habilidades demandadas (V3), diferenciando entre competencias brandas (C7) e técnicas (C8). A ficha de análise tamén contempla o mecanismo de contratación (V4), é dicir, os pasos e trámites a seguir para presentar unha candidatura (C10). Por último, estuda o employer branding (V5), examinando se o medio conta cun lema de captación (C11), con testemuños dos empregados (C12), ou ben presenta os seus atributos (C13) e prestacións (C14).

Para cumprir cos obxectivos do **sétimo artigo compendiado,** 'Innovation and metaverse: first experiences and use cases in European Public Service Media', optouse por utilizar métodos cualitativos e realizáronse entrevistas persoais en profundidade aos directores de innovación, tecnoloxía ou estratexia responsables de xestionar as iniciativas de metaverso en 15 das principais corporacións de radiotelevisión pública de Europa. A triangulación metodolóxica consíguese mediante a revisión das notas corporativas e informes internos das corporacións para analizar a presenza do concepto de metaverso nas súas prioridades ou intereses. Estes documentos foron localizados na súa maioría mediante un rastrexo na sección de comunicados corporativos destes medios, a pesar de que noutros casos foron os propios profesionais entrevistados os que compartiron documentos internos de interese para a investigación.

Tamén se observan as súas redes sociais e propostas en contornos virtuais mediante unha revisión inicial ao inicio da investigación e un monitoreo permanente destes canais para detectar e analizar casos de uso, o funcionamento destes proxectos e a súa utilidade, ademais de para comprobar a validez das informacións recompiladas.

'Tendencias y previsiones de innovación en la realización audiovisual y retransmisión de eventos deportivos: optimización de la experiencia de usuario en DAZN y Movistar Plus+' é o título do **oitavo artigo compendiado,** no que se pretende identificar as tendencias e previsións de innovación na realización audiovisual, así como analizar a retransmisión e a experiencia de usuario no consumo de eventos deportivos. A técnica utilizada para alcanzar este propósito foi o estudo de casos. En concreto, analízanse dous proxectos: DAZN e Movistar Plus+. O primeiro é un servizo de streaming dedicado ao ámbito deportivo, que ofrece retransmisións de eventos en vivo e baixo demanda, mentres que o segundo é unha plataforma de televisión de pago propiedade de Telefónica. Para levar a cabo a investigación, analizáronse datos de cada unha das unidades, extraídos de procuras en profundidade. O traballo de campo tamén comprendeu a realización de entrevistas semiestruturadas en profundidade a diferentes profesionais das dúas compañías con perfís complementarios e cunha visión cualificada sobre o tema.

O ***noveno artigo compendiado***, titulado 'AI Implementation Strategies in the Spanish Press Media: Organizational Dynamics, Application Flows, Uses and Future Trends' pretende determinar a posición estratéxica dos 10 xornais impresos con maior difusión diaria de España con respecto á intelixencia artificial, coa finalidade de identificar as dinámicas organizativas e de produción actuais, os fluxos de implementación de ferramentas automatizadas, os departamentos e profesionais implicados, os usos actuais e o seu impacto sobre os perfís profesionais vixentes e demandados, así como as previsións de futuro que permitan anticipar a tendencia evolutiva desta tecnoloxía no sector. Optouse por empregar métodos cualitativos, e recorreuse á realización de entrevistas persoais en profundidade a profesionais con cargos directivos con visión estratéxica dos 10 xornais impresos con maior difusión en España segundo o informe de setembro de 2023 da Asociación de Medios de Información (AMI), cuxos datos son aportados polas propias empresas, elaborados por KPMG e coteixados por OJD. Estas entrevistas foron realizadas a modo de Delphi e en dúas voltas. Isto complétase coa análise dos contidos principais destes medios e do funcionamento das súas plataformas para detectar posibles usos de técnicas automatizadas nas súas propostas.

No **décimo artigo** desta tese por compendio de publicacións, titulado 'Verificación automatizada de contidos nas radiotelevisións públicas europeas: primeiras aproximacións ao uso da intelixencia artificial', recórrese á realización de entrevistas persoais aos directores

de intelixencia artificial das televisións públicas de Alemaña (ARD), Austria (ORF), Bélxica (VRT), España (RTVE), Gran Bretaña (BBC), Italia (RAI), Suíza (RTS), así como a membros da EBU; a modo de Delphi e en dúas voltas. Trabállase con cuestionario semiestruturado que nunca superou as 12 preguntas e no que se incluíron cuestións específicas en función da corporación entrevistada. Aínda así, os bloques principais en todas elas foron: aplicación da intelixencia artificial na verificación de contidos; sistemas de detección e rastrexo de noticias falsas; avance e desenvolvemento das estratexias de innovación das radiotelevisións; e previsión e retos de futuro con respecto ás fake news.

O **undécimo texto compendiado** consiste nun capítulo de libro titulado 'Sistemas adaptativos basados en intelixencia artificial como novas solucións personalizadas de tecnoloxía educativa', nel analízase o funcionamento, beneficios e desvantaxes das solucións educativas personalizadas baseadas en intelixencia artificial a través dunha revisión da bibliografía científica e da documentación normativa existente sobre a materia, coa intención de identificar as vías de aplicación da intelixencia artificial sobre o ecosistema da educación.

O **duodécimo texto compendiado**, titulado 'Cocreación en el universo e-sport: estrategia de la RTP para captar a público joven' é un capítulo de libro no que se analiza pormenorizadamente o funcionamento do proxecto de deportes electrónicos da radiotelevisión pública portuguesa, RTP Arena, desde a perspectiva da cocreación e a innovación xerada por esta corporación para xerar valor e atraer a novas audiencias. Para iso realízase un estudo de caso baseado na análise das redes sociais, canais de distribución e páxina web matriz do proxecto a partir dunha ficha específica de estudo e realízanse entrevistas en profundidade con integrantes do proxecto para recibir deste xeito achegas e información de primeira man.

A **última publicación compendiada** desta tese doutoral por compendio de publicacións consiste nun capítulo titulado 'Cómo acelerar un periodismo de vangarda: laboratorios de innovación nas noticias de BBC e VRT', nel analízase a orixe, estrutura, funcionamento e actividade principal de dous laboratorios de innovación referentes no contexto das radiotelevisións públicas de Europa: o BBC News Lab e o NWSlab da VRT de Bélxica. Ambos foron seleccionados tendo en conta a data de creación e a súa actividade. O lab da BBC é dos primeiros en integrarse nun medio de comunicación no ámbito global (2012), e o da VRT (novembro de 2021) dos últimos en iniciar a súa actividade. Ambos investigan, ademais, con enfoques diferentes: externo o da BBC, e interno o da VRT. A análise da actividade e dos proxectos principais de ambos laboratorios permite concretar as causas que motivaron a súa creación; identificar disparidades en metodoloxías e en rutinas de traballo; e coñecer a súa estrutura interna e os perfís profesionais que compoñen os equipos de traballo. As entrevistas cualitativas en profundidade a Miranda Marcus, directora executiva de

produtos do BBC News Lab, e a Chajá Libot, investigadora de usuarios no NWSlab da VRT, serven de base para realizar ese análise. No caso da BBC complétase un mapeo da páxina web do seu laboratorio de innovación para analizar pormenorizadamente a súa actividade e extraer un listado de todos os proxectos e eventos que fixeron públicos desde a súa creación. Na VRT trabállase con cuestionario de reconsulta para matizar os datos que se consideran oportunos.

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CAPÍTULO 6:
RESULTADOS E DISCUSIÓN XERAL DO TRABALLO

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Neste apartado realízase unha discusión xeral dos contidos traballados nesta tese de doutoramento e desenvólvense e resúmense os resultados xerais e específicos obtidos na investigación, dos que derivaron 13 publicacións relacionadas entre si e que parten da mesma liña de traballo. Cada un dos textos compendiados trata de dar resposta a unha ou máis preguntas de investigación, partindo todos eles da temática central obxectivo de estudo, consistente na análise da aplicación da intelixencia artificial en medios de comunicación públicos e privados e no estudo das dinámicas de innovación e áreas ou tecnoloxías prioritarias de optimización para estes axentes.

Desta forma, no primeiro dos subapartados desta sección profundízase nas prioridades e dinámicas de innovación no PSM de Europa para reforzar os niveis de confianza e apoio cidadán xa mencionados por Donders (2021), entendendo a innovación estratéxica como o punto de encontro do resto de subtemáticas, o que xustifica que sexa o foco idóneo de partida para contextualizar o resto de cuestións. Posteriormente, agrúpanse en diferentes apartados todas aquelas perspectivas relacionadas coa implementación da intelixencia artificial nos medios de servizo público, partindo dunha panorámica completa das estratexias adoptadas polo PSM para desenvolver e aplicar esta tecnoloxía, e acadar así melloras operativas que optimicen o seu rendemento (Puppis & Ali, 2023)

Merece un apartado independente a dinámica ou proceso de deseño de algoritmos nos medios públicos, tanto para as funcións de recomendación ou personalización como para a verificación de contidos, xa que a construción de sistemas automatizados nestes medios de comunicación deben responder a unhas particularidades específicas que os diferencian do resto de axentes do sector (Donders, Raats & Tintel, 2020), polo que o esbozo do prezado algoritmo PSM é unha temática de alta relevancia dentro desta tese doutoral

Outro dos aspectos analizados na relación IA-PSM consiste en examinar os procesos de contratación que seguen estes medios en plena era da intelixencia artificial, así como coñecer se realmente se están demandando perfís profesionais especializados en IA ou se se están redefinindo ou alterando os perfís xornalísticos convencionais. Todos estes puntos de interese, centrados na monitorización do avance da IA nas radiotelevisións públicas de Europa, extrapólanse ao sector da prensa nacional en España, de ámbito privado, do que se estuda do mesmo xeito os usos actuais, as dinámicas de implementación, os perfís profesionais e os efectos xerais que a IA xenerativa está a producir nas súas redaccións, e que se equiparan ás repercusións que esta tecnoloxía está a ter en medios do ámbito global (Newman, 2024).

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Por último, preséntanse os resultados obtidos sobre o uso do metaverso como innovación social inmersiva nos medios públicos, o que consiste nunha sección específica e secundaria sobre o manexo da realidade estendida e de ecosistemas virtuais que deriva da liña central de investigación desta tese. Segundo García-Avilés (2023) estas solucións poderán ser aproveitadas para a comercialización de productos e xeración de ingresos por parte dos medios de todas as rexións na próxima etapa do sector.

Os achados principais desta tese doutoral indican que as 18 emisoras públicas europeas analizadas comparten unha orientación cara á dixitalización progresiva das súas estruturas, plataformas e rutinas de traballo como principal acción innovadora, o que reforza a investigación de Cañedo, Rodríguez-Castro e López-Cepeda (2022) e a idea de que os PSM están en pleno proceso de renovación e reposicionamento. Este avance tecnolóxico impleméntase mediante solucións específicas de alta tecnoloxía, permitíndolles un salto cualitativo na exploración de novos escenarios disruptivos e o seguimento do ritmo das empresas privadas máis revolucionarias. As iniciativas innovadoras clave destas corporacións céntranse en optimizar as rutinas de produción mediante a integración de novas tecnoloxías como a intelixencia artificial (IA), o desenvolvemento e mellora das súas plataformas de vídeo baixo demanda (VOD) e a creación de comunidades dixitais estables e participativas.

En termos estratéxicos, os plans de desenvolvemento destas emisoras divídense en accións incrementais que buscan mellorar as súas estruturas e produtos actuais, en iniciativas de desenvolvemento operativo e funcional, e en accións exploratorias que tentan anticiparse ás tendencias mediante o uso de novos marcos tecnolóxicos e creativos. Respecto aos sistemas organizativos para implementar a innovación, algunhas corporacións prefiren a holocracia ou xestión horizontal, mentres que outras adoptan unha estrutura vertical, organizando as súas accións tanto de arriba cara abaixo (directrices da alta dirección cara aos xornalistas) como de abaixo cara arriba (propostas dos xornalistas á alta dirección). Estes procesos dependen de factores clave como o apoio dos seus respectivos gobernos, as políticas nacionais, así como factores culturais (D'Arma; Raats & Steemers, 2021).

Aínda que a intelixencia artificial se aplica de maneira pioneira en casos limitados, os exemplos estudados mostran actitudes innovadoras no seu uso dentro do sector dos medios de comunicación. Os casos máis destacados, como é de esperar, son liderados por empresas con maiores orzamentos. A implementación da IA nestas corporacións pode resumirse en catro áreas principais: produción (automatización de noticias, produción automatizada, xestión de metadatos); xestión de contidos (arquivo e recomendacións); verificación; e ampliación de servizos (tradución automática de contidos, subtitulado automático para persoas con discapacidade auditiva) o que amplía e actualiza o listado de usos e beneficios concretado pola EBU (2019).

A heteroxeneidade en canto ao software específico utilizado polas emisoras públicas europeas reforza a idea de que a IA é unha tecnoloxía ad hoc que require unha implementación personalizada en cada caso, o cal contribúe ao seu alto custo e dificultade para ser escalada. A situación da IA é similar ao uso de tecnoloxías de xestión interna na radiodifusión, que xeralmente necesitan solucións tecnolóxicas personalizadas en lugar de produtos estándar do mercado, debido ás particularidades dos seus fluxos de traballo e intranets.

A análise de entrevistas con corporacións de medios de servizo público (PSM) e líderes en IA da Unión Europea de Radiodifusión (UER) confirma que a intelixencia artificial é de gran interese para estes medios, constituíndo unha parte relevante da súa folla de ruta, o que xa adiantou Sørensen (2019), apuntando que a IA será unha tecnoloxía fundamental para a evolución do PSM. Identificáronse diversas interpretacións do que significa a IA para estas organizacións. Por exemplo, a ZDF prefire utilizar o termo "intelixencia mecánica" en lugar de "intelixencia artificial", argumentando que os procedementos que xeran valor nesta tecnoloxía non seguen os patróns habituais da mente humana.

O potencial da intelixencia artificial (IA) é unánime entre as corporacións, que apenas comezan a explorar e aplicar as súas capacidades, situándose nunha fase incipiente de experimentación. Esta etapa caracterízase pola proliferación de proxectos piloto, carentes de produción a gran escala e dun enfoque estratéxico definido, aínda que se prevén progresos significativos a curto prazo. En termos de proxectos colaborativos ou conxuntos, é de salientar o proxecto Peach da EBU, destinado a ofrecer unha solución de sistema de recomendación para os PSM (Canavilhas, 2022).

En relación coa construción de algoritmos de servizo público, as opinións corporativas diverxen considerablemente (Van-dean-Bulck & Moe, 2017). A NPO, por exemplo, intenta traducir os valores do servizo público en códigos numéricos para que o sistema poida interpretalos e aplicalos en futuras recomendacións. Pola contra, a BBC e a DR consideran que definir o servizo público de maneira precisa é inviable. Por iso, poñen énfase en incorporar valores de diversidade, pluralidade, responsabilidade e transparencia nos algoritmos, asegurando así que se adapten á súa misión e eviten a creación de burbullas de filtro (Napoli, 2011).

Debido á carencia de habilidades en enxeñería de datos e á escaseza de perfís profesionais capacitados para desenvolver estes sistemas, moitas corporacións recorren a provedores externos para obter os algoritmos, que logo son adaptados internamente. Porén, corporacións como YLE, VRT, RTBF, NPO e SVT desenvolven esta tecnoloxía internamente coa colaboración do seu propio persoal.

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Para a avaliación destes algoritmos, as corporacións utilizan métodos cuantitativos como as probas A/B, xunto con métodos cualitativos como probas reais a usuarios e entrevistas. Os sistemas máis comúns baséanse no filtrado colaborativo, que recomenda contido baseado nas características do usuario e no comportamento de perfís similares, e no filtrado baseado en contido, que se centra nas características do produto. Os PSM europeos insisten en diferenciar os procedementos de xeración de suxestións entre plataformas de Vídeo on Demand (VoD) e aplicacións de novas, destacando a importancia de manter o énfase xornalístico nestas últimas e buscando unha mellora na participación da audiencia mediante a distribución de contidos personalizados (Diakopoulos, 2019).

O consentimento do usuario no uso de datos e outras accións que poidan comprometer á súa privacidade é unha preocupación central para os PSM. Hai unha inquedanza específica respecto á actitude dunha parte da audiencia que mostra indiferenza ao compartir a súa información persoal con diversas plataformas. Neste contexto, sublíñase a importancia de manter a ética e a transparencia nas recomendación, así como as normas en canto ao dereito ao esquecemento dos datos persoais e á comunicación sobre o tratamento desta información (Sørensen & Van den Bulck, 2018). Por exemplo, YLE publica informes anuais detallando o uso de datos, o tipo de información recollida e os beneficios que estes sistemas achegan aos usuarios.

En canto á normativa vixente, as corporacións aseguran que non reciben presións gobernamentais, senón pautas que seguen rigorosamente. No contexto europeo, destaca o Regulamento Xeral de Protección de Datos (GDPR), cuxa recente reinterpretación obrigou a modificar os sistemas baseados en cookies, levando ás corporacións a explorar alternativas como portais de subscrición e fórmulas de inicio de sesión.

No caso das principais cabeceiras impresas de España, estas atopanse nunha fase inicial de exploración do valor e utilidade da intelixencia artificial, limitándose á automatización de tarefas diarias. Agás excepcións, rexeitan polo momento o uso da IA xerativa, a pesar de que xa existen sistemas sofisticados capaces de xerar linguaxe natural para a creación de noticias (Gondwe, 2023). A intención común é utilizar a IA con prudencia para optimizar produtos ou servizos e acadar unha diferenciación cualitativa, evitando empregala para amplificar a cobertura, o cal podería desvirtuar o seu modelo de subscrición baseado na diferenciación de contidos de autor.

Estes xornais prestan especial atención á regulación tecnolóxica e á ética da intelixencia artificial, sendo esta unha das preocupacións máis frecuentes entre os seus directivos pola velocidade de crecemento destas tecnoloxías, que xa foi alertada por González Arencibia e Martínez Cardero (2020). Prevese que a IA se incorpore

para a automatización de tarefas rutineiras sen unha achega xornalística significativa, actuando como un asistente que reduza os tempos de execución de tarefas simples, sen chegar a substituír ao capital humano. Desde esta perspectiva, a IA concíbese como unha oportunidade para reafirmar a importancia do xornalismo e dos profesionais da información, quenes sempre deberán supervisar a actividade dos algoritmos, evitando dotarlles de autonomía ou responsabilidade.

En canto ao metaverso e o uso da realidade estendida para xerar innovacións inmersivas, os entrevistados recoñecen o concepto e monitorizan os seus avances, considerándoo unha ferramenta potencialmente implementable nas súas estruturas. Barta (2023) apunta ás oportunidades que brinda o metaverso no ámbito das experiencias e de xeración de engagement. Non obstante, máis da metade dos medios analizados nesta rama da investigación (8 de 15) manteñen actualmente unha posición de seguidores pasivos con esforzos reducidos, e 4 das 15 corporacións están a desenvolver estratexias ou liñas de actuación paralelas a iniciativas puntuais en fases iniciais. Só tres empresas (France TV, YLE e VRT) declaran traballar con maior frecuencia en iniciativas de proto-metaverso, con resultados tanxibles e unha estratexia definida.

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6.1. Prioridades e dinámicas de innovación no PSM de Europa

A disparidade de recursos entre corporacións é unha realidade evidente que reflicte a ambición das distintas estratexias adoptadas por cada unha. Mentres algúns provedores de servizos públicos de medios (PSM) buscan manterse á vangarda mediante a experimentación con novas tecnoloxías, outros prefiren actuar como "seguidores intelixentes", aproveitando os descubrimentos dos seus pares e adaptándoos ás súas propias estruturas, como suxire RTÉ. No caso da SVT de Suecia, a corporación mantén un sistema colaborativo activo con empresas e medios comerciais para promover a innovación conxunta e reducir a fenda competitiva con grandes compañías internacionais, contrastando coa tendencia na maioría dos países, onde as colaboracións público-privadas son menos comúns.

Unha prioridade fundamental para as empresas de PSM é mellorar e renovar a experiencia do usuario coa súa oferta de contidos, asegurando que sexan usables, relevantes e personalizados para cada consumidor. Buscan diferenciarse dos servizos comerciais de medios, priorizando os valores asociados ao xornalismo público de calidade sobre calquera tipo de experimentación arriscada. Atraer a un público novo (16-25 anos), tradicionalmente desinteresado na súa oferta principal, é outro dos seus piares estratéxicos. Para iso, aumentan a súa presenza en novas plataformas de terceiros como Twitch ou TikTok, e potenciaron a súa oferta temática nestes espazos con contidos xuvenís e formatos interactivos que promoven unha participación activa do usuario.

En canto ás plataformas de vídeo baixo demanda (VOD), as corporacións europeas de PSM están a traballar para actualizar e implementar sistemas de recomendación cada vez máis precisos en conformidade co Regulamento Xeral de Protección de Datos (GDPR). Non obstante, historicamente enfrontáronse a dificultades para xerar metadatos asociados aos seus contidos, polo que primeiro están a abordar este desafío mediante a integración de tecnoloxías automatizadas para crear unha arquitectura de datos robusta e suficiente para a personalización. A cocreación é outro tema emerxente, aínda que as entrevistas revelaron que as empresas de PSM teñen diferentes interpretacións do seu significado. Salvo excepcións como Rai, ORF e RTVE, a maioría das corporacións afirman estar experimentando coa inclusión do usuario no proceso de produción de contidos. Aínda así, as prácticas varían significativamente entre as emisoras públicas europeas.

Cada radiotelevisión pública analizada manifesta diferentes prioridades e inquietudes vinculadas á súa estratexia de innovación. Non obstante, existen áreas comúns de interese, como a renovación dixital das súas seccións, procesos e aplicacións; o uso de alta tecnoloxía, especialmente no desenvolvemento de estratexias e solucións de intelixencia artificial (IA); a optimización

da experiencia de usuario (UX); e o establecemento dunha comunicación bidireccional activa e sostida coas súas audiencias.

No primeiro artigo compendiado para esta tese doutoral, centrado no estudo das estratexias de innovación das radiotelevisións públicas de Europa, as corporacións agrúpanse segundo o modelo ao que pertencen segundo o paradigma de Hallin e Mancini (2004). Porén, non se identificou unha correlación directa de tendencias innovadoras entre emisoras do mesmo sistema, o que determina que o paradigma non é adecuado para diferenciar os enfoques de innovación entre corporacións, e destaca a necesidade de establecer novos modelos multidisciplinares que permitan distinguir semellanzas nos procesos de innovación.

No modelo pluralista polarizado, RTVE destaca polo seu avance en tecnoloxías 5G e traballo na nube, que lles permitirá unha conectividade audiovisual constante e a experimentación coa produción remota. Tamén están enfocados na ultra alta definición (4K) e a aplicación da IA en todas as súas seccións, así como no enfoque mobile first para adaptar a súa oferta de contidos a novos formatos. France TV divide as súas prioridades de innovación nunha perspectiva incremental, optimizando os seus servizos existentes, e outra experimental e disruptiva, probando novas tecnoloxías coa IA como protagonista. RTP dá preferencia a accións que potencian a súa proposta de contidos locais e renovación da linguaxe e equipos de traballo cara a perfís máis tecnolóxicos. Rai, pola súa banda, focalízase en alcanzar un nivel importante de dixitalización e en articular as rutinas profesionais e distribución personalizada en torno a ela.

No modelo liberal, a BBC prevé que a innovación en PSM ocorrerá de tres formas diferentes: o afastamento completo da radiodifusión tradicional cara a unha baseada en IP, onde os medios baseados en obxectos (OBM) gañarán protagonismo; a proposta de valor público en relación co procesamento e almacenamento de datos persoais en Internet; e as recomendacións multimodais, ofrecendo contidos en diferentes formatos segundo a situación do usuario.

As prioridades de innovación no modelo corporativista democrático son variadas pero comparten unha orixe común centrada na dixitalización. A VRT enfoca os seus esforzos en aumentar a interacción e participación das audiencias para fidelizar unha comunidade estable en contornos dixitais. Yle, pioneira na personalización de contidos mediante IA, utiliza o seu asistente intelixente Voitto para ofrecer recomendacións personalizadas. A DR optimiza os servizos e programación da súa plataforma dixital DR TV, e outras emisoras como RTBF, SVT, NPO, ORF e RTS destacan a mellora incremental das súas propostas actuais e aplicacións tecnolóxicas. A ARD enfócase en desenvolver unha estratexia e rede de innovación común para todas as súas televisións rexionais.

A dixitalización de estruturas, aplicacións principais e rutinas de produción é central nas estratexias de innovación das emisoras públicas europeas. Céntranse en actualizar e dixitalizar os seus arquivos e metadatos asociados para mellorar a súa interoperabilidade, traballar na nube e asegurar a ciberseguridade para protexer os seus sistemas. As posibilidades inmersivas dos novos contornos virtuais, como a realidade virtual (VR), aumentada (AR) e mixta (MR), e o metaverso, gañaron relevancia desde a pandemia do coronavirus. Non obstante, o investimento e esforzo nestas tecnoloxías aumentarán progresivamente en paralelo ao interese real das audiencias.

Algunhas corporacións públicas establecen proxectos de cooperación sobre aplicacións ou ferramentas tecnolóxicas específicas para explotar sinerxías, reducir custos e optimizar o seu desempeño en innovación. Estas relacións danse ocasionalmente coa EBU e, en menor medida, con laboratorios de investigación académica, universidades, startups e empresas privadas especializadas. No contexto belga, a RTBF e VRT colaboran no mecanismo SandBox para explorar formas innovadoras de traballo e desenvolvemento de ferramentas. Outro proxecto de RTBF é a asociación financeira con France TV e Radio France para crear contidos conxuntos e compartir custos. ORF Austria reforza o valor das asociacións e promove a innovación interna, facilitando que os empregados con boas ideas as leven a cabo.

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6.2. Implementación da IA en medios públicos: repercusións, estratexia e retos

A creación de prototipos e a avaliación de ferramentas de intelixencia artificial son tarefas intrinsecamente complexas e custosas. Estas dificultades fomentan a colaboración entre empresas privadas, start-ups e, no contexto do PSM, coa UER como un punto de encontro estratéxico. Os radiodifusores públicos utilizan predominantemente esta tecnoloxía para a xestión de arquivos internos e dos metadatos dos contidos almacenados, considerándoa esencial para axilizar tanto a distribución como a creación de novos produtos. A mellora da accesibilidade aos contidos mediante subtítulos automatizados é outro tema no que as corporacións coinciden ampliamente e que están comezando a implementar.

A pesar da tendencia positiva na percepción da intelixencia artificial nas redaccións, persisten reticencias, especialmente nas corporacións con estruturas máis tradicionais. A preocupación céntrase en dous factores principais: o temor dos profesionais a ceder responsabilidades, o que podería levar á eventual substitución das súas funcións, e a falta de coñecementos técnicos, que afasta aos xornalistas máis veteranos dos novos procesos de produción.

Corporacións como France TV están a abordar este desafío mediante a implementación de sesións de alfabetización en IA para os seus empregados. Estas sesións buscan familiarizar ao persoal coas sensibilidades e posibilidades destas tecnoloxías, destacando a complementariedade da IA no traballo editorial. A intención é proxectar a presenza da intelixencia artificial como unha oportunidade para que os xornalistas se concentren nos aspectos creativos e reflexivos do seu traballo, eliminando tarefas máis tediosas e mecánicas.

As empresas tamén recoñecen varias preocupacións comúns que merecen un seguimento continuo en termos do seu progreso e impacto. Entre estas preocupacións atópase a dificultade para localizar profesionais con experiencia no uso da intelixencia artificial nos medios de comunicación, xunto coa complexidade de formar aos seus propios empregados. Esta situación, combinada cos elevados custos de implementación de sistemas, limita a adopción de solucións intelixentes en moitos casos. Ademais, é crucial vixiar a capacidade das organizacións de medios para desenvolver proxectos de IA a gran escala dentro das súas estruturas e adaptalos ás súas necesidades específicas, xa que as aplicacións prefabricadas raramente satisfacen plenamente as demandas concretas das corporacións.

O PSM destaca o valor da intelixencia artificial na xestión dos seus arquivos, abrindo a posibilidade de convertelos en sistemas "vivos" capaces de recuperar información de maneira máis eficiente e, ao mesmo tempo, alimentar o arquivo con novos contidos xerados

a partir dos anteriores. Nalgúns casos, isto lógrase mediante sistemas de recoñecemento facial ou de voz baseados en IA, que etiquetan os contidos (identificación de persoas, interlocutores, contidos e temas), facéndoos máis facilmente identificables e recuperables. A RTS suíza, en particular, non só realiza a transcrición de voz a texto, senón que tamén distingue entre voces masculinas e femininas.

A accesibilidade aos contidos representa unha prioridade para as televisións públicas europeas. A intelixencia artificial (IA) demostrou ser unha ferramenta valiosa para facer os contidos máis accesibles a persoas con limitacións, como as auditivas, a través de sistemas de subtitulado automático baseados no recoñecemento e transcrición de voz.

As televisións públicas europeas que implementan a IA consideran que con ela poden ampliar a súa cobertura de contidos e, ao mesmo tempo, mellorar a súa calidade. Por exemplo, RTVE está a desenvolver un sistema de cámaras intelixentes que permitirá a realización audiovisual de programas de radio en directo cun único dispositivo. Paralelamente, a BBC explorou alternativas creativas e probou a xestión automatizada da programación e dos contidos dun dos seus canais.

Na relación coa súa audiencia, os PSM europeos están a utilizar a IA para mellorar a interacción cos espectadores a través de chatbots e a personalización da oferta de contidos. Os sistemas de recomendación algorítmica son unha das solucións aplicadas por estes radiodifusores para facer chegar produtos relevantes ao usuario, cumprindo así coa súa misión de servizo público.

Non obstante, o principal desafío para os PSM europeos radica na adopción cultural e o aprendizaxe profundo destas tecnoloxías, á vez que se xestionan problemas como o fluxo de traballo, a cultura corporativa, a organización, os perfís profesionais e as cuestións éticas. Un desafío específico é o deepfake, que pode falsificar sinteticamente o discurso ou a imaxe dunha persoa con alto grado de realismo, o que pode intensificar o problema matriz da desinformación.

No apartado organizativo, prevese a creación de equipos mixtos compostos por xornalistas, enxeñeiros e os algoritmos como asistentes, nos cales a correcta integración achegaría un valor engadido a toda a cadea de desenvolvemento do produto. Isto tamén responde á necesidade de supervisar a actividade das máquinas coa presenza e o criterio editorial de profesionais humanos, tal como se especifica no libro branco da IA publicado pola Comisión Europea en 2020.

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As empresas de radiodifusión pública agardan grandes avances técnicos relacionados con ferramentas específicas que aumenten a eficiencia e a calidade de tarefas concretas. Estes algoritmos e sistemas inflúen en todas as fases da cadea de produción, chegando

ao punto onde a IA pode xerar parte dos contidos. Aínda que moitos destes avances se atopan na fase de prototipos e probas de concepto, os resultados foron positivos e as empresas planean seguir innovando coa IA como eixo central.

Entre os desafíos que enfrontan os PSM europeos na implementación da IA, destacan a barreira cultural tecnolóxica, a dimensión ética, a privacidade e a xestión dos datos dos usuarios, especialmente no ámbito do servizo público. Moitos xornalistas temen que esta tecnoloxía os substitúa nos seus traballos. Para abordar esta preocupación, as empresas destacan que as máquinas substituirán ás persoas só en tarefas rutineiras, permitindo aos profesionais concentrarse en áreas creativas esenciais para o resultado final.

A financiación é outro reto significativo. Os servizos públicos de radiodifusión deben reafirmar a súa relevancia e a confianza do público para evitar unha deslexitimación que comprometa a súa supervivencia futura. A IA pode xogar un papel crucial a curto prazo, dado que depender de tecnoloxía externa por razóns orzamentarias podería xerar problemas a medio prazo. Esta dependencia non só implica unha falta de control sobre o deseño específico da IA para uso do servizo público, senón tamén unha falta de capacidade de actuación e operatividade. Neste contexto, optar polo desenvolvemento tecnolóxico propio ou por unha solución mixta pode ser determinante para o futuro destas empresas.

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6.3 O deseño de algoritmos nos medios de servizo público: personalización, recomendación e verificación de contidos

Os medios públicos en Europa coinciden na relevancia de empregar algoritmos PSM para orientar eficazmente o contido cara á súa audiencia. A vasta oferta dos medios de comunicación fai imposible concentrala na páxina principal, polo que a implementación de recomendacións é imprescindible para optimizar a experiencia do usuario. Ademais, a audiencia adaptouse progresivamente a esta presentación personalizada do contido a través do consumo de plataformas privadas, converténdose nunha esixencia fundamental máis que nun valor engadido.

Para desenvolver un sistema de recomendación algorítmico de servizo público, é esencial minimizar os sesgos para mellorar a accesibilidade e permitir que as corporacións alcancen audiencias normalmente distantes das súas propostas. En SVT, por exemplo, o algoritmo utilízase como ferramenta de apoio para os editores, garantindo que se reflictan "todas as partes do país, a diversidade xeográfica e de perspectivas". De forma similar, a DR de Dinamarca está a desenvolver un novo servizo que permite aos usuarios crear listas de contido sobre as que se basean as recomendacións.

No proceso de creación do algoritmo PSM, Bon Van de Velde, xefe de datos e arquivos en NPO e codirector de IA na EBU, destaca que o primeiro paso consiste en representar a entrada de contido, determinando as variables independentes e ficticias, coñecidas como espazo de características ou "feature space". Neste primeiro paso pódense incluír valores, o que facilita a introdución do servizo público. A continuación, o algoritmo mapea esta área, asegurando que o conxunto de entrada e saída sexa cuantitativo. A fase final inclúe criterios de avaliación, como "se a xente ve ou non o contido por recomendación, se fai clic nel para buscalo", onde debe haber unha puntuación que permita avaliar a súa eficacia.

As radiotelevisións públicas europeas adoptaron enfoques diversos ao construír ou adquirir os seus sistemas de recomendación algorítmica. Corporacións como YLE, VRT, RTBF, NPO e SVT desenvolven os seus propios conceptos e tecnoloxías de base, aínda que a miúdo combinan estes desenvolvementos con recursos de provedores para perfeccionar o seu funcionamento. YLE asegura que selecciona aos seus colaboradores coa mesma meticulosidade que a un empregado, garantindo que comprendan a importancia de cumprir coa súa misión e valores. Pola súa parte, a BBC está traballando na migración de sistemas de terceiros a solucións propias, buscando maior "control, comprensión e transparencia".

En contraste, algunhas corporacións, como RAI, optaron por provedores que ofrecen solucións xa listas para personalizar. A organización italiana non considerou unha estratexia de creación propia, xa que necesitaban a tecnoloxía de maneira inmediata e non desexaban investir "recursos humanos, tempo ou diñeiro" en desenvolvemento. DR menciona que moitos dos seus colegas de PSM cren que as solucións adquiridas a empresas non son eficaces e son difíciles de controlar. Con todo, aseguran que obtiveron bos resultados con estas solucións.

As corporacións como RTVE e France TV enfróntanse a unha escaseza de profesionais especializados en áreas como a ciencia de datos, enxeñería e arquitectura, esenciais para desenvolver solucións intelixentes. Radiotelevisión Española respondeu a esta situación mediante a contratación de servizos a través de licitacións públicas, unha estratexia que tamén aplicaron a principios de 2020 coa Axencia EFE e a empresa Narrativa para a creación automática de noticias. De xeito diferente, France TV colabora con startups e comezou a contratar persoal con perfís tecnolóxicos, dedicándose á limpeza de datos e á selección de algoritmos adecuados para os seus sistemas nunha fase de deseño estratéxico. En paralelo, a ZDF aproveita as sinerxías derivadas da súa colaboración con outras corporacións e expertos universitarios.

Os sistemas de recomendación empregados polos PSM europeos baséanse en diversas estratexias. Unha metodoloxía prevalente é o filtrado colaborativo, que analiza aos usuarios para crear perfís e recomendar contidos baseándose na similitude entre eles. Este sistema asume que se un usuario 'A' está interesado nun contido 'B', outro usuario cun perfil similar tamén o estará. Por outra banda, existen sistemas que se centran na análise do contido, xerando recomendacións a partir do propio material.

No desenvolvemento de recomendacións, as corporacións distinguen entre as plataformas de Video on Demand (VoD) e as aplicacións de noticias. As primeiras seguen un modelo similar ao de empresas como Netflix ou Amazon, utilizando a personalización baseada na dirección IP do usuario. As aplicacións de noticias, en cambio, teñen taxas de produción máis elevadas e empregan procedementos distintos para evitar a mestura de recomendacións entre ambos tipos de contido.

Algunhas corporacións non requiren o rexistro de usuarios nos seus sistemas. Por exemplo, a SVT optou por non utilizar o inicio de sesión, argumentando que os servizos públicos non deben monitorizar ás súas audiencias, e baséanse exclusivamente en cookies para construír as súas recomendacións. A desconfianza xerada polo mal uso de rexistros por parte de grandes compañías como Facebook é

unha preocupación para a radiotelevisión pública sueca. En contraste, a RTÉ ofrece un servizo mellorado con rexistro, aínda que non o considera obrigatorio, mentres que YLE personaliza incluso as imaxes de portada para os usuarios na súa plataforma de streaming.

Os PSM europeos xa están a explorar a nova xeración de recomendacións multimodais, que combinan texto, audio e vídeo. A BBC chámaas "universais" e recoñece que aínda queda moito camiño por percorrer para dominalas, aínda que anticipa o seu alto valor potencial para os usuarios. A DR, pola súa banda, experimentou resultados negativos nos seus intentos, aínda que non descarta seguir traballando nelas. A corporación sinala que a súa estrutura de metadatos non é efectiva en todos os tipos de contido, o que implica un traballo adicional para mellorar esta nova modalidade de recomendación.

No ámbito da verificación de contidos, as solucións automatizadas axilizan e optimizan as tarefas rutineiras dos verificadores, sexan xornalistas ou outros profesionais da comunicación. A intelixencia artificial facilita a busca de palabras clave, a verificación de información e a análise de grandes volumes de datos en tempos reducidos. Isto permite aos profesionais concentrarse en tarefas específicas de testeo, monitorización e loxística, actividades que requiren o compoñente humano insubstituíble de coherencia e pensamento crítico. Non obstante, a combinación de recursos humanos e tecnolóxicos resulta esencial para elaborar estratexias eficaces e adecuadas ás particularidades da realidade identificada.

Os PSM recoñecen que a problemática das noticias falsas non desaparecerá de xeito instantáneo, sendo un desafío duradeiro que afecta de maneira desigual a distintos sectores da poboación. As radiotelevisións públicas europeas están atrasadas na protección e loita contra a desinformación e consideran que o labor educativo nas escolas e as políticas gobernamentais deben reforzar este proceso desde a base.

Desenvolver ferramentas efectivas de verificación é custoso, polo que corporacións como RTVE crearon departamentos especializados que utilizan tecnoloxías de plataformas como Google ou Facebook, complementándoas con recursos propios. Outras corporacións optan por desenvolver solucións internas a través de colaboracións con diversas entidades. As tipoloxías de fake news son diversas, así como as ferramentas desenvolvidas para combatelas. A medida que a intelixencia artificial avanza, tamén o fan as tácticas de desinformación. Por iso, é fundamental que a sociedade fomente a conciencia crítica nos mozos para cuestionar os discursos que reciben. Desde a ORF, argumentan que aínda non se descubriu un algoritmo universalmente efectivo en todos os contextos, o que obriga a cada corporación a adaptar os sistemas ás súas estruturas particulares, aínda que isto resulte máis custoso e complexo.

6.4. Dinámicas de contratación e perfís profesionais demandados no PSM na era da IA

No contexto dos medios de servicio público de Europa a irrupción de ofertas laborais cun alto compoñente dixital non implica a eliminación de oportunidades de emprego para posicións xornalísticas tradicionais, existindo un equilibrio na publicación de ambas tipoloxías de empregos. Mentres que na vertente convencional demándanse profesionais especializados para todas as fases do proceso de creación de novas (newsmaking), os postos tecnolóxicos asócianse predominantemente a funcións de enxeñaría de datos, ciberseguridade, xestión de big data e servizos na nube. Con todo, as emisoras, salvo en casos excepcionais, rara vez solicitan profesionais especializados en aprendizaxe automático ou expertos en intelixencia artificial.

En canto aos procedementos relacionados coa súa actividade empregadora, a maioría das emisoras operan de xeito semellante en termos de canles, tipos de procesos de selección e dinámicas de contratación. Na construción da súa marca empregadora, as narrativas corporativas de empresas como a BBC, France Tv, VRT e ARD son as máis elaboradas, utilizando propostas de storytelling e campañas de atracción para novos talentos. Pola contra, a RTP utiliza o seu portal de contratación principalmente para a aplicación a postos e tramitación de solicitudes, explotando menos este aspecto.

Nos PSM solicítanse principalmente perfís tecnolóxicos asociados a procesos dixitais de xestión, arquitectura ou tratamento de big data, máis que a funcións de desenvolvemento de prototipos automatizados ou xenerativos. Esta situación coexiste coa actividade empregadora convencional das corporacións, mantendo as súas necesidades tradicionais de persoal enfocado ás funcións clásicas do xornalismo audiovisual.

As habilidades brandas máis valoradas inclúen a adaptabilidade ao cambio e a polivalencia. No aspecto técnico, solicítanse destrezas en análise, administración e uso de bases de datos, deseño UX/UI (experiencia de usuario), deseño 3D, xestión de redes sociais, SEO, marketing dixital e sistemas de información (SI) e redes de transmisión. Cabe salientar que non é frecuente a demanda de habilidades específicas para o desenvolvemento de prototipos baseados en machine learning ou IA.

En relación ao funcionamento dos procesos de selección, a aplicación ás ofertas segue unha estrutura común: envío dunha carta de motivación e o currículo; entrevistas persoais para realizar probas específicas segundo o posto; e resolución do proceso. As primeiras entrevistas adoitan ser un filtro realizado polo equipo de recursos humanos, que logo redirixe aos candidatos seleccionados a un segundo encontro co responsable do departamento correspondente. As probas

máis comúns inclúen avaliación de idiomas, test de cultura xeral, entrevistas cognitivo-motivacionais, probas psicotécnicas intensivas e avaliación de habilidades específicas segundo o posto (redacción, locución, edición, resolución de casos prácticos).

As principais canles empregadas polas radiotelevisións públicas europeas para a súa actividade empregadora inclúen ferramentas propias desenvolvidas en sitios web independentes da súa páxina matriz corporativa, seccións dentro da súa web principal, ou a sección 'Empregos' do seu perfil de LinkedIn. Non recorren a outras redes sociais ou portais de emprego para promocionar as súas ofertas ou executar os trámites de selección e contratación. A BBC, France Tv e Rai utilizan sistemas aloxados en sitios independentes, mentres que outras corporacións integran unha sección dentro da súa web principal. As accións nestes espazos inclúen a publicación de ofertas laborais, a xestión de solicitudes, a construción da marca empregadora e a promoción dos atributos e prestacións que brinda cada corporación aos seus empregados.

As emisoras comezan a incorporar ferramentas e recursos para a captación de traballadores, reorientando as súas mensaxes corporativas e frases de venda. Anteriormente as campañas de marketing enfocábanse á promoción de produtos e servizos, agora otórgase maior énfase a publicitar entornos de traballo ideais, con perspectiva de xénero, inclusividade e unha proxección futura dixital, tecnolóxica e innovadora.

Exceptuando RTVE e RTP, a maioría das emisoras publican as súas ofertas na sección de 'Empregos' do seu perfil de LinkedIn, empregando esta canle principalmente para replicar as propostas e redireccionar ao candidato interesado ás súas ferramentas para formalizar a solicitude. A maioría das televisións presentan ofertas laborais específicas, coa excepción da Rádio e Televisão de Portugal, que mantén unha convocatoria aberta permanente. France Tv, VRT, SVT e Rai combinan ambas tipoloxías de procesos, mentres que RTVE traballa exclusivamente con convocatorias de oposicións. Así mesmo, todas as corporacións reservan un apartado para ofertas destinadas a profesionais noveles ou en prácticas.

As ofertas con compoñente dixital nas corporacións son cada vez máis diversas e especializadas. Identifícanse postos relacionados coa xestión e análise de bases de datos, produción de contidos en redes sociais e plataformas alternativas, ciberseguridade, investigación e desenvolvemento, enxeñaría de software, deseño de experiencia de usuario, servizos na nube, business intelligence, 3D ou aprendizaxe automático, entre outras. En canto ás habilidades brandas, requírense profesionais talentosos, creativos, ambiciosos, entusiastas, positivos, con capacidade psicofísica e sensorial, espírito de equipo, cultura amigable, coraxe xornalística, comprometidos e con facilidade para o traballo en equipo.

6.5. A intelixencia artificial nas redaccións: efectos da IA na prensa nacional de España

Dende unha perspectiva organizativa, é habitual que os principais grupos editoriais de prensa de España definan liñas de acción conxuntas para as súas diferentes cabeceiras, analizando o mercado tecnolóxico a través de departamentos transversais de tecnoloxía, estratexia ou produto. Posteriormente, as ideas ou ferramentas identificadas como relevantes propóñense a estas seccións dentro dos medios, as cales avalían o seu interese antes de implementalas nas redaccións ou departamentos pertinentes.

No noveno artigo compendiado desta tese de doutoramento propúxose unha escala de implementación da intelixencia artificial graduada en catro niveis, baseada na análise das estratexias de aplicación da IA nestas cabeceiras e os usos específicos executados. O nivel máis baixo, ou estado 'nulo', inclúe aqueles medios de comunicación que aínda non integraron ningunha ferramenta de IA nas súas rutinas nin mostran interese no concepto. O nivel 'iniciático' refírese a medios con aproximacións incipientes a esta tecnoloxía, pero sen unha estratexia definida. O estado 'intermedio' agrupa cabeceiras con usos máis sofisticados ou con traxectorias máis extensas na implementación da IA. O nivel 'avanzado' describe medios cunha estratexia transversal sólida de IA e unha variedade de ferramentas integradas en todas as fases de produción de noticias. Ata a data, ningunha das dez cabeceiras estudadas alcanzou este último nivel, ubicándose a maioría no nivel iniciático, con excepción de El País, Mundo Deportivo e ABC, que presentan unha maior traxectoria na integración da IA nas súas rutinas e propostas máis avanzadas.

Os fluxos de implementación de aplicacións de IA e as dinámicas organizativas varían segundo cada medio e grupo editorial. Non se identificou ata o de agora ningún departamento especializado en IA nas cabeceiras estudadas, coa excepción de Unidad Editorial, que conta cunha Comisión dedicada exclusivamente á IA. Esta comisión, de recente creación, está integrada polo equipo de tecnoloxía, un redactor de cada cabeceira e o director de dixital (CDO) de cada un dos seus medios, que se reúnen semanalmente para revisar novas ferramentas e posibilidades de automatización.

Os grupos Prisa e Vocento tamén desenvolven estratexias conxuntas transversais para os seus xornais, deixando nas mans dos seus equipos internos a decisión sobre que aplicacións integrar nas súas respectivas redaccións. Os xornais do Grupo Godó xestionan as súas estratexias de maneira independente, aínda que ocasionalmente levan a cabo iniciativas conxuntas. La Voz de Galicia e El País son os únicos medios que considerarían a creación dun departamento específico para a innovación en IA se esta tecnoloxía adquirise unha importancia significativa, mentres que o resto dos xornais prefiren manter os equipos ou comisións actuais a cargo destas responsabilidades.

Na prensa española, non se identificaron aínda profesionais estritamente especializados en intelixencia artificial, nin se contempla a formación en IA como un requisito nas ofertas de emprego destes medios. Porén, contan con persoal capacitado para entender e seguir o desenvolvemento de prototipos de IA emerxentes, aínda que a súa formación sexa autodidacta e derivada doutras áreas tecnolóxicas como a analítica de datos ou a enxeñaría de software.

A medida que a IA se integre progresivamente nas estruturas destes medios, será necesario contar con persoal especializado para optimizar as solucións e maximizar o seu rendemento. Non obstante, no contexto actual, valórase máis o perfil dun comunicador polivalente capaz de producir contidos en diversos formatos. Estes xornais prefiren a formación gradual dos seus traballadores en lugar dunha renovación drástica das súas plantillas con profesionais especializados, anticipando que a IA impulsará unha significativa reconversión de perfís, similar á experimentada durante a dixitalización dos seus modelos de negocio.

Os medios de comunicación españois están a avanzar na adopción de intelixencia artificial (IA), enfocándose na optimización da súa oferta actual e na redución do tempo dedicado a tarefas rutineiras para reservar eses esforzos a actividades máis especializadas e creativas. Aínda que a maioría dos xornais realizaron probas internas con IA para a produción de textos, só Mundo Deportivo publicou contidos informativos xerados por IA, supervisados polos seus redactores, en temas sinxelos como resultados de lotaría, previsións meteorolóxicas ou crónicas de categorías non profesionais.

O resto dos xornais, por agora, non están interesados en ampliar a súa cobertura con contidos sinxelos que non cumpren cos seus estándares de calidade. Con todo, valoran a posible futura incorporación destes contidos para atraer nichos específicos de usuarios, redirixíndoos cara aos seus contidos principais, unha estratexia xa en uso por Mundo Deportivo. Unha excepción notable é El Mundo, que contempla o uso de IA xerativa para redactar textos sobre temas específicos como resultados electorais en pequenas localidades.

Unidad Editorial integrou unha aplicación de IA xerativa no seu sistema de xestión de contidos (CMS) para crear textos promocionais en formato de noticia sobre produtos de Amazon, recomendados polas súas diferentes cabeceiras. Esta ferramenta, relacionada coa súa liña de negocio, xera pezas que logo son supervisadas polos redactores e publicadas na sección ‘Bazar’. Especificamente, El Mundo utiliza ChatGPT a diario para funcións diversas, como a tradución de información, a adaptación da extensión das pezas para a versión impresa, a revisión de erratas, a documentación e a preparación de entrevistas mediante a xeración de preguntas que logo son filtradas polos redactores.

No xornalismo español, a IA tamén se está a utilizar nas liñas de negocio e departamentos de marketing para a xeración de textos publicitarios, a creación de anuncios personalizados, a tradución a idiomas estranxeiros, a planificación de contidos en redes sociais, a verificación de feitos, a analítica de audiencias, a xeración de imaxes e ilustracións, e a mellora gramatical e de posicionamento SEO dos textos.

A aplicación Marfeel Compass, empregada pola maioría destes xornais, revisa os textos para optimizar a súa redacción e gramática, ofrecendo diversas propostas de titulares cun adecuado posicionamento web segundo os parámetros de Google. Tamén se están a levar a cabo probas para converter texto a voz e engadir a opción de narración de noticias nas plataformas dixitais, así como nos departamentos de vídeo para optimizar os procesos de edición e posprodución.

A previsión máis inmediata para a incorporación de solucións de IA nestes medios inclúe a recomendación personalizada de contidos, a creación de resumos a partir de textos xa existentes, a verificación de feitos e informacións, a xestión de redes sociais e a análise do comportamento dos usuarios para mellorar a súa experiencia nas plataformas dixitais.

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6.6. Metaverso e realidade estendida como innovación social inmersiva no PSM

As corporacións de radiotelevisión pública consultadas para a elaboración do sétimo artigo compendiado coinciden en que o PSM debe estar presente nos espazos onde se atopan as súas audiencias. Polo tanto, cando o metaverso ofreza características relevantes e teña un impacto tangible na cidadanía, estas entidades intensificarán os seus esforzos para fortalecer as súas propostas virtuais. Non obstante, a maioría dos medios analizados non consideran o metaverso como unha aposta segura neste momento, o que restrinxe os investimentos actuais.

Os custos dos dispositivos, a autonomía, a calidade dos contidos, a diversidade dos creadores e o acceso á economía dixital seguen sendo barreiras significativas para a adopción dos mundos virtuais por parte dos usuarios. Aínda que a intelixencia artificial xenerativa engade unha nova dimensión ao mercado, permitindo a creación de contidos 3D sen necesidade de codificación, os medios de comunicación de servizo público enfróntanse ao desafío de dirixirse a unha poboación diversa en termos culturais, sociais e xeracionais, con segmentos de audiencia que aínda prefiren a televisión lineal.

Estas transformacións ocorren nun contexto de orzamentos limitados, o que obriga ás corporacións a axustar as súas estratexias para identificar con precisión as plataformas onde as xeracións máis novas realmente invisten o seu tempo. O obxectivo é ofrecer contidos de alta calidade adaptados a estes espazos, explorar métodos innovadores de interacción coa audiencia e establecer un espazo seguro para o discurso democrático.

As primeiras experiencias das radiotelevisións públicas de Europa no metaverso céntranse en novos formatos culturais e deportivos, identificados como os temas máis efectivos para xerar valor engadido para as súas audiencias mediante esta tecnoloxía. A narración interactiva e o consumo de formatos tradicionais dentro do metaverso son as primeiras propostas que están xurdindo, contribuíndo a mitigar a fatiga informativa e presentando novos modelos de representación da información, aínda que a súa implementación efectiva aínda se atopa nunha etapa inicial.

Wesa Aapro, integrante do departamento de innovación de Yle e responsable do metaverso na devandita corporación, foi o primeiro profesional dun PSM europeo en ocupar un cargo vinculado estritamente a este concepto. Aapro sostén que os mundos virtuais non acadaron o éxito esperado debido ás expectativas iniciais irrealistas de trasladar toda a existencia humana a estes espazos, como propoñían os altos executivos das empresas desenvolvedoras, o que non conseguiu o nivel de aceptación nin de adopción previsto.

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En Yle, o capital destinado ao metaverso non é significativo en termos orzamentarios, pero isto non impide que realicen experimentos continuos para audiencias novas, explorando e explotando estes recursos de xeito satisfactorio. As 12 corporacións que consideran que o metaverso ten unha importancia baixa ou nula na súa estratexia actual prognostican que a súa posible implementación futura coincidirá co nivel de adopción progresivo da sociedade en xeral, o cal está por definir. Na maioría destas empresas de radiodifusión aínda non se deu forma ao concepto nin se integrou nas súas estruturas, e os seus dirixentes non se pronunciaron sobre a utilidade do metaverso para o seu futuro estratéxico, polo que non é unha prioridade actual para a maioría dos casos analizados.

En Rai, o metaverso vincúlase ocasionalmente á súa proposta de contidos de cine, mentres que en RTS están á expectativa de como pode axudarlles e avanzar, pero nun segundo plano. Gonzalo Madail, director de innovación de RTP, cre que os mundos virtuais aparecerán no PSM mediante iniciativas exitosas puntuais máis que a través dunha estratexia estrutural corporativa. Egon Verharen, director de innovación de NPO, considera que os contornos totalmente inmersivos tardarán máis en asentarse que os baseados en web3D, utilizables en smartphones ou outras pantallas, principalmente pola necesidade de adquirir dispositivos específicos.

ARD e ORF destinaron a maior parte dos seus recursos de innovación á IA en lugar do metaverso, debido á dificultade de establecer un valor de mercado real e de identificar aplicacións efectivas para os esforzos xornalísticos necesarios. A empresa austríaca ORF cre que as grandes compañías de xogos e as empresas comerciais serán as primeiras en desenvolver aplicacións no metaverso, mentres que as propostas dos medios de comunicación chegarán nunha segunda etapa, debido ao seu mandato de eficiencia e aforro, que lles impide empregar diñeiro público en probas arriscadas ou ser “early adopters”. Preven que en 2024 o metaverso cobrará maior relevancia ao combinarse coa IA, evolucionando cara a un novo esquema de dixitalización, entretemento, coñecemento e negocio combinados.

Os medios públicos deben analizar se o metaverso terá un valor estratéxico na fidelización e busca de relevancia para o público xuvenil, e decidir o grao de implementación que asumirán. A partir das valoracións dos profesionais entrevistados, propónse unha escala de implementación para situar o nivel de desenvolvemento de cada corporación participante neste estudo. Esta escala abarca desde a inacción, interese reducido e monitorización superficial (implementación baixa); deseño de estratexias e plans de acción futuros con aproximacións tímidas (implementación incipiente); consolidación de actividades recorrentes en plataformas do proto metaverso (Web 2.0) e metaverso (Web 3.0) coa réplica dixital de algúns espazos da emisora (implementación media); ata un nivel de

‘implementación alta’ caracterizado pola creación dun xemelgo dixital da corporación no metaverso como nova plataforma de distribución cunha oferta sólida e constante, inspirada nos valores de Servizo Público.

Máis da metade das corporacións non proxectaron ningunha iniciativa vinculada ao metaverso nin recrearon as súas instalacións ou programas en contornos virtuais, sendo as súas aproximacións máis próximas a esta materia a cobertura de eSports ou gaming. As corporacións restantes (Yle, France Tv, VRT, RTVE, NPO ou Rai) si experimentaron na creación de espazos, mentres que a BBC asinou un acordo con Reality+ en maio de 2023 para crear unha experiencia de metaverso en The Sandbox, prevista para finais de 2024. Así mesmo, a European Broadcasting Union (EBU) creou un grupo de traballo chamado ‘Tecnoloxía de Medios no Metaverso (Mediaverse)’ para explorar casos de uso sobre tecnoloxías Web3, metaverso e NFT para o PSM.

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CHAPTER 7:

VERIFICATION OF HYPOTHESES, CONCLUSIONS, AND FUTURE LINES OF RESEARCH

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7.1. Objectives, questions, and verification of hypotheses

This doctoral thesis aims to address the main questions and achieve the proposed objectives through 13 interconnected studies that stem from the same general purposes and line of work. Collectively, all these secondary studies allow for the extraction of a series of results and conclusions that resolve the central objectives set forth and coincide with the sum of all the specific purposes of these projects.

The central axis or starting point of this thesis, which encompasses the rest of the studied issues, is the prism of innovation. Within this process, the most relevant concept and the one studied in greatest depth in this research is the integration of artificial intelligence in the media. Likewise, from the focus on innovation, the other analyzed topics derive, such as the platformization process and gamification to approach new audiences, the use of new technologies like extended reality or environments such as the metaverse to generate immersive innovation, or the application of artificial intelligence in educational communication to optimize learning processes.

The main purpose of this research is to analyze the transversal influence that artificial intelligence is exerting in the media sector and the implementation or growth projections anticipated for the next stage. Additionally, it aims to detail how innovation processes are being carried out in these corporations, identifying key areas and new technologies on which they are focusing their efforts. Each compiled publication also has its specific objectives:

Publication 1: Building the future of european public service media: innovation priorities, key points, and optimization areas in PSM

This study examines the innovation strategies, key points, and priority optimization areas of 15 European public broadcasters, as well as detailing the forecasts and future challenges these institutions anticipate for the media sector in the coming years. The central objectives of this project are as follows: to identify the key areas of innovation where European public broadcasters are focusing their efforts, to understand how these organizations manage and implement innovative ideas and processes, to determine the specific innovation priorities of each of these entities to extract common trends applicable to the sector, and to specify their future projections and the challenges anticipated for the public media sector in a five-year horizon.

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Publication 2: Artificial intelligence strategies in european public broadcasters: uses, forecasts, and future challenges

The main objective of this article is to provide an overview of the current situation and application of artificial intelligence (AI) technologies in European public service media (PSM). It aims to determine the areas and productive processes where AI is used within these corporations and to present the challenges identified by the consulted media regarding the use and implementation of AI in their organizations.

Publication 3: Designing personalisation of European Public Service Media (PSM): trends on algorithms and artificial intelligence for content distribution.

This research aims to provide a comprehensive overview of the use of recommendation systems in European public service media, focusing on the functioning of these systems, their origin, the teams responsible for their maintenance and implementation, and the concept of the public service algorithm.

Publication 4: Innovation analysis of national scale Public Service Media in the Iberian Peninsula: strategic, technological and youth audience engagement vision in RTVE and RTP

This article examines and compares the innovation strategies of the national public broadcasters of Spain and Portugal, RTVE and RTP, focusing on three main axes: their strategic vision, technological proposals, and plans to attract young audiences. The objective is to define the strategies and establish a list of priorities in each of these areas. To achieve this, the study aims to analyze and prioritize the innovation strategies of these corporations, identify the main ongoing technological initiatives and their future plans related to digitalization and new technologies, as well as evaluate the strategies designed to attract new audiences and increase their relevance among young people.

Publication 5: A new scenario in digital communication: eSports coverage on public broadcasters in Europe

This research examines the current coverage of electronic sports by European public broadcasters. This analysis not only responds to the growing interest in an emerging topic with an increasingly significant presence in the media but also to the influence of these broadcasters in shaping a new communication landscape. This new context is marked by gamification, interactivity, the transformation of participant roles, and the disappearance of traditional participation boundaries—trends that are expected to expand to other formats and topics in the short term.

With this purpose, the study seeks to identify the most notable projects of these corporations related to electronic sports. Additionally, it aims to analyze the origin of these initiatives, their activities, the content formats produced, the work teams involved, the professional routines adopted, and the distribution strategies employed. This analysis covers both the broadcasters' own platforms and the communicative use of social networks.

Publication 6: Actividad empleadora en la televisión pública de la era de la automatización: employer branding, canales de contratación, procesos de selección, competencias y perfiles profesionales demandados

The main objective of this study is to analyze the labor market and recruitment activity of public media in Europe in the context of the advent of artificial intelligence, focusing on various aspects, including the recruitment channels used, the selection processes implemented, the competencies and professional profiles required, current job offers, and the methods for developing an employer brand.

Publication 7: Innovation and metaverse: first experiences and use cases in European Public Service Media

This research explores the potential that the metaverse offers to the public media sector in Europe, particularly in its ability to attract new audiences and develop new shared environments for consuming information and entertainment, referred to as Immersive Social Spaces (ISS). The main objectives of this study are to evaluate the current utility, capabilities, and features that the metaverse offers to media organizations, as well as the perceptions of professionals involved in these technological initiatives within the corporations; to determine the relevance that major European public broadcasters assign to the metaverse within their strategies and the state of its implementation; and to examine the experiences and metaverse projects developed by these entities.

Publication 8: Tendencias y previsiones de innovación en la realización audiovisual y retransmisión de eventos deportivos: optimización de la experiencia de usuario en DAZN y Movistar Plus+

The central purpose of this project is to identify the innovation trends and forecasts in audiovisual production, as well as to analyze the broadcasting and user experience in the consumption of sports events. Specifically, two projects are studied: DAZN and Movistar Plus+. DAZN is a streaming service dedicated to sports, offering live and on-demand event broadcasts. Movistar Plus+ is a pay television platform owned by Telefónica. For the research, data from each unit were analyzed through in-depth searches and interviews with their technology managers.

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Publication 9: AI Implementation strategies in the spanish press media: organizational dynamics, application flows, uses, and future trends

This article aims to determine the strategic position regarding artificial intelligence of the ten printed newspapers with the highest circulation in Spain. It seeks to identify the current organizational and production dynamics, the implementation flows of automated tools, the departments and professionals involved, the present uses of AI and its impact on existing and required professional profiles, as well as to foresee the future evolution of this technology in the sector. The specific objectives are: to evaluate the degree of AI implementation and the strategic interest of these media; to identify the professionals or departments involved and the implementation flows followed; to determine the impact of AI on current and demanded professional routines and profiles; and to analyze the use of AI solutions in the phases of documentation, production, distribution, recommendation, or verification of content and their future projections.

Publication 10: Verificación automatizada de contenidos en las radiotelevisiones públicas europeas: primeras aproximaciones al uso de la inteligencia artificial

This research project aims to determine how European public broadcasters are implementing solutions based on automation and artificial intelligence for content verification in their newsrooms, with the goal of effectively mitigating misinformation. Through eight in-depth interviews with innovation and artificial intelligence managers at these broadcasters, the study seeks to reveal current practices and evaluate their effectiveness in combating fake news in the renewed digital context.

Publication 11: Sistemas adaptativos basados en inteligencia artificial como nuevas soluciones personalizadas de tecnología educativa

The central objective of this book chapter is to analyze the functioning, benefits, and drawbacks of personalized solutions based on artificial intelligence, with the aim of identifying the best ways to apply them in the educational ecosystem. To achieve this, a thorough review of the scientific literature and existing regulatory documentation is conducted to understand their effectiveness and potential impact in the educational field.

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Publication 12: Cocreación en el universo e-sport: estrategia de la RTP para captar a público joven

This book chapter explores in detail the functioning of the electronic sports project of the Portuguese public broadcaster, RTP Arena, focusing on the co-creation and innovation that this corporation promotes to generate value and attract new audiences. To this end, a case study is conducted, including an analysis of social networks, distribution channels, and the project's main website, using a specific study sheet. Additionally, in-depth interviews are conducted with project members to obtain direct information and insights.

Publication 13: Cómo acelerar un periodismo de vanguardia: laboratorios de innovación en las noticias de BBC y VRT

The main objective of this work is to analyze and understand the origin, structure, functioning, and main activities of two prominent innovation labs in European public broadcasting: the BBC News Lab and the NWSlab of VRT. By comparing a pioneering lab (BBC) with a recent one (VRT), the study seeks to identify the reasons for their creation, the differences in their methodologies and work routines, as well as the internal structure and professional profiles of their teams. This analysis is supported by qualitative interviews and a detailed mapping of the labs' activities, providing a comprehensive view of how these spaces contribute to accelerating cutting-edge journalism.

Overall, the research objectives outlined in the creation of these 13 publications are framed under two central research questions that unify and provide coherence to this doctoral thesis:

1. What effects is artificial intelligence having on the media sector in terms of organizational, structural, production, or distribution perspectives of products and services?

2. Besides AI, what other innovation processes or new technologies are prioritized in public and private media, and what actions are these agents taking to generate value and remain relevant to new audiences?

From these two questions and the set of specific objectives outlined in all secondary studies, a list of joint hypotheses was formulated, which could be addressed through the global analysis of the results obtained in the compiled works:

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H1. The first hypothesis posits that artificial intelligence is being implemented by public and private media in organizational tasks, productivity, business management, documentation, production, distribution, and content verification. The findings validate this hypothesis, showing that in public media, the most notable examples of use are led, predictably, by companies with greater financial resources. The adoption of artificial intelligence in these entities can be divided into four main areas: production (news automation, automated production, metadata management); content management (archiving and recommendations); verification; and service expansion (automatic content translation, automatic subtitling for the hearing impaired). As for the main newspapers in Spain, they are in an initial phase of exploring the value and utility of artificial intelligence, focusing mainly on the automation of daily tasks. With a few exceptions, they currently rule out the use of generative AI, despite the existence of advanced systems capable of generating natural language for news creation. The common intention is to use AI prudently to optimize products or services and achieve qualitative differentiation, avoiding its application to expand coverage, which could distort their subscription model based on the differentiation of authored content.

H2. The second hypothesis suggests that AI is altering the organizational and work dynamics of media companies, reformulating key aspects of their operation and reorienting part of their efforts to understand and integrate automated systems. In addition to corroborating this hypothesis, it is specified that although there is a positive attitude towards artificial intelligence in newsrooms, certain reticences persist, particularly in corporations with more traditional structures. The main concerns are divided into two categories: professionals' fear of delegating responsibilities, which could lead to the eventual replacement of their functions, and the lack of technical knowledge, which distances more experienced journalists from the new production processes. Furthermore, it is crucial to assess the capacity of media organizations to implement large-scale AI projects within their structures and adapt them to their specific needs, as predefined applications rarely fully meet the specific demands of these corporations.

However, the greatest challenge for European Public Service Media (PSM) lies in the cultural adoption and deep learning of these technologies, while managing issues related to workflow, corporate culture, organization, professional profiles, and ethical considerations. A particular challenge is the use of deepfakes, which can synthetically falsify a person's speech or image with a high degree of realism, thereby exacerbating the fundamental problem of misinformation.

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On the organizational level, the formation of multidisciplinary teams composed of journalists, engineers, and algorithms as assistants is anticipated. The correct integration of these elements would add significant value to the entire product development chain. This also responds to the need to supervise the activity of machines with the presence and editorial judgment of human professionals, as described in the White Paper on Artificial Intelligence published by the European Commission in 2020.

H3. The third hypothesis suggested that, for now, a specialized journalist or communicator profile in artificial intelligence has not been consolidated. Instead, the skills and aptitudes necessary for handling automated systems are being progressively integrated into professionals who are closest to using these tools within their respective corporations. It is observed that a specialized profile in artificial intelligence is not being consolidated within corporations, as the necessary skills for supervising these systems are gradually being incorporated into the professionals responsible for their management. In the hiring processes of PSM, primarily technological profiles associated with digital management, architecture, and big data processing are in demand, rather than functions related to the development of automated or generative prototypes. This situation coexists with the conventional labor activities of the corporations, maintaining the need for personnel focused on traditional audiovisual journalism functions.

Job offers with a digital component within corporations are increasingly varied and specialized. Positions related to database management and analysis, content production for social networks and alternative platforms, cybersecurity, research and development, business intelligence, user experience design, cloud services, 3D design, and machine learning, among others, are identified. However, a consolidated demand for skills related to the execution of machine learning processes has not been identified. In the technical field, competencies in analysis, administration, and use of databases, UX/UI design, social media management, SEO, digital marketing, information systems (IS), transmission networks, and software engineering are valued.

Additionally, companies express concern about the difficulty of finding professionals with experience in applying artificial intelligence in media, as well as the complexity of training their own employees. This circumstance, along with the high costs associated with implementing these systems, limits the adoption of intelligent solutions in many cases.

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H4. The final hypothesis proposes that the fundamental areas of innovation in audiovisual media focus on the digitalization of their archives to increase interoperability; the optimization of production routines; the development and implementation of an artificial intelligence (AI) strategy transversally, with special emphasis on the use of generative AI for content creation and personalization algorithms for distribution; and the modernization and renewal of their video-on-demand (VOD) platforms, among other important aspects. The various public broadcasters evaluated present diverse priorities and concerns in their innovation strategies, although common areas of interest are observed. These include the digital modernization of their sections, processes, and applications; the use of advanced technologies, particularly in the development of AI solutions and strategies; the optimization of user experience (UX); and the creation of continuous and active bidirectional communication with their audiences, confirming this final initial hypothesis.

A fundamental priority for public service media (PSM) companies is to improve and renew the user experience with their content offerings. They seek to ensure that these are usable, relevant, and personalized for each consumer, differentiating themselves from commercial media services by prioritizing the values of quality public journalism over any risky experimentation. Additionally, attracting new audiences (ages 16 to 25), who traditionally show less interest in their main offerings, is another of their strategic pillars. To this end, they are increasing their presence on third-party platforms such as Twitch or TikTok, strengthening their thematic offerings with youth-oriented content and interactive formats that promote active user participation.

The digitalization of structures, main applications, and production routines is central to the innovation strategies of European public broadcasters. They focus on updating and digitalizing their archives and associated metadata to improve interoperability, work in the cloud, and ensure cybersecurity to protect their systems. The immersive capabilities of new virtual environments, such as virtual reality (VR), augmented reality (AR), and mixed reality (MR), as well as the metaverse, have gained importance since the coronavirus pandemic. However, investment in these technologies will progressively increase according to the real interest of the audiences.

In summary, although each public broadcaster shows different priorities in their innovation strategies, there is consensus regarding the digitalization and modernization of their structures and processes, the adoption of advanced technologies, and the improvement of user experience. These efforts are aimed at ensuring the relevance and sustainability of their services in an increasingly competitive and technologically advanced media environment.

USC DE COMPOSTELA

7.2. General conclusions

In the current European media landscape, public media face the imperative need to innovate to remain competitive against commercial operators. This innovation is not perceived as an option but as a strategic imperative that encompasses both incremental improvement of existing services and the exploration of disruptive solutions that are redefining the sector.

One of the first steps in this process is the comprehensive digitalization of the infrastructures and historical archives of these corporations. This effort aims not only to preserve the historical legacy of their respective countries but also to facilitate the access and interoperability of content through metadata, enabling the integration of these resources into daily operations efficiently and effectively.

Simultaneously, public media are focusing their efforts on several key areas to strengthen their market position. The optimization of production processes and the formulation of artificial intelligence strategies play a central role in these plans, as the transversal implementation of AI not only improves operational efficiency but also opens new opportunities for content creation and user experience personalization.

The most advanced public corporations, such as the BBC, France TV, Yle, and ARD, have established technological standards that serve as references for other entities. These organizations have developed robust strategies that combine digitalization with disruptive approaches, positioning themselves as industry leaders. Other corporations adopt a smart follower approach, benefiting from the learnings and advances of these pioneers, while considering variants that arise in their specific context.

The transition from traditional linear channels to digital platforms is a clear trend, although its pace varies according to audience consumption habits in different regions. This shift involves organizational management that combines horizontal and vertical flows, facilitating the generation and execution of new ideas from all levels of the organization. The demand for professional profiles is also evolving, making the ability of journalists to collaborate with high-tech experts indispensable. However, adaptability to change and versatility are the most valued competencies by media executives in a constantly changing sector.

Despite the advances experienced in the recent period, European public media face significant challenges posed by cultural, technical, and budgetary barriers. Additionally, it is crucial for these media to reinforce their credibility and relevance to their audiences, clearly differentiating themselves from commercial operators and their operations. The true challenge for PSM lies in demonstrating their tangible value to citizens, avoiding remaining mere intentions without real impact on user experience.

In this renewed digital context, artificial intelligence has become the central technological proposal for European public broadcasters, marking a trend that promises to revolutionize the sector. Despite high expectations, these corporations are still in an initial phase of experimentation, with pilot projects and an exploratory attitude that is progressively being consolidated into firm strategies. The adoption of AI has been observed uniformly across various European regions, without significant impact from political differences or media systems (Hallin & Mancini, 2004).

The process of integrating AI into public broadcasters has been complex and costly, leading these entities to collaborate closely with other media, private companies, start-ups, universities, and the EBU. This cooperation has been essential to overcoming the technical and financial challenges associated with the development of AI-based prototypes.

Current applications of this technology in PSM are varied and promising. These include tools for the automatic creation of content from structured data, intelligent production of audiovisual programs, and enhanced interaction with the audience through chatbots. Additionally, AI is being used to generate content summaries, personalize and recommend programs to users, and combat misinformation by verifying fake news.

Despite the growing importance of video-on-demand (VoD) platforms and digital news applications, European public broadcasters do not foresee abandoning their traditional linear services. However, they recognize the need to implement recommendation systems that offer relevant content to viewers without creating filter bubbles that limit their exposure to new perspectives. The evolution of these systems will be crucial in determining whether they can broaden society's field of vision, differentiating from the algorithms used by private operators.

One of the most innovative initiatives is multimodal recommendation, which combines text, audio, and video to offer personalized content to the user based on their particular situation at the time of the request. This technology has the potential to transform the user experience, and the most technologically advanced corporations will be the first to adopt and perfect it, setting a model for the rest of the sector in the coming years.

Another objective of this thesis is to study the impact of AI on the newspapers with the highest readership in Spain. In this regard, it is established that the Spanish press is beginning to integrate algorithms and artificial intelligence at all stages of the journalistic process to automate mechanical tasks and optimize both their routines and their main products. However, the leading newspapers still rule out the use of AI for generating final texts in the short and medium term,

arguing that these lack the complexity and differentiation necessary to maintain the high quality standards that support their subscription models.

Organizationally, the departments of technology, product, or strategy are responsible for managing AI resources and tools. In the case of Grupo Prisa and Vocento, these applications are first reviewed by centralized strategy teams before being implemented. At Unidad Editorial, a specific AI committee assesses the needs of each business unit, while at Grupo Godó, the responsibility falls directly on the individual newspapers, although they do not rule out the possibility of occasional joint solutions.

Currently, there are no specialized AI professional profiles within these corporations, although they have employees trained to interpret and understand new trends in this technology. A gradual and progressive training of staff is expected as AI is more deeply introduced into their structures. Newspapers believe that AI will drive a reconversion of professional profiles, although the time needed to consolidate these new functions specialized in algorithms and automation is yet to be determined.

The most frequent uses of AI in the Spanish press include areas such as business and marketing, translation into other languages, social media planning, content review, information verification, analytics, and SEO positioning. Additionally, AI is expected to be used for personalized recommendations, predictive analysis, creation of summaries of completed texts, automated content management, and a deeper analysis of user behavior and fact-checking.

The incorporation of AI into the Spanish press promises to energize and transform the sector, but it also poses challenges in terms of training and organizational adaptation. As these technologies are implemented, it will be crucial to monitor their impact on content quality and the operational efficiency of newsrooms.

In the educational field, the implementation of AI offers significant advantages, although it also presents challenges that must be carefully managed. One of the main advantages is the ability to quickly access relevant information on any topic, facilitating the learning process. Additionally, technology promotes collaboration among students and teamwork, supporting both in-person and distance learning.

Personalized learning is another crucial benefit, as it allows content and methods to be tailored to the specific needs of each student, helping to prevent school failure. Additionally, AI can enhance students' technological skills, optimize time use, and reduce teachers' routine tasks. This enables teachers to focus on more creative activities and direct interaction with students.

However, the incorporation of AI in education also faces several obstacles. Technical issues can arise at any time, disrupting the educational flow. Additionally, the high implementation costs can create inequalities among institutions, as not all schools have the same financial resources. Intensive use of technology can also cause health problems, such as visual fatigue, if not properly managed.

Another significant challenge is to prevent learning from becoming overly dependent on technology, which could limit students' ability to develop critical thinking and problem-solving skills. Irresponsible use of technology could lead to stagnation in learning.

To maximize the benefits of AI in education and minimize its drawbacks, it is essential for institutions to adopt a balanced approach. This includes ensuring adequate technological infrastructure, providing continuous training to teachers, and developing policies that promote the responsible and ethical use of technology. By doing so, the potential of AI to transform learning and teaching can be maximized, benefiting both students and teachers.

Returning to the conclusions of this doctoral thesis related to innovation in the media, an analysis was conducted on the state of the metaverse concept in European PSM. However, it was limited by the lack of solid strategies and ongoing projects that would allow a deeper analysis of its implementation. Nevertheless, it is concluded that the concept is widely known among these broadcasters, although the level of implementation and interest vary significantly, and for most corporations, the metaverse is not yet among their strategic priorities.

Engagement with the metaverse is closely linked to the relevance of virtual spaces to their audiences. Corporations state that investment and efforts in these digital spaces will grow according to their importance to their audience. This suggests the need to monitor user participation and acceptance to evaluate whether this translates into a greater content offering by public media.

Although there is no widespread movement towards the metaverse, some broadcasters like France TV, Yle, and VRT are at the forefront, identifying the metaverse as an opportunity to connect with new audiences that do not typically consume traditional media. These broadcasters value the conversational, interactive, and immersive possibilities of the metaverse, as it transforms the viewer into an active participant in content development, thus promoting immersive social innovation.

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So far, the metaverse has not been used as a primary platform for the consistent or significant dissemination of informative content. The initial experiences of public media in these environments have

focused on entertainment, as well as sports and cultural themes, and no massive migration of informative content is expected in the short term. Current initiatives have been sporadic, and although they have generated satisfactory internal results, they have not shown direct and immediate benefits.

It will be crucial to study in the coming years how these practices in the metaverse will influence consumption and communication patterns in the global digital society. It will also be important to observe whether public media can build a user community around their proposals in the metaverse, consolidating their presence in these new environments and leveraging their potential to attract and retain new audiences, or if these proposals will ultimately remain mere attempts at conversational renewal within European PSM.

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7.3. Difficulties encountered during the development of the work

During the development of this research on the implementation of artificial intelligence in the media and its dynamics and innovation priorities, various limitations were identified that hindered its execution and influenced the scope and depth of the study.

One of the main limitations was the lack of defined and continuous strategies in many corporations regarding AI, which made it difficult to conduct an exhaustive and comparative analysis among them. Additionally, the variability in the implementation of these technologies among different companies complicated the generalization of the findings on several occasions.

Access to detailed internal information was another significant challenge, particularly regarding quantitative data and information on funding and revenues. Many organizations were reluctant to share specific data about their pilot projects and internal strategies, probably due to competitive and confidentiality concerns. Even so, public media were more open to sharing valuable information, while private agents were more reserved, and the effort to gain their participation in the studies was considerably greater. This limitation restricted the ability to obtain a comprehensive view of certain ongoing initiatives and their specific results, both in audience numbers and economic performance.

Another notable aspect is that the resources allocated to research and development in AI and the metaverse are limited in many corporations, which conditions the scope of the initiatives. The scarcity of long-term projects in these areas hindered the ability to conduct effective longitudinal monitoring, thereby limiting the capacity to evaluate the long-term impacts of these technologies.

Furthermore, there are disparities in the resources available among different corporations and regions, which created inequalities in the capacity for implementing and developing advanced technologies. The technical problems associated with the integration and maintenance of algorithms were an additional barrier, frequently interrupting processes and project progress. Additionally, the adaptation of organizational structures and staff training to effectively apply these technologies represented a considerable limitation.

In summary, although the research conducted for this doctoral thesis provided valuable insight into the current state and potential of AI, innovation, and new technologies such as the metaverse for the media, the limitations encountered highlight the need to continue exploring their evolution and growth. Furthermore, it underscores the necessity for media to keep developing these technologies with a more defined focus and adequate resources.

7.4. Future research lines and next steps for this project

Based on the results and conclusions drawn from this thesis through the compendium of publications, new areas of interest have been identified that will be relevant to monitor and investigate as a continuation of this study. In this way, a total of five new specific lines of research have been identified, which have already begun to be explored and are encompassed within the central themes of this project.

An interesting perspective to explore, and which is already being observed, is understanding how the new regulatory frameworks on artificial intelligence will be applied in the media. Specifically, whether the AI Act of the European Parliament is permeating these corporations and will have repercussions on their operations and AI implementation, or if corporations are still unaware of this regulation and plan to apply their own internal regulations.

As a second line of interest, it will be relevant to apply the same methodology used in the analysis of AI strategies in the national press of Spain to other traditional media in the country: the main radio stations and the main television channels in the Spanish context. This will provide a comprehensive overview of the use of AI in national media and allow for comparisons between each media group, the uses explored to date, and growth expectations.

Thirdly, the focus is on user experience innovation in the main OTT platforms to understand the direction the television sector will take in the next phase. This involves identifying trends that the main audiovisual service companies will apply to renew their offerings, their relationship with audiences, viewing modalities, and the optimization of personalized content production and distribution.

For European PSM, the central line to be explored is the paradigm of creating public service algorithms and their application in leading international public broadcasters. The aim is to analyze AI developments in these corporations, delving into the construction phase to determine whether they are genuinely making efforts to define and implement the concept of public value in the design of algorithms and how they are doing so.

As the fifth and final new line of research delineated so far, the intention is to analyze which new technologies or technological concepts are being integrated with relevance in global media and which new professional profiles are emerging or branching out from these innovations or incorporations. The five described lines of research aim to anticipate trends or behaviors that are beginning to settle in the sector with some advance notice before their definitive landing, thus gaining insight into the progress of media and their future versions.

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CAPÍTULO 8:
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UNIVERSIDADE
DE SANTIAGO
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CAPÍTULO 9:
PUBLICACIÓNS COMPENDIADAS

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COMMUNICATION & SOCIETY

Miscellaneous

Building the future of European Public Service Media: innovation priorities, key points and optimization areas in PSM

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Submitted
October 25th, 2023
Approved
March 18th, 2024

© 2024
Communication & Society
ISSN 0214-0039
E ISSN 2386-7876
www.communication-society.com

2024 – Vol. 37(3)
pp. 107-123

How to cite this article:
Fieiras Ceide, C., Vaz Álvarez, M. & Túñez López, M. (2024). Building the future of European Public Service Media: innovation priorities, key points and optimization areas in PSM, *Communication & Society, 37*(3), 107-123.
https://doi.org/10.15581/003.37.3.107-123

Abstract

The platformization and entry into the international television market of large video-on-demand (VoD) service providers has had an impact on all agents in the sector, as well as on operating rules, consumption habits, and financing, production and distribution models. In the case of public media, innovation is conceived as a strategic driver and the only sustainable alternative for their survival, repositioning and renewal in order to be relevant for citizens. This research analyzes 15 European public broadcasting corporations from Germany (ARD), Austria (ORF), Belgium (VRT and RTBF), 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). A total of 18 interviews were conducted with senior managers of these corporations and one EBU member to shed light on innovation priorities, key points and areas of optimization, which allows identifying the conceptual, strategic and operational lines that these media will follow in the next stage. It is concluded that these broadcasters focus their efforts on the transversal implementation of high technology, particularly AI, for the improvement of their production and distribution operational routines; on the settlement and improvement of their VOD platforms; on digital positioning and cybersecurity; on the creation of stable communities; on the optimization of the user experience (UX) and the attraction and search for relevance for a young audience (16–25) often distant from their performances.

Keywords
Innovation, journalism, public service media, strategy, user experience, artificial intelligence, metaverse, television.

1. Introduction

Innovation is articulated as the strategic engine or conceptual line of action that permeates all the sections, actions and ideas implemented in the media to build a better version of

themselves, projected into the future, but focused on today's agenda and needs. This process of renewal, optimization and repositioning is linked in the case of public service media (PSM) to its public value, characterized by factors such as commitment to citizenship, guarantee of credibility or regional economic promotion, being this value distinctive with respect to the purpose of commercial operators (Cañedo, Rodríguez-Castro & López-Cepeda, 2022).

It is a reality that the arrival of Netflix and the predominant VOD platforms to the media ecosystem has energized the rest of the players in the sector. The "legacy" broadcasters that already existed before the internet are the ones most affected by these developments (Raats & Jensen, 2020), and in the case of PSM, their growth and repositioning strategies depend directly on their respective national contexts, the degree of government support, their political and regulatory priorities, the role and status of PSM in each country, cultural factors and the size of the market, among other factors (D'Arma, Raats & Steemers, 2021).

PSM have a fundamental role to play in this public sphere transformed by the digitizing process (Habermas, 2021), for which they need, at the very least, to maintain budgetary levels due to increasing competition from commercial operators (Donders, 2019). This digital turn presents important theoretical, political and strategic challenges for the creation of the future version of the PSM, in a context in which there is still citizen support, although this varies considerably between countries and regions (Donders, 2021).

For PSM to be meaningful to citizens, it is crucial that it works with a focus on the concept of contribution to society, but this value is useless if it is conceived as a mere marketing or corporate communication tool to justify the existence of these means, rather than to ensure an operational improvement so that PSM serves the public interest and represents a contribution worth paying for (Puppis & Ali, 2023).

The main objective of this research project is to identify the key points, priorities, and central areas of innovation of the main public media in Europe to build their future version, understanding that, knowing the concepts and trends that are beginning to be integrated in their strategic planning will allow to anticipate the operation, behaviors and paths that PSM will follow in its next stage. It is also intended to determine what is the usual procedure in these corporations for the development and implementation of ideas, to know their concerns and progress forecasts, as well as to extract common notions and trends applicable to the sector as a whole. In this way, 15 public broadcasting corporations are analyzed through 18 interviews to senior management professionals of their structure. For this purpose, the following research questions are posed:

RQ1. What are the main areas, concepts, or technologies that Europe's public media plan to focus on in the coming years to build their future version?

RQ2. How are innovation flows and the implementation of innovative projects managed in the internal structures of these media?

RQ3. What are the innovation priorities that make up the strategic line of action of these media?

RQ4. What are the forecasts of progress and future challenges that these broadcasters foresee in the short and medium term in order to renew themselves and maintain relevance for their audiences?

In the case of public service media in Europe, no research has been identified prior to this study that delves transversally into the different concepts, technologies or innovation prisms that are a priority for the sector and are expected to be relevant for its evolution in the short and medium term, so this project offers a complete overview of this subject that is of interest to both the academic community and media professionals, as it allows us to intuit the direction that public broadcasters will take in their next stage.

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2. Perspectives, strategies and plans for innovation in European Public Service Media

Innovation is one of the public service commitments that PSM make to society, further defined in the General Assembly of the European Broadcasting Union as one of the six main values that define why public broadcasters are indispensable in truly democratic societies (EBU, 2012).

However, the fact that innovation in PSM is a commitment does not mean that they have to innovate simply by imperative, but rather, as some authors have described, Public Service Media are also those most legitimized and best contextually positioned to do so. In particular, Donders, Raats and Tintel (2020) have argued that PSM are legitimate and capable of taking on these challenges for 4 main reasons:

1. PSM have a history of innovation, backed by the principle of universality, which is one of their core activities. This principle has traditionally entrusted them with the distribution of services to all audiences, which often requires major technological developments and investments.
2. Innovation is highly contextual. PSM, deeply rooted in the historical, political, economic, social and cultural fabrics of nation states, are better positioned than international conglomerates to lead innovation (Donders *et al.*, 2012).
3. Public corporations have relatively stable budgets, which allows them to face specific risks associated with investment in innovation.
4. Since public broadcasters are obliged to prioritize public interest over market development, financial performance or efficiency, they are best suited to take into account factors such as quality, diversity and access in the development of technological innovations (Donders, Raats & Tintel, 2020).

In recent times, our notion of innovation in the media ecosystem has been fundamentally supported by technological development, driven in the first instance by what we know as 'hi-tech' journalism (López-García & Vizoso, 2021) where drones and virtual reality began to be used, and more recently by the emergence of really significant advances in areas such as Artificial Intelligence, and particularly in generative AI such as ChatGPT, Bard and a growing list of new tools.

While it is true that the irruption of generative AI in the audiovisual landscape had the effect of redirecting a large part of the traditional journalistic tasks linked to the different phases of news making, causing the media to implement strategic approaches to reconversion and recruitment of new qualified professionals, this phenomenon has not yet had a direct effect on the recruitment of professionals with specific skills in Artificial Intelligence (Fieiras, Ufarte & Vaz, 2023), probably due to the difficulty in finding these profiles in the market. The current circumstances invite to think that the capacity and agility of integration of these new professional profiles adapted to the imminent technological advances in the sector will be one of the biggest challenges in innovation in the coming years in the European PSM.

Parallel to the integration of these new profiles is the development of innovation roadmaps, as we mentioned above, very marked by technology and in particular the apex between public service values and Artificial Intelligence, particularly discussed in academia in recent years (Fieiras, Vaz & Túñez, 2022; Sørensen & Hutchinson, 2018; Sørensen & van den Bulck, 2018; van den Bulck & Moe, 2018). In the case of technological development strategies, in addition to generative AI, the discussion on the deployment of algorithmic recommender systems, the management of personal audience data or the automated distribution of certain kinds of content is approached in different ways among leading European PSM.

For example, there are differences in establishing or acquiring algorithm-based recommender systems. Entities such as YLE, VRT, RTBF, NPO and SVT choose to develop their own technologies and concepts (in order to have greater control over them and have them

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cater to the particular needs of their own audience), although they often combine them with tools from external providers to optimize their performance. YLE, for example, carefully selects its eventual collaborations, looking for companies that understand its mission and values, just as one would choose an employee. On the other hand, the BBC is evaluating and working on the transition from external systems to in-house solutions, seeking greater "control, understanding and transparency." In contrast, RAI opted for vendor solutions that require only customization, avoiding investing in in-house development due to the immediate need for technology and the desire not to spend human resources, time or money on development. For their part, the RD indicates that many of their counterparts in the Public Service Media (PSM) sector believe that solutions purchased from companies are neither effective nor easy to manage, although they themselves have had positive experiences with them (Fieiras, Vaz & Túñez, 2023).

In this sense, it is necessary to mention that, although more and more European PSM are beginning to integrate these technologies, the truth is that, for the moment, it is still the corporations with the largest budgets the ones leading the most relevant advances (Fieiras, Vaz & Túñez, 2022), so we can understand that the effective application of these technologies depends to a large extent on the economic muscle of corporations to allocate resources to the development of these systems and their maintenance.

Taking into account the imminence of the integration of these technologies, and taking note of those described in some reports such as the latest *Reuters report on Journalism, Media and Technology Trends and Predictions* (Newman, 2024) where it is highlighted that the 'vast majority' of online content will be synthetically created by the year 2026, European PSM have to establish and adapt methodological models that allow them to predict and apply innovation with the greatest possible agility. An example of such methodologies, already applied by the Yle in Finland and the NPO in the Netherlands, is the 3 horizons of growth (Baghay, Coley & White, 1999), which consists of the creation of 3 (simultaneous) activity scenarios that enable spaces for innovation and prepare teams for future developments. These three horizons are defined as follows:

Horizon 1 (H1): This horizon focuses on the core business and aims to improve the performance of current products/services to generate consistent and incremental revenue. These are usually low-risk initiatives that focus on improving and expanding the existing business model.

Horizon 2 (H2): This horizon involves emerging opportunities that have potential for substantial growth. These initiatives are usually in a pilot or early stage of development and require considerable investment. They should be aligned with the corporation's strategic objectives but represent new areas of potential growth.

Horizon 3 (H3): This horizon consists of ideas for future growth, such as radically new business models or technologies. These are long-term initiatives with a high degree of uncertainty, but also with high potential for future growth. They require significant investment in research and development.

3. Methodology

This study analyzes the innovation strategies, key points, and priority areas for optimization of 15 public broadcasters in Europe and details the forecasts and future challenges that these broadcasters foresee for the media sector in the coming years. The main objectives of this project are as follows:

O1. To identify the main areas of innovation on which public broadcasters in Europe focus their efforts, as well as to learn how these corporations manage and execute the implementation of innovative ideas and processes.

O2. To determine the specific innovation priorities of each of these corporations in order to extract common trends for the sector.

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O3. To specify their forecasts for the future and the challenges they foresee for the public media sector in the next five years.

To meet these objectives, this research is approached as an exploratory, descriptive project with a blind hypothesis. Qualitative methods are used, such as semi-structured personal interviews, conducted with the directors of innovation, strategy and artificial intelligence of Public Service Media in Germany (ARD), Austria (ORF), Belgium (VRT and RTBF), Denmark (DR), Spain (RTVE), Finland (Yle), France (France TV), Great Britain (BBC), Netherlands (NPO), Ireland (RTÉ), Italy (RAI), Portugal (RTP), Sweden (SVT) and Switzerland (RTS) as well as the EBU Data and AI coordinator; using the Delphi technique and in two separate rounds.

To make a relevant selection of the professionals in the study, and to fulfill the set purposes with valuable contributions regarding the strategic lines of each respective corporation, a first round of consultation was carried out with the broadcasters to identify the different figures in charge of managing the innovation processes within their structure. Even though the usual response is directed to senior management positions within the organizations, nuances are distinguished in their training and final occupations, which vary between profiles with a greater technological, strategic, digital, managerial or R&D component, which enriches the sample and the results obtained.

In this way, an intentional convenience sample was selected and expanded by snowball sampling based on the contributions of the interviewees, and a second consultation was carried out to clarify the details of the information collected. We worked with a semi-structured questionnaire that never exceeded 9 questions and included specific queries tailored for each corporation. However, the common questions asked to all professionals were the following:

Question 1. What are your main innovation priorities in the short term?

Question 2. What issues do you think will be the focus of public media innovation strategies in the coming years?

Question 3. How is innovation managed in your corporation and in which sub-areas is it divided in?

Question 4. What are the channels or channels through which innovation is applied in your corporation?

Question 5. What are your most striking and impactful innovative projects?

Question 6. How do you think the public media sector will progress in the next five years in terms of innovation? Where do you foresee the greatest progress? What challenges do you think public broadcasters will face in the coming years in relation to innovation?

The main thematic blocks in all meetings were: key points of the strategy and innovation of these media; impact of new technologies on their professional routines; digitalization, content recommenders and VOD platforms; co-creation and relationship with their audience; and diagnosis and strategy.

Thirty-five contacts were made and finally a convenience sample was validated, composed of 18 professionals from 15 public broadcasting corporations, who participated representing PSM corporations from the three media models (polarized-pluralist, liberal and democratic-corporatist) described by Hallin and Mancini (2004). In this way, we reviewed whether there were any similarities in the innovation strategies of corporations within the same system, and whether the paradigm works in this case, or whether it would be necessary to redefine new multidisciplinary comparative models to analyze innovation in the PSM. Table 1 below presents the final panel of 18 professionals.

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Table 1. Purposive convenience sample of European public broadcasters.

Abbreviation	Name	Corporation	Cargo
(GA/RAI)	Gino Alberico	RAI	*R&D Director*
(BT/BBC)	Bill Thompson	BBC	*Head of Research and Development*
(GM/RTP)	Gonzalo Madail	RTP	*Director of Innovation for RTP and the Memory Channel*
(UG/RTVE)	Urbano Garcia	RTVE	*Innovation and Digital Director*
(DC/RTVE)	David Corral	RTVE	*Innovation Manager*
(DB/VRT)	Dieter Boen	VRT	*Innovation Director*
(EV/NPO)	Egón Verharen	NPO	*Innovation leader*
(EB/RTS)	Eric Borgo	RTS	*Head of Innovation at RTS*
(JF/RD)	Jacob Faarvang	DR	*Digital Product Manager*
(JP/BBC)	Judy Parnal	BBC	*Head of Standards and Industry*
(JL/SVT)	Johan Linden	SVT	*Strategy Director*
(JS/ARD)	Jonas Schlatterbeck	ARD	*Content Director at ARD Online*
(KP/ORF)	Karl Petermichl	ORF	*Head of Governance, Strategy and Innovation*
(KB/FranceTV)	Kati Bremme	France TV	*Innovation Director*
(LG/UER)	Lalya Gaye	EBU	*AI and Data Initiatives Coordinator*
(LV/RTBF)	Loïc de Visscher	RTBF	*Innovation Director*
(RW/RTÉ)	Richard Waghorn	RTÉ	*Director of Operations, Technology and Transformation*
(JK/Yle)	Jarno Koponen	Yle	*Head of Artificial Intelligence and Personalization, Yle News Lab*

Source: Own elaboration.

In relation to Hallin and Mancini's media models, the sample of corporations is divided as follows:

Table 2. Distribution of the sample of public broadcasters according to the Halin and Mancini (2004) model.

Pluralistic polarized	Democratic corporatist	Liberal
France TV (France) RAI (Italy) RTP (Portugal) RTVE (Spain)	ARD (Germany) DR (Denmark) NPO (Netherlands) ORF (Austria) RTBF (Belgium) RTS (Switzerland) SVT (Sweden) VRT (Belgium) Yle (Finland)	BBC (Great Britain) RTÉ (Ireland)

Source: Own elaboration.

Meetings were conducted via video-conference through Microsoft Teams, Skype or Google Meet between January 20, 2022 and April 30, 2023, with an average duration of 40 minutes. The meetings were recorded and transcribed for content analysis and in-depth interpretation of the data in relation to the central objective of the research. The assistance of Atlas.ti software, version 9.1.7 for Windows, has been fundamental in carrying out this content analysis, which was performed in 4 phases: 1) Capture of the information from the transcriptions; 2) Data coding; 3) Thematic identification of the collected information related to each of the aspects linked to the objectives; and 4) Conclusion with the interpretation of results. It is important to mention that explicit permission was obtained from the sources to disclose their statements in a non-anonymous manner.

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For the elaboration of case-specific questionnaires for each corporation, and the selection of topics, a bibliographic review of scientific literature on key sections of innovation in the media was carried out. These sections included structure, strategy, production, distribution and technology. This review was complemented with a product analysis and digital platforms of the agents comprising the sample.

4. Results

4.1. *Innovation pillars and strategies in the PSM: progressive digitization with a focus on disruption*

All 15 European public broadcasters coincide in orienting their key innovative actions towards a progressive digitalization of their structures, associated platforms and work routines. They implement high technology through specific solutions that allow them to make a qualitative leap, explore new disruptive scenarios and keep pace with the revolutionary potential of private companies.

The main innovative initiatives of these corporations are related to the digitization of their archives to increase their interoperability; the optimization of production routines; the development of an AI strategy and its transversal implementation (particularly of generative AI in creation and personalization of algorithms in distribution); the updating and renewal of their VOD platforms; the increase of their presence in impactful social networks and the creation of stable communities; proposals for co-creation and participation of their audiences; cybersecurity; optimization of the user experience (UX); and the application of high technology for reinforcing its main services and renewing its offer, such as the use of extended reality (virtual reality [VR], augmented reality [AR] and mixed reality [MR]), or the implementation of the metaverse, although this is only the case for France TV, VRT and the Finnish corporation Yle, which are recurrently working with this concept in Europe, while RTVE, NPO and Rai complete the list of corporations making their first approaches in this new environment.

At the strategic level, their development plans are divided into incremental actions: improving their current structures and products; both operational and functional development; and exploratory actions, in which they try to anticipate trends using new technological and creative frameworks. In terms of organizational systems for the implementing of innovation, some corporations advocate for an holocratic or horizontal management, while others organize their actions vertically, both top-down (requests from top management to journalists) and bottom-up (proposals from journalists to top management).

The difference in resources between corporations is a palpable reality that highlights the ambition of each corporation's roadmap. Some PSM aim to stay ahead of the curve and experiment with new technologies, while others limit themselves to being "smart followers," as RTÉ points out, to take advantage of their peers' discoveries, and try to adapt them to their own structure. In the case of SVT, the corporation explains that they have an active collaborative system with companies and commercial media to outline joint innovation and narrow the competitive gap with large international companies, which differs from most countries where public-private contributions are less frequent.

One of the priorities of PSM corporations is to improve and renew the user experience with their content proposal, so that it is usable, relevant and personalized to each consumer. They try to differentiate themselves from commercial media services, putting the values associated with quality public journalism before any kind of risky experimentation. Attracting a young audience (16-25) that is traditionally not interested in their core content offer is another of their strategic pillars, for which they are increasingly present in new third-party platforms such as Twitch or TikTok, and have boosted their thematic offer in these spaces with youth content and new interactive formats with an active position by the user.

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Regarding VOD platforms, European PSM are working to upgrade and implement increasingly more accurate recommender systems in compliance with the GDPR (General Data Protection Regulation). Still, these media corporations have historically had problems generating metadata associated with their content, so they are first solving this problem by integrating automated technologies to create a deep and sufficient data architecture for personalization.

Co-creation is another theme that is on the rise, although the interviews identified that PSM corporations had different interpretations and concepts of what it actually is. Most of the corporations studied, with the exception of Rai, ORF and RTVE, claim to be experimenting with including the user at the center of the content production process. Even so, the practices expressed by European public broadcasters are different and come from different origins.

In the case of RTP, it considers an example of co-creation some the focus groups it conducts with part of its audience to check the quality and success of its content. It also considers the votes cast by audiences to decide the outcome of a reality show or live program to be some level of co-creation. VRT, BBC and DR, among others, explain that their experiences are based on a relevant contribution of value by users, where they share and generate content. The scarce involvement and participation of viewers continues to be the main obstacle to the implementation of projects of this nature.

4.2. *Specific priorities and innovative initiatives in the European PSM*

Each public broadcaster analyzed expresses and cites different priorities and current concerns linked to its innovation strategy. Even so, the most prominent areas are common, and most of them are closely related to the digital renewal of all its sections, processes and applications; the use of high technology, especially the development of AI strategies and solutions; the optimization of the user experience (UX); and the establishment of an active, stable and loyal two-way conversation with its audiences.

The three tables in this section summarize the key areas that each corporation prioritizes in its current innovation strategy and with a view toward the short and medium term. The information shown comes from the responses of the professionals interviewed when asked about the innovation prisms on which they focus and to which they allocate most of their current efforts and funding. The corporations are grouped according to the model to which they belong according to Hallin and Mancini's paradigm (2004), despite the fact that no direct correlation of innovative tendencies has been identified among broadcasters in the same system, revealing that the paradigm may not be as pertinent to differentiate the innovation approaches among corporations, and that there could be grounds to establish new multidisciplinary models that make it possible to distinguish similarities in innovation processes between the broadcasters.

Within the corporations of the polarized pluralist model, RTVE highlights an imminent breakthrough in 5G technologies and work in the cloud that allows them to have a permanent audiovisual connectivity and experiment with remote production. They are also working on a recurring basis on ultra-high definition (4k) and on the application of AI in all its sections, as well as on the mobile first approach for the adaptation of its content offer to new formats.

France TV divides its innovation priorities into two perspectives: an incremental one, to optimize its existing services, and an experimental, disruptive one, in which they test new technologies with AI as the protagonist. In RTP they give preference to actions that enhance their proposal of local content, native audio, and the update of the audiovisual language and the workforce towards profiles with a greater technological component; while in Rai they focus on achieving a significant level of digitization and on articulating professional routines and an effective personalized distribution around it. Table 3 below shows the innovation priorities of the corporations in the polarized pluralist model.

USC UNIVERSIDADE DE SANTIAGO DE COMPOSTELA

ISSN 2386-7876 – © 2024 Communication & Society, 37(3), 107-123

Table 3. Innovation priorities of corporations in the polarized pluralist model.

Corporation	Innovation priorities in television broadcasters polarized pluralist model
RAI	Digitization of tools, work routines and structures
	Automation, AI implementation
	Optimization of distribution through the recommendation system on the VOD platform
	Design and implementation of extended reality technologies
RTVE	Migration and renewal of your IT infrastructures (IT technology information)
	Three pillars of technological innovation: ultra-high definition (4K); stable and transversal implementation of 5G/Cloud technologies for permanent audiovisual connectivity and remote realization; application of AI
	Optimize user experience, innovate storytelling, *mobile first* approach
	Innovation in AI: simple automatic realization, file metadata, automatic text generation, closed captioning, user recognition and personalization of the conversation, automatic video production, video control disinformation, social network monitoring or verification.
France TV	**Incremental innovation:** improvement of existing products and tools, increasing internal productivity and external qualitative projection
	Experimental innovation: working on AI to integrate it transversally and optimize specific aspects of broadcasting (subtitling, translation, creation, distribution, realization, verification, etc.); implementation of high-tech, or extended reality technologies (VR/AR/MR); experimentation on new platforms, environments or concepts such as the Metaverse)
RTP	Enhanced local content, native audio, and video streaming
	Digitalization of its structure, tools, and production routines. Customer service optimization
	Development of algorithmic personalization (for the moment editorial) and automated content verification
	Consolidation of your innovation bubble team/department
	Renewal of the language of linear television broadcasts, renewal of work teams towards technological profiles and of TV presenters
	A strategic revolution with an active presence in social networks and new platforms (adaptation of content and formats)
	Attract and retain young audiences: Twitch broadcasts/gaming projects: 360º RTP Arena platform

Source: Own elaboration.

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ISSN 2386-7876 – © 2024 Communication & Society, 37(3), 107-123

For liberal model broadcasters, the BBC believes that innovation in PSM will come in three different ways. The first step will be for corporations to move completely away from traditional broadcasting and move to IP-based broadcasting, where object-based media is gaining prominence. Object-based media (OBM) consists of moldable content that adapts to the circumstances, preferences and devices used by the user. These are systems that understand viewing habits and adapt to them, and are assembled in front of the consumer in format and duration.

As a second aspect, the BBC points out that the public value proposition made by corporations in relation to the processing and storage of personal data on the Internet will also be fundamental; as well as multimodal recommendations, in which systems will offer the user content in different formats depending on their available time, geographic situation and preferred format. The innovation priorities of the BBC and RTÉ, broadcasters belonging to the liberal model, are summarized in Table 4 below:

Table 4. Innovation priorities of liberal model corporations.

Corporation	Innovation priorities for liberal model broadcasters
BBC	Digitalization of its structure and transfer of its traditional public service value proposition to its online actions
	Multimodal recommendations
	Object-based media: content assembled in front of the user according to their own consumption conditions, preferences and devices
	Move away from traditional broadcasting to IP-based broadcasting or IP-based streaming services
RTÉ	Optimization of workflows, tools and systems
	Development of innovative digital products and applications

Source: Own elaboration.

In the corporations of the democratic corporatist model, innovation priorities are varied and start, as in the rest of the media systems, from a common origin focused on digitization. At VRT, they pay attention to increasing interaction and participation of audiences, and to establish valuable dialogues that allow to build a stable, loyal community in digital environments.

In the case of Yle, the finnish broadcaster is a pioneering corporation in the personalization of content and digital experiences through AI, mainly through its intelligent assistant Voitto, which was the first chatbot in PSM to display news recommendations tailored to each user directly on the home screen of the mobile device.

The DR is continuously working on the optimization of services and programming of its digital platform DR TV, and both RTBF, SVT, NPO ORF and RTS stress the importance of incremental improvement of its current proposal and its technological applications, while ARD focuses on developing a common innovation strategy and network for all its regional television stations. The specific areas of innovation of each corporation of the democratic corporatist system are detailed in Table 5 below.

USC UNIVERSIDADE DE SANTIAGO DE COMPOSTELA

ISSN 2386-7876 – © 2024 Communication & Society, 37(3), 107-123

Table 5. Innovation priorities of corporations in the democratic corporatist model.

Corporation	Priorities for innovation in the corporatist democratic television model	
VRT	Increased interaction and conversation of value with their audiences and construction and loyalty of a stable community in digital environments	
	Co-creation of content	
	Development of content personalization/curation actions	
	Implementation of AI in a transversal, effective way, aimed at improving internal productivity and qualitative optimization of the content offer	
RTBF	Identification and creation of new types of value to maintain relevance to the audience	
	Development of a business model for the future	
SVT	**External innovation:** collaboration with local private media, technology startups and universities to study new AI solutions and tools	
	Internal innovation: incremental evolution of its structure, digital equipment, upgrades of its core software, tools and applications	
	Production, tagging and annotation of metadata for future customization	
DR	Development and optimization of digital products	
	Improvement of its content personalization system	
	Reinforcement of the DR TV streaming platform	
NPO	Incremental improvement of existing services and implementation of new services adapted to users' consumption patterns, interests and devices	
	Study of possible future business models	
	Introduction of new technologies, distribution and audience interaction processes and immersive content formats	
ORF	Innovation of a mainly technological nature, divided into two operational dynamics:	
	Internal interdepartmental work	Cooperation with external entities, universities, innovative companies, the EBU and startups
RTS	Innovation based on creativity and the development of internal ideas	
	Two pillars: strengthening the relationship and connection with the public and investing heavily in key technology areas, such as machine learning or AI	
	Gain presence in social networks relevant to young audiences (Tik Tok, or Twitch)	
	To deepen the idea of the public service algorithm	
	Approach to extended reality tools and the concept of metaverse	
	Develop a common ARD-wide innovation strategy and network	

USC UNIVERSIDADE DE SANTIAGO DE COMPOSTELA

ISSN 2386-7876 – © 2024 Communication & Society, 37(3), 107-123

ARD	Endow your production capabilities with greater flexibility and mobility
	Content distribution and orientation, accessibility
	Optimize the management of user communities and the established conversation
	Content tagging through effective metadata
Yle	Accurate and reliable personalization of digital content (i.e., Voitto Intelligent Assistant [no longer active])
	Transversal implementation of AI in all sections of the corporation and innovate around it
	Experimentation with extended reality (XR) and the Metaverse concept
	Optimization of the user experience based on technology

Source: Own elaboration.

The digitization of their structures, core applications and production routines is at the heart of European public broadcasters' innovation strategies. Before moving forward with the development of sophisticated prototypes, most of them are particularly focused on updating and digitizing their archives and associated metadata to improve their interoperability. They are also focused on working in the cloud, whether in the remote production or distribution areas. In this context, cybersecurity shielding is particularly important to prevent computer attacks that sabotage PSM systems.

> *(GA/RAI) There are several issues at a strategic level at the moment. One of the most important is the digitization of our entire structure. We have a very large video archive dating back to the 1950s and we need to bring all this material into an accessible digital format.*

As for personalization systems, users have gradually become accustomed to the algorithms and operation of capture tools in private platforms. This is why public corporations are accelerating the development of proprietary systems that, in addition to advancing quantitatively in terms of metadata content, are expanding the catalog of programs produced specifically for their VOD platforms, recycling fewer and fewer pieces from linear broadcasts.

> *(JF/DR) We've done a lot of work on personalization and rebroadcasting, mainly since the relaunch of DR TV in 2022. Now there is a lot of our content that is only available there, it has been established as a main distribution channel.*

The construction of a public service algorithm that manages to translate in its operation the main values of PSM, such as plurality or diversity, and avoids the isolation effect on users is another of the issues on which these media corporations are working. Some broadcasters, such as RTS and the BBC, believe that they are not so far from obtaining satisfactory results, which could be achieved by translating different qualitative characteristics into specific numerical values that are introduced as variables in the very creation of the system.

> *(EB/RTS): With the public service algorithm we must cater to other people's desires, but at the same time give them information that did not appeal to them in the first place. For us, it will be critical to differentiate ourselves from commercial media systems.*

Regarding the immersive possibilities offered by new virtual environments, particularly those who emulate viewer immersion in places where informative events take place, shared entertainment environments, or to spaces and experiences far away or with restricted or limited access, PSM have amplified their experimentation with extended reality technologies such as virtual reality (VR), augmented reality (AR) and mixed reality (MR) since the

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coronavirus pandemic, and as of lately, with the metaverse as a concept. However, there is agreement among corporations that the current relevance of these solutions in people's lives is limited, so the investment and efforts allocated to these technologies will grow progressively and in parallel to the real interest of audiences.

Occasionally, some public corporations establish cooperation projects among themselves on specific matters, mainly on technological applications or tools, since this practice allows them to exploit synergies, reduce costs and optimize their performance in innovation. These relationships are also eventually established with the EBU as an international meeting point, and to a lesser extent, with academic research laboratories, universities, start-ups and/or specialized private companies, so that public-private collaboration is reduced despite an upward trend in project outsourcing in the last stage of PSM. In the Belgian context, RTBF and VRT work together, along with other European PSM and other private corporations in the SandboxHub, in which they explore innovative ways of working and developing tools.

Another of RTBF's projects is a financial partnership with France Tv and Radio France through which they create joint content and share the associated costs. ORF Austria reinforces the value of partnerships while emphasizing the importance of internal innovation, making it easier for employees who have good ideas to turn them into reality.

> *(KP/ORF) The fundamental pillar of our innovation is the internal part in our teams. We find that by enabling and facilitating internal innovation channels, we get very good results by leveraging the internal talent of our people, which also gives us independence.*

4.3. *Outlook and future challenges for the European PSM in the innovation area*

European public broadcasters agree that in the coming years they will have to adapt, become more flexible and update their structures to the ever-changing digital landscape. It is assumed that they will have to make creative decisions based on solid data and the results derived from control tests performed on prototypes and projects. Among their list of future priorities are understanding and optimizing personalization, and implementing artificial intelligence in all the tasks in which their employees can benefit from less routine work; to position themselves and adapt to those spaces to which their audiences migrate and are relevant to them; to build and enhance a more solid and richer digital content offer; to create advanced multidisciplinary teams that combine journalists with other professionals with technological specializations; and to advance in the fight against disinformation, among other aspects.

Regarding the profiles that will be in demand in the communication sector in the coming years, all professionals interviewed agree on the need to recruit and train multitasking journalists with technological skills, who are able to adapt quickly to the new tools and systems that will emerge. This adaptability to change and interpersonal skills are the most sought-after skills, even above technical proficiency, and these changes in professional profiles, as Urbano García, director of innovation at RTVE describes, will be introduced "progressively and out of pure necessity for the corporations and the sector."

France TV stresses the importance of having "project management" skills so that communicators can work with other professional profiles, such as computer engineers. RTP believes that traditional journalists will lose a lot of value if they do not reinvent themselves and adapt to new environments. ORF in Austria does not believe that breakingly new roles or professional definitions will emerge in the short term, they argue that this is old thinking and that journalists will only need to delve deeper into new developments, technologies and systems, but most like lye without changing their key routines.

Different opinions were identified regarding the progressive replacement of linear services by streaming services. These differences are linked to the level of digitalization of the populations in each of the countries studied. RTVE assures that in the case of Spain, the population pyramid presents a huge digital divide, so the corporation cannot ask a part of the

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ISSN 2386-7876 – © 2024 Communication & Society, 37(3), 107-123

audience to consume its contents in digital media, since some of the audience is still not close enough to this format.

In the case of RTP, the company understands that VOD platforms will coexist peacefully with traditional television. They say that in Portugal, after all, young people "have been watching TV as long as their parents or grandparents." In this line, the company believes that there will be content that will remain in linear distribution and other content that will move to the digital sphere.

Other European public broadcasters are clear on the fact that migration to online services will be completed sooner or later. With the coronavirus crisis, corporations experienced a mirage in which they registered significant increases in their audience figures, which representatives of France TV explain was misleading, because as the situation stabilized, the previous trend returned.

The French public broadcaster argues it must change its production strategy to generate content specifically for its digital sites rather than recycling its products on them. The EBU points out that the transformation to VOD platforms is happening because it is something that will bring real value to the user and predicts that this process will continue.

The new type of relationship established between corporations and their public will be much more individualized and personalized thanks to the resources and tools of the digital environment. Even so, in order to cover all user requests, it will be necessary to develop new formulas to adapt this attention to each user. To this end, chatbots or intelligent assistants are emerging as a solution.

The EBU concludes that it will be necessary to identify whether these technologies "become a standard of service to people in all companies," since in that case they will not be a differentiating element of public service. Linked to this question is the ethical dilemma of the systems through which corporations expect to work in the coming years to try to find correct production processes that respect international regulations as much as possible.

Public Service Media foresee different challenges for this new stage, mainly related to cultural, budgetary and technical barriers, or to gaining, maintaining and retaining the audience's attention and trust. In terms of technology, European public broadcasters will undergo a readjustment and redefinition of their strategy. However, the biggest challenge facing public media corporations is the permanent struggle against budget cuts, a circumstance experienced by the most experienced employees since their entry into the public media environment. This situation is complex, since these corporations are required to generate the same content, and even improve and expand it, with fewer and fewer resources.

To change the culture within organizations, RTBF says it is necessary to move away from the old culture of informing, educating and entertaining to a more digital one. The permutation lies in moving from a "push" culture to a "pull" culture, for which RTBF claims to have the knowledge and know-how to create the necessary content, in what format and the correct distribution, so they just need to renew their strategy and routines in parallel to the advancement of the industry and the needs of the audience.

The main objective of PSM corporations is to maintain the attention of the public, and they are working to offer services that differentiate themselves from the commercial media, thus gaining relevance for users in their respective countries. Distribution is an area on which European public broadcasters will place special emphasis, as they consider it essential to maintaining their own service at a time when media choice is becoming increasingly broad and misinformation caused by the multiplication of sources undermines the central role of journalism and the media.

USC UNIVERSIDADE DE SANTIAGO DE COMPOSTELA

ISSN 2386-7876 – © 2024 Communication & Society, 37(3), 107-123

5. Conclusions

The arrival of video-on-demand (SVoD) services in people's lives has profoundly altered national television industries, including both changes in viewing habits, in industry norms for financing and distribution, now led by subscription models, and in the intensified globalization of information and entertainment products, resulting in the introduction of new business systems and a constant challenge to national regulations (D'Arma, Raats & Steemers, 2021).

Innovation is no longer conceived in the context of public media as an option, but as a necessity or obligation to maintain the competitive pace with respect to these commercial services. The two classic innovation models are combined: the incremental model, which involves renewing and optimizing existing services, i.e., doing the same as always, but in a different way; and the disruptive model, which involves exploring new concepts, scenarios, and themes (**RQ3**).

The main objective of this research is to shed light on the innovation priorities, key points and areas of optimization on which the PSM is focusing its efforts to renew itself and build its future version. Understanding the most worked trends and concepts, and those that are beginning to be integrated into its strategic planning, allows us to identify the paths that the media will take in its next stage, as well as to intuit how it will operate in the years to come. It will be of interest to monitor the concepts and ideas that are beginning to establish themselves as key in the media in order to study their evolution and measure their progressive impact on the sector.

In order to meet the research objectives, 15 corporations belonging to the media systems described by Hallin and Mancini (2004) were analyzed, without finding significant coincidences in the innovation procedures or strategies in broadcasters of the same model, so it is concluded that this paradigm is not valid for comparing innovative trends among corporations and opens the way for future lines of research that propose new multidisciplinary models adapted to innovation routines, protocols and approaches.

Before advancing on the development of sophisticated prototypes or the establishment of complex processes, these corporations propose a progressive and complete digitization of their current structure and their historical archive, with an aim of metadating it to make it accessible, interoperable and thus integrate it into their operational routines. In parallel, and as a future proposal, they go deeper into priority areas and key points such as the optimization of production routines, the development of an AI strategy and its transversal implementation, the settlement and improvement of their VOD platforms, digital positioning and cybersecurity, the creation of stable communities, the application of high technology to optimize the user experience and the attraction and search for relevance for a young audience (16-25) usually distant from their services (**RQ1**/**RQ3**).

The innovation strategies outlined by public broadcasters in Europe coincide in their digitizing nature, but the disruptive component integrated in their plans varies depending on the size of the corporation, the knowledge and specialization of its staff and its level of leadership in the sector. Companies such as the BBC, France TV, Yle or ARD, among others, with strong technological strategies, have set the roadmap followed by the rest of the media, which adopt the profile of smart followers and take advantage of the advances and experiences of cutting-edge corporations. It will be relevant to follow closely in the coming years whether the traditional values of public television reach a point of confrontation with the operation of new tools, technologies, and systems, or whether there is a reinterpretation or adaptation, both of classic values to technology, and in the opposite direction, following the approach of Van den Bulck and Moe (2018) (**RQ2**).

In terms of production and distribution, corporations foresee the maintenance of their activity in linear channels, but gradually ceding the relative weight of this aspect in favor of

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digital platforms. This trend will advance in parallel to the consumption habits of audiences, so this will be a process that will follow an uneven speed in different territories. In this sense, at the organizational level, for the implementation of ideas, both horizontal and vertical management flows are identified, where proposals move from senior management to other employees in the corporation and vice versa (**RQ2**).

In terms of the professional profiles that are already in demand in today's public media, the ability to work and co-create with high-tech professionals is becoming a prerequisite for the creation of mixed teams. Technical skills will be fundamental for the handling of specific tools, but competencies such as versatility and adaptability to change will be the most valued in a constantly evolving ecosystem with little room for reaction and learning (**RQ2**).

Cultural, technical, and budgetary barriers are the main hurdles that European PSM will have to overcome in the next stage in order to continue its repositioning, renovation, optimization and growth. This challenge, together with the search for credibility and relevance for their audiences and the conceptual distancing from commercial operators, prolongs a historical need and litmus of tests for public media, consisting of knowing and managing to transmit their value, and making sure that this represents a real contribution for the citizenry as a whole, and not a static manual of good practices without real transfer to the screen (**RQ4**).

This article is part of the activities of the project "Medios Audiovisuales Públicos en el Ecosistema de Plataformas: modelos de gestión y evaluación del valor público de referencia para España" (PID2021-122386OB-I00), funded by the Ministry of Science and Innovation (Spain), AEI and Feder, EU. It is also part of the activities of the project PDC2023-145885-I00, funded by MCIN/AEI/10.13039/501100011033 and by the European Union "NextGeneration EU"/PRTR, and of the RTVE-USC Chair on Public Service Media in Europe. The author César Fieiras Ceide holds an FPI contract from the Spanish Ministry of Science and Innovation with reference (PRE2022-103954)

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USC UNIVERSIDADE DE SANTIAGO DE COMPOSTELA

ISSN 2386-7876 – © 2024 Communication & Society, 37(3), 107-123

Artificial intelligence strategies in European public broadcasters: Uses, forecasts and future challenges

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https://revista.profesionaldelainformacion.com/index.php/EPI/article/view/87035

Recommended citation:

Fieiras-Ceide, César; **Vaz-Álvarez, Martín**; **Túñez-López, Miguel** (2022). "Artificial intelligence strategies in European public broadcasters: Uses, forecasts and future challenges". *Profesional de la información*, v. 31, n. 5, e310518.

https://doi.org/10.3145/epi.2022.sep.18

Manuscript received on June 28th 2022
Accepted on August 13th 2022

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Abstract

As artificial intelligence (AI) gains space in the media, public broadcasters are testing and experimenting with these technologies to raise their services to the new standards of the audiovisual ecosystem. From algorithms that help recommend the most suitable content for users, to others that detect news and automate some of the tasks of journalists, these tools are increasingly present in public audiovisual corporations. The data were obtained from semi-structured in-depth interviews with a convenience sample of 15 corporations from 12 countries. The results reflect a heterogeneous application of artificial intelligence in corporations, oriented towards the automatic creation of content from structured data, the improvement of audience interaction through chatbots, and personalisation or verification. The implementation of these technologies also poses major challenges. Firstly, the economic cost of adapting these systems to each corporation and the difficulties in hiring experts to develop AI solutions prevent a complete deployment of these tools in public broadcasters. As main conclusions, we have understood that AI as a "culture" is believed to be vital for the public audiovisual services of the future, although its application is still far from being a standard and generally does not occupy a relevant strategic position in the innovation departments of corporations.

Keywords

Artificial intelligence; AI; Algorithms; Media; Automation; Journalism; Innovation; Public service media; News; Broadcasting; Audiovisual; Technology.

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Funding

This article is part of the activities of the project "Public audiovisual media in the face of the platform ecosystem: management models and evaluation of the public value of reference for Spain" (PID2021-122386OB-I00), funded by the *Ministry of Science and Innovation* (*Micin*, Spain), *Agencia Estatal de Investigación* (*AEI*, Spain), and *European Regional Development Fund* (EU). In addition to being integrated in the activities of the '*RTVE-USC* Chair on Public Service Media in Europe'.

The author Martín Vaz-Álvarez holds an FPU fellowship from the *Ministry of Science and Innovation* of the *Government of Spain* with the reference (FPU19/06204).

1. Introduction. The impact of AI on the media ecosystem

Since the *Quakebot* algorithm of the *Los Angeles Times* first published news on an earthquake in California in March 2014 (**Ufarte-Ruiz**; **Manfredi-Sánchez**, 2019), more than 30 leading international media have applied artificial intelligence (AI) in the automatic generation of news. The map of the impact of AI in the media drawn by **Fanta** (2017) has undergone a considerable update of small media that have followed the path opened by the *Associated Press* and *Reuters* agencies, and *The Washington Post*, which are pioneers in these techniques (**Rojas-Torrijos**, 2019).

AI, with its entry into media newsrooms and its application in news production processes, gives rise to what we know as 'automated journalism' (**Carlson**, 2015; **Graefe**, 2016), 'algorithm journalism' (**Diakopoulos**, 2019; **Dörr**, 2016), 'robot journalism' (**Oremus**, 2015) or 'artificial journalism' (**Túñez-López**; **Toural-Bran**; **Valdiviezo-Abad**, 2019), replacing certain tasks of information professionals through the use of algorithms; although the experience of recent years tells us that it should be considered as a tool that allows journalists to enrich storytelling based on natural language generators, which transform structured computational data into human language (**Dörr**, 2016; **Marconi**; **Siegman**, 2017).

The *European Broadcasting Union* (*EBU*) *News Report* (2019) concludes that only some of the tasks of journalism will be automated. However, it also indicates that the changes brought about by the application of this technology will, in one way or another, cut across many newsroom tasks so that journalists will inevitably need to become more technologically literate. In the current application of automated journalism, **Graefe**'s (2016) prediction that the profession is not at risk and that AI is not seen as a replacement for human journalists still holds true, but editors are highly likely to be assigned to 'higher value-added activities', complementing the mechanical work of algorithms (**Sirén-Heikel** *et al.*, 2019).

> According to the *EBU* report, the *Organization for Economic Co-operation and Development* has estimated that almost half of all occupations will disappear or be fundamentally changed in 15-20 years due to automation and machine learning. 'In the field of communication, we are experiencing the biggest transformation since the advent of traditional media. It is also the greatest social disruption since the Second World War' (*EBU*, 2021).

1.1. Automated solutions at all phases of journalism

Túñez, **Toural** and **Frazão** (2020) point to the use of AI beyond the creation of news, transcending nowadays to most journalistic tasks. In its current applications, AI is used in the creation of alerts and recommendations, in product verification and marketing and in the intelligent automation of workflows (**Rojas-Torrijos**, 2019). The *European Broadcasting Union* (2019) believes that the advancement of language technologies such as machine translation, speech recognition and speech-to-text generation will provide exciting possibilities for the media of the future.

Con la IA, las noticias se escriben automáticamente utilizando una biblioteca de narraciones. Bases de datos estructuradas permiten la producción de noticias con estructuras y códigos coherentes, lo que es suficiente para la cobertura común y rutinaria de eventos como las finanzas, la bolsa, los deportes o el tiempo. Esta cadena de producción acelera el uso de los datos para la verificación de la información en tiempo real, donde se cruzan cifras y declaraciones (**Hansen** *et al.*, 2017).

Table 1. Benefits of applying AI in the media. Source: *European Broadcasting Union* (2019).

Benefits of applying AI in the media
Detect trends in social networks
Get trend-breaking tips
Get story angles, images and people suggested through an online search
Fact-checking
Verify fake photos and videos
Checking for deep fakes
Finding email addresses connected to websites
Discovering bots on social networks
Audio transcription
Creating stories from structured data
Automatic text translation
Automatic text correction
AI assistance in video editing
Automated audio editing
Automating workflows
Predictive analytics to generate revenue and increase customer satisfaction
Chatbot creation
Data cleansing and filtering

With AI, news are automatically written using a library of narratives. These structured databases enable the production of news stories with coherent structures and codes, which is sufficient for common, routine coverage of events such as finance, the stock market, sports or weather. This production chain accelerates the use of data for real-time verification of information, where figures and statements are cross-checked (**Hansen** *et al.*, 2017).

AI systems interpret, organise and produce news in a user-recognisable format through algorithms that first process the information, take pre-programmed news structures, select key aspects and insert new terms, statistics or pictures (**Anderson**, 2013). As a result, using these automatic language generation techniques, they transform the source data into journalistic products in which human intervention has been minimal (**Carlson**, 2015) and narrated autonomously (**Montal**; **Reich**, 2017).

In the area of distribution and interaction, the contributions of algorithms are also increasingly valuable for the media. *Yle Finland* was one of the pioneering public service media (in 2014) to experiment with personalisation through its personalised news application, *Yle NewsWatch*, which has become a benchmark for the media as a whole. This tool collects data from three sources: "the user's active choices, the behaviour of other users and editorial decisions". In addition, it incorporated the first intelligent personal news assistant (*Voitto*) that displays news recommendations directly on the lock screen. *Voitto* has also helped publishers in the coverage of events such as municipal elections or *National Hockey League* (*NHL*) games (*Yleisradio*, 2018).

Along these lines, European public broadcasters joined forces in building a platform where they share their data science and personalisation tools. This *EBU PEACH* (personalisation for each) project operates diversified algorithms, through which it tries to expand the user's content catalogue (*EBU*, 2019). Content recommendation is also valuable in the specific case of young audiences, bringing them closer to the formats with which they feel most recognised and are most interested. This can help to address the loss of relevance of television and public media for them, which is accompanied by a historical decline in the consumption of these spaces.

Regarding disinformation caused by the proliferation of fake news, this is one of the main threats to the media system. For this reason, automated solutions are essential to solve or speed up part of the routine verification work carried out by journalists. In this sense, artificial intelligence makes it possible to track keywords, cross-check information and analyse large volumes of data in record time. This decision allows information professionals to focus on specific testing, monitoring or logistical tasks in which they provide greater value (**Fieiras-Ceide**; **Vaz-Álvarez**; **Túñez-López**; 2022).

1.2. Debates in the application of AI: provenance of systems, limitations and possibilities in PSM, social responsibility, costs and privacy

In the application of AI tools, the media must decide how they approach the implementation of intelligent systems. The first is to create an in-house algorithm, which involves not only a large financial outlay but also serious difficulties in finding qualified personnel in the market with the skills to build and manage an AI infrastructure. The second option is to go to the market in search of third-party products, which may not be ideal, especially in the case of public service media (PSMs), because of their specific content and data processing needs (**Rojas-Torrijos**, 2019).

The media have undergone a restructuring with the advent of the internet; new platforms such as cybermedia have appeared, and new actors such as 'hypertextuality, interactivity and multimedia have been added to the journalistic profile' (**Túñez-López**; **Toural-Bran**; **Valdiviezo-Abad**, 2019). One of the challenges of this new context is that AI applications replace, in addition to the routine part of journalistic work, its cognitive part. To exercise this algorithm, journalists must also put themselves on the side of the technology, getting used to thinking like a machine (**Lewis**; **Guzmán**; **Schmidt**, 2019).

A parallel discussion on the application of AI can be found in the field of PSMs. Traditionally, these media are constituted with the mandate to guarantee a series of rights, such as access to information, diversity and universality, among others (**Aslama-Horowitz**; **Nieminen**, 2017). For this reason, the application of intelligent tools that select, filter and distribute content is especially delicate, understanding that the principles governing these mechanisms must be aligned with the public service values committed to by corporations, avoiding the creation of filter bubbles or the omission of relevant information for the construction of a democratic society.

However, the high cost of AI technologies, both in terms of technical deployment and recruitment of talent, is a limitation for many PSM in some of their most demanding or customised applications. Privacy management, on the other hand, is a major challenge for PSM in the use of these technologies. The need for data by algorithms in the execution of their functions raises some issues for public media, the most contentious being the legitimacy of holding and using personal audience data in the generation of new products.

PSMs are constrained by the rules of the *General Data Protection Regulation* (in force since 25 May 2018), which, among other things,

> "provides for the extension of users' rights to protect personal information, including the right to be informed about the processing of their data and the right to be forgotten" (**Sørensen**; **Van-den-Bulck**, 2018).

This regulation, while necessary, arguably represents a significant competitive disadvantage vis-à-vis media giants that use personal data on a more regular basis through their subscription services.

In 2021, *Tortoise Media* updated its global AI index, through which it analysed how 62 countries apply and evolve with respect to this technology. Its study is based on three fundamental sections: investment, innovation and implementation. The United Kingdom, the leading European nation and number three in the world after the US and China, is the third-best rated in terms of talent, behind only the US and India. Spain ranks eleventh outside the top 10 leading regions in Europe. Despite this, Spain's governance strategy is the fourth highest rated by *Tortoise Media*.

Table 2. European AI ranking. Source: *Tortoise Media* (2021)

Country	Talent	Infrastructure	Operational environment	Research	Development	Government strategy	Commercial	Global ranking
1. United Kingdom	3rd	23rd	24th	5th	11th	11th	4th	3rd
2. The Netherlands	6th	9th	10th	15th	8th	33rd	18th	8th
3. Germany	11th	13th	30th	6th	12th	10th	8th	9th
4. France	9th	14th	17th	16th	15th	5th	10th	10th
5. Ireland	8th	5th	31th	28th	7th	25th	25th	12th
6. Finland	16th	22nd	18th	17th	20th	8th	21st	13th
7. Denmark	13th	18th	11th	13th	32nd	18th	26th	14th
8. Luxembourg	18th	3rd	33rd	23rd	17th	30th	20th	15th
9. Switzerland	14th	11th	54th	3rd	13th	58th	9th	18th
10. Sweden	10th	17th	34th	11th	22nd	47th	22nd	19th
11. Spain	21st	19th	23rd	26th	29th	4th	28th	21st

More recent research on AI follows in the wake of older, but pioneering work (including **Kim** *et al.*, 2007; **Matsumoto** *et al.*, 2007; **Van-Dalen**, 2012; **Clerwall**, 2014; **Edge**, 2014; **Karlsen**; **Stavelin**, 2014; **Napoli**, 2012; **Lecompte**, 2015; **Dörr**, 2016; **Graefe**, 2016; **Fanta**, 2017; **Hansen** *et al.*, 2017; **Lindén**, 2017; **Marconi**; **Siegman**, 2017).

Studies by **Diakapoulos** (2019) have explained how machine learning and data mining have changed investigative journalism. **Saurwein** (2019), for his part, values 'distributed responsibility' in the design and application of algorithms in recommendations, classification, content production or decision making. In addition, **Soffer** (2019) reflects on variations of intelligent personalisation in communication flow theories, and **Gran**, **Booth** and **Bucher** (2020) raise the debate on whether talking about algorithmic knowledge level can lead to talking about the digital divide.

Yanfang (2019) draws a comparison between human-written and machine-constructed news, assessing the perceived objectivity and credibility of both journalistic products and corroborates that the conclusions of **Clerwall**'s (2014) analysis still hold, and audience reactions do not detect significant differences between human-written and machine-constructed news.

While **Wu**, **Tandoc** and **Salmon** (2019) draw on Bourdieu's work to explore how automation generated by external companies can be applied to the news environment. In this regard, **Dierickx** (2019) points to the vital need to incorporate journalists from the first phase of automating news creation.

2. Materials and methods

This research is descriptive and exploratory, with a blinded hypothesis. We chose to use qualitative methods and conducted in-depth personal interviews with the directors of innovation, strategy and AI of the public broadcasters of Germany (*ARD* and *ZDF*); Belgium (*VRT* and *RTBF*); Denmark (*DR*); Spain (*RTVE*); Finland (*YLE*); France (*France TV*); Great Britain (*BBC*); the Netherlands (*NPO*); Ireland (*RTÉ*); Italy (*RAI*); Sweden (*SVT*); Switzerland (*RTS*); as well as members of the *EBU*, in Delphi mode and in two rounds.

A purposive convenience sample was selected and expanded through the 'snowball' methodology based on contacts shared by the interviewees, and a second consultation was carried out to refine aspects of the information collected.

We worked with a semi-structured questionnaire that never exceeded 12 questions and in which specific questions were included, depending on the corporation interviewed. The main blocks were the application of AI, relative weight of AI in their innovation strategy, and forecasts and future challenges with respect to this technology.

Forty contacts were made, and the sample was finally validated, in which PSM from the three media models described by **Hallin** and **Mancini** (2004) were represented. The final panel of 15 interviewees is described in table 3.

> "The *BBC* has started experimenting with Object-based media, a new way of personalising content based on the user's situation"

Table 3. Purposive convenience sample of the study

Abbreviation	Name	Corporation	Position
(AM/*RAI*)	Alberto Messina	*RAI*	R&D Director
(AJ/*EBU*)	Atte Jääskeläinen	*EBU*	Professor at *LUT University* and consultant at the *EBU*
(BV/*NPO/EBU*)	Bob Van de Velde	*NPO/EBU*	Head of Data and Archives at NPO; Co-Director of AI at *EBU*
(DC/*RTVE*)	David Corral	*RTVE*	Head of content innovation
(JF/*DR*)	Jakob Faarvang	*DR*	Digital Product Manager
(JK/*YLE*)	Jarno Koponen	*YLE*	Head of AI and perosnalisation
(JA/*BBC*)	Jatin Aythora	*BBC*	Chief Architect, responsible for AI
(JL/*SVT*)	Johan Linden	*SVT*	Strategy Director
(JB/*BR/ARD*)	Jonas Bedford	*BR/ARD*	Innovation Leader at Bayerischer Rundfunk
(KB/*FranceTV*)	Kati Bremme	*France TV*	Artificial Intelligence Vision Director
(LB/*RTS/EBU*)	Léonard Bouchet	*RTS/EBU*	Data and Archives Lead at *RTS*; Co-Director of AI at *EBU*
(LV/*RTBF*)	Loïc de Visscher	*RTBF*	Innovation Director
(MM/ *VRT*)	Mike Matton	*VRT*	Responsible for international innovation partnerships
(RW/*RTÉ*)	Richard Waghorn	*RTÉ*	Director of Operations, Technology and Transformation
(RA/*ZDF*)	Robert Amlung	*ZDF*	Digital Strategy Director

Thus, by models, the polarised pluralist model is represented by *RTVE*, *FranceTV* and *RAI*; the corporatist-democratic model is represented by *VRT*, *RTBF*, *DR*, *RTS*, *SVT*, *ZDF*, *ARD*, *NPO* and *YLE*; and the liberal model is represented by the *BBC* and *RTÉ*.

Table 4. Correspondence between corporations/**Hallin** and **Mancini** model (2004)

Polarised pluralist	Democratic corporatist	Liberal	Other
FranceTV (France) *RAI* (Italy) *RTVE* (Spain)	*ARD* (Germany) *DR* (Denmark) *NPO* (Netherlands) *RTBF* (Belgium) *RTS* (Switzerland) *SVT* (Sweden) *VRT* (Belgium) *YLE* (Finland) *ZDF* (Germany)	*BBC* (United Kingdom) *RTÉ* (Ireland)	*European Broadcasting Union* (*EBU*)

Interviews were conducted between April 2020 and February 2022 via *Skype*, *Zoom* and *Google Meetings* platforms, with an average duration of over 40 minutes. The first round of contact to the broadcasters' corporate email addresses began on 1 March 2020, with a subsequent fine tuning and personal contact with each of the professionals of interest. The transcription and translation of the material were carried out in parallel to its collection, whereas the analysis of the results began after this period.

Methodological triangulation was achieved through a scan of the scientific literature on the application of AI and the importance of innovation in PSM and a review of the websites and web platforms of the corporations contacted to contextualise the questions and verify the answers of the interviewees.

The objectives set out in the development of this article can be divided as follows:

- Main objective: To draw an overview of the status and use of AI technologies in European PSM.
- Secondary objectives: To identify the different sections and production processes in which AI is used in corporations and to expose the challenges perceived by the consulted media regarding the use and implementation of AI in their companies.

These objectives were achieved through the following research questions proposed in the construction of the article:

- What are the processes in which European PSM are applying and plan to apply AI?
- What are the problems and challenges faced by European PSM in using these technologies?
- How do European PSM see the future with the implementation of these technologies in their various departments?

3. Results

The results obtained reveal a diverse picture of the use of AI in PSM. Although this technology is applied in a cutting-edge way in a few cases, examples demonstrate innovative attitudes to the use of AI in the media sector. These examples are led, as is to be expected, by corporations with the biggest budgets.

The *BBC* has already started experimenting with the idea of 'object-based media', a new way of personalising content that considers the user's situation (geographical, postural, sensory) and automatically adapts content to different formats on demand. On a practical level, this can be understood through the following example: If you have a 15-minute walk to work every morning, you can ask the *BBC* app to summarise the main news of the morning in a podcast of that length (even narrating content that may have originally been conceived in text format); by contrast, if you commute 30 minutes on a train every day, you may be more interested in receiving that content in text format, audiovisual format, or a mix of both.

The *ARD* has already drawn a preliminary picture of the areas and operations in the corporation where AI will be applied. AI will play a leading role in content production, verification, recommendation, image recognition and even in internal operational aspects of the corporation through a novel strategy that even considers the use of these technologies for the calculation of its employees' bonuses.

In corporations as a whole, we can summarise the application of this technology in four different areas: production (news, automated production, metadata), content management (archive management, recommendations), verification and the extension of services (automatic translation of content, automatic subtitling for the accessibility of people with hearing disabilities).

No great homogeneity exists among European PSMs in terms of the specific software used, which reinforces the idea of AI as an ad hoc technology requiring a customised installation in each case, which is one of the reasons why it is highly costly and very difficult to scale. The case of AI is comparable to the use of internal management technologies in the field of broadcasting, which usually need customised technological solutions and not so often standard market products because of the particularities of their workflows and intranets.

In the following sections, the uses of AI in each of the European PSM that deal with these technologies in the exercise of their activities are described.

3.1. AI technology in European *PSM*

After analysing the 15 interviews with the 15 corporations and the *EBU* AI leaders, we confirmed that AI is a technology of great interest to corporations, constituting a relevant part of the innovation roadmap of European PSM.

Different interpretations of what AI means for these organisations are identified. Some of them, such as the *ZDF*, reject the term 'artificial intelligence' and opt for 'machine intelligence', given that, in their opinion, the procedures that generate value in this technology do not follow the usual patterns of the human mind.

All the corporations agree that AI has enormous potential that they are still beginning to understand and implement and are, therefore, still in what we could consider to be the first phase of experimentation. This phase is characterised by the proliferation of a multitude of pilot projects, but without scalable productions or with little strategic approach. However, considerable progress is expected in the short term. In the words of Alberto Messina, *RAI* Italy's director of development and innovation, they hope to 'reduce the amount of effort needed to produce certain content or create better content with the same effort'.

According to the results obtained, the prototyping and testing of AI tools are costly and complex, so inter-corporate collaborations are frequent, with private companies and start-ups, and in the case of PSM, with the *EBU* as a meeting point. Among the uses that public broadcasters make of this technology, the management of the corporations' internal archives and the metadata of the content hosted there stand out. This is seen as fundamental by all the professionals interviewed and is considered a first step in speeding up the distribution and creation of new products. Work on the accessibility of content, with automated subtitles as the protagonist, was another issue on which the corporations consulted were in agreement.

The general view in corporations is that misinformation is a long-lasting, complex problem against which the human factor will need to be applied. AI by itself is not expected to be sufficient to counteract the crisis of trust that PSM are going through, but it is projected as an enabler of verification at different stages of information production.

Among the challenges facing professionals in the application of AI is overcoming the cultural barrier to the technology. Although the perception of AI in newsrooms is beginning to show a positive trend, some reticence occurs, especially in corporations with a more traditional structure, regarding the use and presence of these technologies in certain processes. The internal reading that corporations make in this respect reveals two factors: on the one hand, the fear of professionals to hand over certain responsibilities that could lead to an eventual replacement of their functions, and on the other hand, the lack of technical knowledge, which distances the most experienced workers from potential new production processes.

Corporations such as *France TV* conduct AI literacy sessions with their employees with the aim of bringing their staff closer to the sensitivities and possibilities of these technologies, with a special emphasis on the complementary nature of AI in newsroom work. In other words, they seek to project the presence of these technologies as an opportunity for journalists to focus their time on the creative and reflective aspects of their work, eliminating the more tedious and mechanical aspects.

3.2. Specific uses of AI in European public broadcasters

Below are three tables of results showing the areas in which each European public broadcaster consistently applies AI. The corporations are grouped in the tables according to the media system, following Hallin and Mancini's paradigm. The most common processes where AI is used are in algorithmic recommendation engines, content creation, content accessibility, metadata and indexing, verification and audience interaction.

A number of common concerns are recognised among the corporations that merit future monitoring of their progress and impact. These include the difficulty of locating experienced professionals in the use of artificial intelligence in the media, which is coupled with the complexity of training their own employees. This issue, together with the high costs of implementing the systems, limits in many cases the implementation of intelligent solutions. Another issue that deserves to be monitored is the capacity of media organisations to develop large-scale AI projects within their structures and their capacity to adapt them to their specific needs, as ready-made applications often fail to fulfil the corporations' specific needs.

Table 5. Specific uses of artificial intelligence in polarised pluralist model corporations

Corporation	Application of artificial intelligence in polarised pluralist model televisions
RAI (Italy)	- Experimentation with *natural language processing* (NLP), *computer vision* and visual information analysis. - They work on content accessibility and automatic subtitling and in automatic voice recognition in news transcription, information retrieval and automatic recommendation of news material. - Data collection, cleaning and display (example: femicide project). - Automatic recommendation by algorithm.
RTVE (Spain)	- Subtitling of news programmes in regional languages. - Facial and voice recognition for metadata generation, both for cataloguing the archive and for new content (transcription of press conferences identifying interlocutors). - Intelligent realisation using a single camera to enable and improve the quality of certain broadcasts. - Automatic news generation with *Narrativa* and *EFE*.
FranceTV (France)	- Indexing. Speech to text and image recognition to add more and faster index content. - Automatic creation of articles in the newsroom on parties, electoral processes or the weather. - Creation of automatic football videos for broadcasting on social networks. - Recommendation algorithm.

Table 6. Specific uses of artificial intelligence in corporations in the democratic corporatist model

Corporation	Application of artificial intelligence in democratic corporatist model television stations
VRT (Belgium)	- Subtitling using the speech recognition engine. - AI-based recommendation engine. - Chatbots for audience interaction. - Tools for news verification. - Real-time sports statistics (provided by suppliers)
RTBF (Belgium)	- Automatic tagging of metadata for the archive and new content. - Analysis of the post-production process. - Conceptual evidence of content summaries and highlights. - Small projects with start-ups - Content recommendation.
SVT (Sweden)	- Creation of graphic solutions. - Creation of journalistic content. - Content recommendation algorithm.
DR (Denmark)	- Machine learning for personalisation. - Analytical systems, also for customisation. - Metadata generation (with *Media Distillery*)
NPO (Netherlands)	- Live subtitles, real-time translation. - Use of AI throughout the media chain (production, aggregation and dissemination). - Metadata generation. - Analysis of usage data and user data. - Creative applications (e.g. music, lyrics). - Automatic generation of trailers and promos. - Experiments generating sports news and election results from structured data. - Search for information in large databases by means of automatic searches.
YLE (Finland)	They divide AI innovation into four areas: 1. Understanding of content, data and metadata. 2. Content creation with smart tools. 3. Content distribution and personalisation. 4. Analysis. -They are also creating metadata to use systems that can recognise images. -They experiment with content creation using automated systems that generate images and illustrations.
ZDF (Germany)	-*Machine learning* (not used to generate automatic content, such as texts). -Video analysis or machine translation.
RTS (Switzerland)	- Generation of metadata and searching of the archive through it. - Voice recognition. - Creation of customised classifiers.
ARD (Germany)	- Creation of texts from regional data. - Verification. - Transcription and automation of routine tasks. - Image and text recognition for metadata and file enlargement. - Algorithmic recommender systems. - In the near future: AI strategic plan to automate administrative operations (e.g. calculation of workers' capital gains).

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Table 7. Specific uses of artificial intelligence in corporations in the liberal model

Corporation	Application of artificial intelligence in liberal model televisions
BBC (UK)	- Content recommendation. - Ethical dimension of AI. - Partnerships with other entities against disinformation. - Implementation of AI machine learning for journalistic work. - Small specific tests in audiovisual content creation but no large-scale or chain creation. - In the future: object-based media (automation of the production of flexible multi-platform content personalised to the user's personal situation).
RTÉ (Ireland)	- Microsoft indexer for content indexing. - Creation of metadata. - *Machine learning* for automatic database analysis.

The PSMs agree in highlighting the value of AI in the management of their archives, opening up the possibility of turning it into a 'live' system capable of retrieving information more efficiently and in turn feeding the archive with new content generated from previous ones. In some cases, this is done by applying facial or voice recognition systems based on AI that manage to tag the contents (identification of people, interlocutors, contents and themes), making them more easily identifiable and retrievable. Despite this consensus on the usefulness of the technology, most corporations have not catalogued, classified or tagged their archives with metadata, making them difficult to access and disorganised. The Swiss *RTS*, in particular, not only performs speech-to-text transcription but also manages to differentiate between male and female voices.

> "We work with various facial or voice recognition applications to preserve the archive, the only way to keep it alive is to catalogue it through metadata. These tools are made in collaboration with the *EBU*, they are very expensive tools, and it is necessary to unify resources" (DC/*RTVE*).

> "We have several tools that we are pioneering. I think we have the only metadata video archive in the world" (LB/*RTS*).

Accessibility of content is another priority issue for European public broadcasters. AI is useful in bringing content closer to people with limitations, for example, hearing impairments and through automatic subtitling with voice recognition and transcription systems. Such real-time AI systems are becoming increasingly common, and in corporations such as VRT, it was the first AI tool to be integrated into content.

> "We use AI for subtitling in the different languages recognised by the State, in the news, for example" (DC/*RTVE*).

> "The first area where we applied AI was in subtitling, the speech recognition engine has been with us for more than 10 years and, for a long time, it was the only resource where we used machine learning. Now, we are also using it in chatbots and verification systems" (MM/*VRT*).

> "On one of our channels, where we cover all the debates, we do real-time subtitles. This is based on an AI system that understands the speech, translates it into text and even translates it live" (BV/*NPO*).

The perception of European public broadcasters using AI is that they are able to expand their content coverage while improving the quality of their content. *RTVE*, for example, is working on the implementation of a smart camera system that will allow it to produce live coverage with a single device. For its part, the *BBC* has tried creative alternatives and has even tried important management tasks, such as the automated direction of the programming and content of one of its channels.

> "Big advances expected by corporations are related to the technical side, with specific tools that allow them to be more efficient and increase the quality of specific tasks"

> "We are applying AI in camera systems. When you can't move a whole team, if one camera can provide intelligent live production with different shots, it allows us to extend our coverage" (DC/*RTVE*).

> "Last year, we ran *BBC Channel 4* entirely powered by AI, we ran programming and content successfully because of it. We have a lot of specific use cases, but we don't have large-scale production cases yet" (JA/*BBC*).

In terms of their relationship with their audience, PSMs also take advantage of the benefits of AI, both in their interactions with the audience through chatbots and in the personalisation of their content offer. Algorithmic recommendation systems are one of the solutions that European public broadcasters apply to bring relevant products to the user and thus fulfil one of their public service missions. However, Atte Jääskeläinen (*EBU*) explained that private broadcasters are much more advanced in these services.

> "Digitalisation has brought about major changes. There is now a lot more information, so personalisation can channel the situation and offer relevant content for the user and add value to the public service. Still, private media are ahead of PSM. While public corporations worked cautiously trying not to make mistakes, *Google*, *Facebook* and *Twitter* have developed high-quality services" (AJ/*EBU*).

3.3. Future prospects and challenges for European *PSM* in relation to AI

The main challenge for European PSMs lies in the learning and deep cultural implementation of the technologies to exploit the benefits of the technology while analysing and managing the various problems (workflow, corporate culture, organisation and professional profiles and ethics) that may arise from its use.

In the field of verification, deepfake, through which a speech or image of a character can be synthetically falsified, is another of the great challenges identified by corporations in the use of AI. *RAI* proposes that this can be used constructively to revive characters from the past, for example.

> "An interesting topic is deepfake. It is dangerous if it is used to make things appear to be what they are not, but it is already being used in the reconstruction of characters from the past" (AM/*RAI*).

Another common forecast is the creation of mixed human-machine teams, so that their correct adaptation will give added value to the entire product development chain. This also responds to a prophylactic need to always supervise and accompany the activity of machines with the presence and editorial criteria of human professionals, as specified in the AI white paper published by the *European Commission* in 2020.

> "With AI, we will be more creative to be able to target different audiences in the perfect way with the right programme, but all those tasks should be done hand in hand with humans. Not just robots, and not just people, really working together creates something useful and valuable" (KB/*France TV*).

Big advances expected by corporations are related to the technical side, with specific tools that allow them to be more efficient and increase the quality of specific tasks. These algorithms and systems affect all phases of the production chain until they reach a point where AI generates parts of their content. For the moment, many of them have only worked on prototypes and proofs of concept, but the results are positive, and their intention is to continue innovating with AI as the main actor.

> "Editing systems will have artificial intelligence plugins to enhance the image; or in distribution, we will have technologies that can encode our content more intelligently and find the right files for the end user. All of that is done with algorithms" (BV/*NPO*).

> "We explore AI solutions to generate some summary, some highlights, in short, to generate new content. At the moment, what we are doing is testing conceptual projects. I think in 5 years, it is possible that AI will generate some parts of our content" (LV/*RTBF*).

Among the challenges that European PSM identify in the implementation of AI, the cultural barrier to technology and the ethical dimension, privacy and management of user data, especially relevant in the field of public service, stand out among the challenges that European PSM identify in the implementation of AI.

Many journalists still fear that this new technology will replace them in their jobs. Along this line, corporations are trying to communicate that machines will only replace people in routine tasks in which the contribution of human value is not essential to be able to devote their efforts and time to creative areas that are fundamental to the final result. *France TV* is emphasising this point by organising sessions to make its journalists aware of the advantages that AI will bring to them.

> "We create automated content from structured data, but it's complicated. Journalists are afraid of having their work taken away from them, so we do sessions to explain to them that AI will do the stupid tasks so they can focus on doing the smart ones" (KB/*France TV*).

> "We are working on how public service broadcasters should be cautious in their use of data and privacy management. We have guidelines and principles that we adhere to every time we develop any kind of machine learning or AI" (JA/*BBC*).

PSMs are concerned about building mixed teams because they cannot find professionals specialised in building smart technologies. This is partly due to the lack of economic incentives in the public sector compared to the supply and economic resources that exist in the private sector. This makes it very difficult to incorporate new professional profiles and, therefore, to renew the internal culture of companies and the implementation of innovative technological initiatives.

Another challenge is funding. Public service broadcasters stress that they must claim and strengthen their relevance and the trust of the audience to avoid falling into a delegitimisation that would compromise their future survival. In the short term, AI can play an important role in this sense, given that the strategic decision for corporations to be mediated by external technology for budgetary reasons can generate problems in the medium term, not only because this would mean being dependent on third-party technology but also because it implies a de facto lack of control and capacity for the specific design of this technology for public service use. Against this background, whether to opt for in-house technological development or for a mixed solution may mark the future of corporations.

> "We can summarise the application of AI in four areas: production, content management, verification and the extension of services"

> "One of the challenges is to defend the relevance of public service media for generations to come. This goes hand in hand with the challenge of funding: if we are relevant it will be more difficult to make cuts, if we are not, they will. The main challenge is trust, adaptability, resilience, adaptability, and I think we still have a lot to learn in that respect" (LB/*RTS*).

> "I think the biggest challenge is people. There is strategic scenario planning from which we conclude that if nothing is done with AI, our services will be very irrelevant in the future. There are 3 possible scenarios: our service will be mediated by the internet technology giants, in that context our services and values will not be relevant; we focus only on our own services, without being mediated, so we would need huge expertise; the third is that we do nothing, and if we do this we will have no idea whether our services would still be relevant" (JA/*BBC*).

All corporations understand AI as a cross-cutting issue. In fact, this position is expected to be maintained in the future, as the creation of dedicated AI teams is generally not considered essential. However, AI-related proposals are commonly worked on in multidepartmental innovation labs.

> "Firstly, I don't think there will be an AI learning department. I think AI will be the culture of all our engineering activities at the *BBC*. Secondly, I think the focus for us will be more on training models, on ensuring knowledge of the technology, and then on the services that can be offered on top of them" (JA/*BBC*).

> "We have no innovation or AI department. Nor will we have either in five years' time. As I said at the beginning, they really need to be in all parts of the company. We need to make the whole company more flexible to be able to not only produce good linear products and some add-ons. Really the core of the company has to be able to adapt to digital, to be able to innovate, to be an agile organisation using the AI tool" (RA/*ZDF*).

4. Discussion and conclusions

AI is identified as the technological proposal par excellence to which European public broadcasters are turning and plan to turn in the near future. Some of them, such as *ZDF*, have decided to use an alternative term (machine intelligence) because of the differences between their procedures and those of the human mind. None of the corporations, except Finland's *YLE*, have specific departments dedicated to AI, nor do they plan to incorporate it in the near future. Even so, all corporations consider it a cross-cutting element across all departments and employees, and a large number of them are already experimenting with its future applications in their respective innovation labs. In the coming years, it will be key to analyse whether AI management and development becomes independent in new departments or is integrated transversally into already existing sections.

Comparing the budgetary capacity of the different corporations with their interest in and deployment of AI, we can see that the size of these PSM is of relative but not decisive importance. The *ARD* and the *BBC*, with the two largest budgets in the sample analysed, are, at the same time, the corporations with the greatest foresight and ambition (at least, and at this stage, at a theoretical level) regarding the use of these technologies. However, other media, such as the Swiss *RTS* or the Finnish *YLE*, with moderate budgets, have some of the most advanced technologies, particularly in archive management and automated news production, respectively. However, it is not yet clear whether talent will be enough to accomplish successful results in the application of AI, or if the biggest differences will be marked almost exclusively by the corporations' financial resources.

Corporations have been intentionally grouped according to the media system models proposed by Hallin and Mancini, with the intention of testing for the presence of any relationship between this classification and the perceived uses and challenges of AI, particularly those referring to corporate culture and uses that may have a deeper ethical dimension. At this level, no notable differences were observed. Hence, we can understand, at least preliminarily, that the application of AI is not directly influenced by the political particularities of each region and media system.

Expectations for this technology are high, yet European public broadcasters are still in the early stages of experimentation and implementation, with various projects, more of a voyeuristic attitude than a firm strategic approach, and no large-scale proposals. The PSMs agree that developing prototypes based on AI is costly and complex. Therefore, they resort to cooperation with other media, private companies, start-ups, universities or the *EBU*.

In terms of applications that are currently recognised, tools for the automatic creation of simple content from structured data, intelligent audiovisual production of programmes, those related to improving interaction with the audience through chatbots, the generation of summaries, the personalisation and recommendation of content and the verification and fight against fake news stand out.

The weight and importance given to the generation of metadata to keep their archives alive, considered the heritage of their respective countries, gains relevance through the interviews. The need to broaden access to content, particularly with the expansion of their competences and public service duties in using this technology to reach new groups of people or to facilitate consumption and reception for population groups with greater difficulties, is also a major consideration.

> "Corporations are still in a first phase of experimentation characterised by a proliferation of pilot experiences"

Corporate practitioners do not believe that AI will be sufficient to counter the crisis of trust in PSM, or at least that this solution will not come simply through technology, but will inevitably have to be accompanied by an extensive exercise in public education and media literacy.

> "Corporations recognise the difficulty of locating professionals with experience in the use of AI in the media, coupled with the complexity of training their own employees"

Some corporations with more traditional schemes or a lower incidence of AI in their media and technology ecosystems also face a greater challenge: overcoming the cultural barrier to technology, maintaining audience trust, surviving budget cuts and managing data, privacy and the ethical dimension of everything related to AI.

In terms of future forecasts, PSMs agree on the need to make their structures more flexible, on the construction of journalistic profiles that are more technologically trained, on the growing relative weight that Video On Demand platforms will have in their companies and on the generational differences that will be recognised in these changes. This fact opens up a discussion and a larger question: Should PSM, also to looking for ways to reach young audiences, also look for ways to rejuvenate themselves from within? At the intersection of AI, journalism and public media, the professional profiles that dominate these fields are scarce and often beyond the hiring capabilities of corporations.

Furthermore, changes are expected in the relationship with its audience; a new two-way relationship in which the suggestions of users and for which chatbots can play a leading role must be considered.

Finally, the challenges that European public broadcasters expect to face in the coming years are linked to technological re-adaptation, budget cuts, cultural barriers within and outside the organisations, maintaining the trust and attention of audiences and, in short, maintaining their capacity for innovation.

In this sense, in line with the current deployment of IA in European media public corporations, we can determine that it has a long, multidimensional and polyvalent path in these corporations, solving part of the difficulties related to operability and efficiency, but which promises to add important challenges in the cultural, budgetary and aptitudinal aspects of the different corporations.

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Designing personalisation of European public service media (PSM): trends on algorithms and artificial intelligence for content distribution

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Recommended citation:

Fieiras-Ceide, César; **Vaz-Álvarez, Martín**; **Túñez-López, Miguel** (2023). "Designing personalisation of European public service media (PSM): trends on algorithms and artificial intelligence for content distribution". *Profesional de la información*, v. 32, n. 3, e320311.

https://doi.org/10.3145/epi.2023.may.11

Manuscript received on 1st March 2023
Accepted on 09th May 2023

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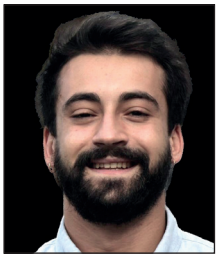

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Abstract

The migration of audiences to digital environments has motivated the media to develop a content distribution strategy that has a presence in these new spaces. In the case of European public broadcasters, they have strengthened their digital news services and have built video-on-demand platforms where they organise and screen their products. Even so, the overload of information and content reaching users forces corporations to look for new mechanisms to present an adequate, interesting and diverse offering to each of their followers. This research project analyses the use of artificial intelligence in the recommendation systems implemented by 14 European public broadcasters in Germany (*ARD* and *ZDF*), Belgium (*VRT* and *RTBF*), Denmark (*DR*), Spain (*RTVE*), Finland (*YLE*), France (*France TV*), Great Britain (*BBC*), the Netherlands (*NPO*), Ireland (*RTÉ*), Italy (*RAI*), Sweden (*SVT*) and Switzerland (*RTS*). The results reveal that there is no unanimity among the corporations with regard to the operation and origin of these systems, which vary between home-made developments, acquired from third parties, or collaborative solutions. Operators differentiate between news recommendation processes and those executed on their VoD platforms and aim to distance their systems from those of commercial media, for which they have already started working on a public service media (PSM) algorithm that includes traditional public media values, avoids filter bubbles, and pays special attention to the *European General Data Protection Regulation* (*GDPR*).

Keywords

Public service broadcasting; PSM; Recommendation systems; Artificial intelligence; AI; Public service media; Algorithms; Bubble filters; Video on demand; VoD; Journalism; Audiovisual communication; Content distribution; News; Trends; Europe.

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Funding

This article is part of the activities of the project "Public audiovisual media in the face of the platform ecosystem: management models and evaluation of the public value of reference for Spain" (PID2021-122386OB-I00), funded by the *Ministry of Science and Innovation* (*Micin*, Spain), *Agencia Estatal de Investigación* (*AEI*, Spain), and *European Regional Development Fund* (*ERDF*, EU). In addition to being integrated in the activities of the *RTVE USC Chair on Public Service Media in Europe*.

1. Introduction

In the age of digitisation, public service media (PSM) have been forced to look for new alternatives to remain relevant to their audiences, improve their experience and ultimately fulfil their public service mission. Competition with the private media and the services they offer have also prompted European public broadcasters to implement disruptive technologies to close the competitive gap with them. This is why they have chosen to implement content recommendation systems in their corporations, with which they achieve an effective distribution where users and their interests converge at a common point: Video on Demand (VoD) platforms or news apps.

The algorithms that feed these systems are mathematical models that work with huge amounts of data and have already penetrated the different spheres of everyday life (**Thurman**; **Lewis**; **Kunert**, 2019). However, the opacity of their operation sometimes limits the credibility of their internal processes, which, together with the accelerated implementation of resources based on artificial intelligence, points to three major challenges for democracy in relation to these technologies (**García-Orosa**, 2022):

- polarisation;
- fake news, deepfakes and astroturfing;
- echo chambers and bubble filters.

The *Reuters Institute* believes that AI will be the technology with the greatest impact on journalism in the coming years (**Newman**, 2021, p. 30). Internationally, these solutions have already been implemented and accommodated in newsrooms at all stages of creation and distribution, from the search for newsworthy elements and content analysis, to automated production, distribution and verification (**Sanahuja-Sanahuja**; **López-Rabadán**, 2022), which means that journalists inevitably need to become more technologically literate (*EBU*, 2019).

In the case of Public Service Media, they have traditionally worked with the aim of offering relevant content to the whole population (**Sørensen**, 2019), and although traditional algorithmic recommendation (also called collaborative filtering) optimises content exposure and protects the user from information overflow (**Herlocker** *et al*., 1999), the application of intelligent tools that select, filter and distribute content is particularly delicate (**Fieiras-Ceide**; **Vaz-Álvarez**; **Túñez-López**, 2022), as these mechanisms have to be aligned with the core values of these media (**Aslama-Horowitz**; **Nieminen**, 2017): universality, diversity, independence and distinctiveness (*Unesco*, 2001).

For effective use of recommender systems, PSMs must find a way to provide a critical mass of information sufficient to provide these personalisation engines with material to generate relevant product recommendations for each user.

This is expected to lead to changes in production routines and newsrooms, and some corporations may even decide to incorporate content from other media into their offerings (*EBU*, 2019).

Regarding news and media, there has always been a concern about the potential loss of diversity that algorithmic recommender systems could lead to (**Napoli**, 2011). Subsequently, the debate has centred on filter bubbles (**Pariser**, 2011) that would be caused by this collaborative filtering by omitting content of specific interest in favour of the most popular (**Bozdag**; **Van-den-Hoven**, 2015). However, it has been shown that algorithms are just as good at providing diversity as human editors (**Möller** *et al*., 2018) and that the uncertainty of filter bubbles may have been overestimated (**Zuiderveen-Borgesius** *et al*., 2016).

The use of recommender systems in PSMs has been discussed by **Fields**, **Jones,** and **Cowlishaw** from the *BBC* (2018) and also by **Van-den-Bulck** and **Moe** (2017), comparing the organisational strategies of European public corporations with respect to personalisation, and focusing their study on *VRT* in Belgium and *NRK* in Norway. **Pöchhacker** *et al*. (2017) analyse the incorporation of a recommender system in the German media ecosystem, discussed in depth by **Schmidt** *et al*. (2018). **Sørensen**, in 2013, analysed the first tests of personalisation in online services of PSMs, while **Bodo** (2018) and **Kunert** and **Thurman** (2019) studied the use and typologies of personalisation in both private and public media.

The fact that PSMs can offer personalisation options is an important value proposition, as well as a competitive alternative to other media. Even so, **Sørensen** (2019) argues that data analysts, programmers and data curators insist on the complexity of explaining these systems to editors and journalists, who struggle to understand the importance of generating quality metadata, which directly affects the recommendation outcome. Public service organisations also have a duty to explain to users the procedure of personalisation and use of their personal data, despite the complexity involved (**Sørensen**, 2019).

Regarding the provenance of these systems, most of the PSMs studied by **Sørensen** (2019) rely on open-source tools to develop them. Only the *DR* in Denmark opted for a proprietary solution offered by an external provider, as they argue that they should move away from the technology side and focus on content creation. Corporations, in general, opt to build their own systems in order to have more internal control over customisation, and for the tool to be tailored specifically to their environment, ensuring the technical independence of PSMs in the future (**Sørensen**; **Van-den-Bulck**, 2018).

YLE Finland was one of the pioneering PSMs (2014) to experiment with personalisation through its personalised news application, *YLE NewsWatch*. This tool collects data from three sources: "the user's active choices, other users' behaviour and editorial decisions." In addition, it incorporated the first intelligent personal news assistant (*Voitto*) that displays news recommendations directly on the lock screen. *Voitto* has also helped editors in the coverage of events such as municipal elections or *National Hockey League* (*NHL*) games (*YLEisradio*, 2018).

For its part, the *BBC* has set itself the challenge of incorporating "public service" status into the algorithm. They are already segmenting their services for different audiences, so that the homepage of their website looks different depending on age and region of origin (*EBU*, 2019). The *BBC*'s news bots have been basic, do not use machine learning, and have rarely been integrated into news production. At the same time, the corporation is laying the groundwork for developing more interactive news formats, with a more conversational tone that emphasises greater personalisation (**Jones**; **Jones**, 2019).

In terms of international cooperation, European public broadcasters joined forces in building a platform through which to share their data science and personalisation tools. This *EBU* project known as *Peach* (personalisation for everyone) operates diversified algorithms, through which it attempts to expand the user's catalogue of content (*EBU*, 2019). This initiative was inaugurated by the *Bayerische Rundfunk* (*BR*) in Germany, and later continued as a project of the *European Broadcasting Union* (**Sørensen**, 2019).

In the *Peach* project, the recommendation system is complemented by the work of editors in the news section. Editors can choose content by searching by category, news section, source, or date, and once the selection is complete, the final part of the process begins: publication on websites and apps (**Canavilhas**, 2022). The *EBU* (2021) summarises this initiative as 'the right content at the right time for the right person on the right device'.

Through AI, this collaboratively developed, open-source technology seeks to adapt the information offer to the user's interests, combining audience preferences with current news trends (**Canavilhas**, 2022). The *Peach* project includes algorithms for all types of content (text, sound, video, text), with some 20 million elements collected daily. Each content is transformed into a vector representation by means of previously trained machine learning models, aiming to associate similar pieces, even if their descriptors use different words (**Canavilhas**, 2022).

In parallel, the Belgian public service corporation *RTBF* developed another software project aimed at creating generic recommendation solutions for PSM, which, like the *Peach* project, addresses the much-needed diversity requirement in public media (**Sørensen**, 2019). With regard to the quality control of its content, the *Österreichischer Rundfunk* (*ORF*) identifies the most structured and comprehensive quality measurement and control system in Europe. The logic applied by *ORF* the is simple: if the content offered matches the individual interests of a user, it will be more relevant to them. For public service media, this means that they must listen to the feedback of the algorithm in order to modify the offer, both in terms of topics and approach (*EBU*, 2019).

2. Methodology

This research is a continuation of a previous study by the authors analysing artificial intelligence strategies in European public broadcasters, which detects the incipient interest of these corporations in integrating, enhancing, and personalising their content recommendation systems (**Fieiras**; **Vaz**; **Túñez**, 2022). Despite this growing interest, no previous projects have been identified that provide an overview of the use of these technologies in these broadcasters, the procedures followed for their implementation, or the perceptions of the professionals linked to them in relation to their operation.

This is why the central objective that marks the beginning of this research is the following: to extract a complete radiography of the current situation of the use of recommender systems in European public broadcasters, paying special attention to the functioning of these systems, their origin, the teams in charge of their maintenance and implementation, and the concept of public service algorithm. To this end, the following research questions are posed, which are progressively addressed in the results sections:

Q1. What is the perception and intention of corporations in relation to these algorithmic recommender systems?

Q2. What is the concept of a public service algorithm, and what is the procedure proposed by the corporations for its construction and implementation?

Q3. Do the recommendation systems used by these broadcasters come from external companies, collaborative projects, or are they developed by their own internal teams?

Q4. How is content recommendation executed in each of the systems of the corporations studied?

In order to achieve the central objective of the research and to answer the questions posed, qualitative methods were used and personal in-depth interviews were conducted with the innovation managers, strategy and artificial intelligence of the public broadcasters of Germany (*ARD* and *ZDF*), Belgium (*VRT* and *RTBF*), Denmark (*DR*); Spain (*RTVE*); Finland (*YLE*); France (*France TV*); Great Britain (*BBC*); the Netherlands (*NPO*); Ireland (*RTÉ*); Italy (*RAI*); Sweden (*SVT*) and Switzerland (*RTS*); in Delphi mode and in two rounds.

A purposive convenience sample was selected, which was expanded in snowball mode based on the contributions of the interviewees, and a second consultation was carried out to clarify details of the information collected. We worked with a semi-structured questionnaire that never exceeded 8 questions and in which specific questions were included depending on the corporation interviewed.

Even so, the main blocks in all of them were: digital strategy of content distribution; application and origin of recommendation systems; public service algorithm; and data privacy and regulations. Thirty-three contacts were made and a convenience sample was finally validated in which PSMs from the three media models described by **Hallin** and **Mancini** (2004) were represented. The final panel of 14 respondents consisted of:

Table 1. Purposive convenience sample of the study

Abbreviation	Name	Corporation	Position
(AM/*RAI*)	Alberto Messina	*RAI*	R&D Director
(BV/*NPO*/*EBU*)	Bob Van de Velde	*NPO*/*EBU*	Head of Data and Archives at *NPO*; Co-Director of IA at *EBU*
(DC/*RTVE*)	David Corral	*RTVE*	Head of content innovation
(JF/*DR*)	Jakob Faarvang	*DR*	Digital Product Manager
(JK/*YLE*)	Jarno Koponen	*YLE*	Head of AI and personalisation
(JA/*BBC*)	Jatin Aythora	*BBC*	Chief Architect, responsible for IA
(JL/*SVT*)	Johan Linden	*SVT*	Strategy Director
(JB/*BR*/*ARD*)	Jonas Bedford	*BR*/*ARD*	Innovation Leader at *Bayerischer Rundfunk*
(KB/*FranceTV*)	Kati Bremme	*France TV*	Artificial Intelligence Vision Director
(LB/*RTS*/*EBU*)	Léonard Bouchet	*RTS*/*EBU*	Data and Archives Lead at *RTS*; Co-Director of IA at *EBU*
(LV/*RTBF*)	Loïc de Visscher	*RTBF*	Innovation Director
(MM/*VRT*)	Mike Matton	*VRT*	Responsible for international innovation partnerships
(RW/*RTÉ*)	Richard Waghorn	*RTÉ*	Director of Operations, Technology and Transformation
(RA/*ZDF*)	Robert Amlung	*ZDF*	Digital Strategy Director

Thus, by models, the polarised pluralist model is represented by *RTVE*, *France TV* and *RAI*; the corporatist-democratic model by *VRT*, *RTBF*, *DR*, *RTS*, *SVT*, *ZDF*, *ARD*, *NPO*, and *YLE*; and finally the liberal model with the *BBC* and *RTÉ*.

Table 2. Correspondence between corporations/Hallin Mancini model (2004)

Polarised pluralist	Corporatist democratic	Liberal
France TV (France) *RAI* (Italy) *RTVE* (Spain)	*ARD* (Germany) *DR* (Denmark) *NPO* (Netherlands) *RTBF* (Belgium) *RTS* (Switzerland) *SVT* (Sweden) *VRT* (Belgium) *YLE* (Finland) *ZDF* (Germany)	*BBC* (United Kingdom) *RTÉ* (Ireland)

Interviews were conducted between 11 December 2021 and 25 November 2022 via *Skype*, *Zoom* and *Google Meetings*, with an average duration of over 30 minutes. The transcription and translation of the material was carried out in parallel to its collection, while the analysis of the results began after the end of this period.

3. Results

3.1. Recommendation systems in European public broadcasters

The corporations studied agree that the linear services they offer will be maintained in the future and will be complemented by their growing digital offer, which will gain a progressive relevance that will end up imposing itself as reference content in their structures. These media prioritise the establishment of a differentiation with the usual recommendation systems of private operators, in which revenue generation, keeping the user in front of the screen, and where, according to the professionals contacted, "it does not give the sensation of being assisted by people, but by machines", take precedence.

Regarding the construction of public service algorithms, there are discrepancies among corporations. Some, such as the *NPO*, explain that, in the creation process, they try to relate the PSM values to numerical codes, so that the system can interpret it and apply it in the subsequent recommendation. However, the *BBC* or the *DR* state that they do not see it possible to define what public service really is, so they emphasise giving diversity, plurality, accountability and transparency to the algorithm to fit its mission and avoid filter bubbles.

> The lack of data and engineering skills, forces, on most occasions, corporations to turn to suppliers to provide them with the algorithms

The lack of data and engineering skills, and of professional profiles that can carry out these systems, forces, on most occasions, corporations to turn to suppliers to provide them with the algorithms and then adapt them to their structure. However, at *YLE*, *VRT*, *RTBF*, *NPO* or *SVT*, they practically develop all this technology in house with the contribution of their employees.

In cases such as *ARD* or *RTS*, they use the common open solution proposed by the *EBU*, even though the results, at least in the last of these corporations, have not been entirely favourable. In the short term, the *BBC* intends to replace the third-party algorithms it owns with its own algorithms over which it has full control and which fully meet its needs.

In evaluating these algorithms, corporations claim to employ quantitative methods such as A/B testing, alongside qualitative methods such as real user testing and interviews. The most common systems are based on collaborative filtering, which is based on user characteristics and offers content based on what similar profiles have consumed; and content-based filtering, which has the product at the heart of the recommendation. European PSMs insist on differentiating between the procedures for generating suggestions in VoD platforms and in news apps, where they stress the need to return to a journalistic emphasis.

Striking is the case of *YLE*, with its intelligent assistant for the *Voitto* news app, which recommends content directly to the user's lock screen if the user allows it. Multimodal audio, video and text recommendations are a growing trend that corporations have not yet mastered but which is identified in their roadmap for the coming years.

On user consent on notifications, data usage and other actions that may infringe on user privacy, there is considerable interest from PSMs. In addition, there is concern about the attitude of part of their audience, who are indifferent to sharing their personal information with any type of platform. In this regard, the importance of maintaining ethics and transparency in the recommendations is emphasised. Specifically, the *YLE* publishes several annual reports in which it explains exactly how it uses data, the type of data it collects and the benefits that these systems bring to users.

In terms of current regulations, corporations agree that they are not pressured by their respective governments, but that they follow the guidelines carefully. At the European level, they highlight the *General Data Protection Regulation* (*GDPR*), whose reinterpretation recently forced a change in the functioning of cookie-based systems and led the affected corporations to look for alternatives in subscription portals and log in formulas.

3.2. Concept, construction, and implementation of the public service algorithm

VoD services offered by European PSMs are gaining relevance by leaps and bounds. Even so, as *ZDF* points out, in their case, they are suffering significant losses in linear services that are not compensated by the *Mediathek* (online services). This decline is mainly among young audiences, so it is essential to renew services to capture their attention. One issue on which there is no unanimity among corporations is their position on third party platforms such as *YouTube* or *Facebook* to distribute their content.

On these social media, *SVT* Sweden limits itself to reporting on its programmes and maintaining an ongoing dialogue with the audience. They choose to publish products only on their own sites, want to have full control of their signals and shy away from any payment schemes that may arise in these spaces. However, other broadcasters do not hesitate to upload their pieces to these platforms as they understand that part of their users browse them, which they see as a strategic opportunity.

> (JL/*SVT*) "One of our decisions is not to publish full content on *YouTube* or *Facebook*. We use third platforms to report on programmes and dialogue with young audiences. We have to be free and free for all, if you have to pay for a *YouTube* subscription to watch us without ads, we are no longer fulfilling that. We also want to be 100 percent in control of our signals and publishing."
>
> (LV/*RTBF*) "We made the decision to be on *YouTube*, *Facebook* or *Instagram*. We have a mission to bring public service values to all citizens, so we must have a presence on *YouTube* to bring information to young people. We want to be relevant in the future."

Corporations agree that the PSM algorithm is necessary to appropriately target content to the population. The media have an offer that is impossible to concentrate on their homepage, so they need to incorporate the recommendations for a satisfactory user experience. Moreover, the audience is routinely adapting to this new presentation of individualised content, so that rather than a differential value, it has already become an indispensable requirement.

The *EBU* points to the complexity of "estimating what news is important to people." In the exceptional context of the coronavirus, there was a central event that was newsworthy on a global scale, but in everyday life there is not usually news that is relevant for everyone.

> The most common systems are based on collaborative filtering, which is based on user characteristics, and content-based filtering, which has the product at the heart of the recommendation

(RA/*ZDF*) "The idea of personalisation in PSM is to target content. We have a lot of content, it is impossible to put everything on the front page and we have to offer a better user experience. Users have *Netflix* and *Amazon* accounts, they are getting used to this kind of content presentation, we have to react."

To build this public service algorithmic recommendation system, it must be as unbiased as possible so that it improves accessibility issues and allows corporations to reach those populations they do not usually find. *SVT* uses the algorithm to assist publishers. They explain that it should reflect "all parts of the country, the diversity of geography and perspectives." Meanwhile, *DR* is working on a new service that allows users to create lists of content and then run recommendations based on them.

(JL/*SVT*) "It's hard to know how the public service algorithm manages to offer personalisation without being annoying or creating filter bubbles. We don't operate with it now; we use it to help publishers."

(JF/*DR*) "We have been working on a new proposition, *FlexyBlocks*, where we allow the user to create lists of content. We analyse your decisions and recommend you around it. This is our best guess for using recommendation in a public service."

In the process of creating the PSM algorithm, Bon Van de Velde, head of data and archives at *NPO* and co-director of AI at the *EBU*, points out that the first step is to represent the content input, determine the independent variables and dummies, this is called feature space. Then, the algorithm maps this area, so the input-output set must be quantitative.

The last part includes the evaluation criteria, "whether or not people see this content on recommendation, if they click on it to search for it", where there must be some kind of score to conclude if it works. In the first step, values can be included, and this is where the introduction of the public service fits in.

(BV/*NPO*/*EBU*) 'The utility must be introduced in the first step, where features such as values can be included. This algorithm can only optimise one numerical feature. If you do survey research you know that there are many things that can be put in the numbers, so that's how we represent this public service value."

3.3. Provenance and evaluation of recommendation algorithms in European public broadcasters

European public broadcasters have not followed the same roadmap when building or acquiring their algorithmic recommender systems. In the cases of *YLE*, *VRT*, *RTBF*, *NPO* or *SVT*, they develop their own concepts and core technologies, although they combine them with resources from suppliers to finalise their operation. *YLE* says that in selecting these one-off collaborations, they choose the company carefully, in the same way they would a worker, as they need them to understand the fundamentals of delivering on their mission and values. The *BBC* is looking at and working on migrating from third-party systems to in-house solutions, as they need better "control, understanding and transparency."

(JK/*YLE*) "In all our systems we combine resources, but the concept and the basic principles all come from in-house, we need to understand the systems thoroughly, it's how they really work. There are always two things we try to do: to deliver and respect our values, mission, and objectives; and to carefully select our technology partners so that they do so as well."

(JA/*BBC*) "Our top innovation priority is algorithm-driven recommendation engines. We want to build them all in-house and move away from third-party systems, we are in that transition to have better control, understanding and improve transparency."

Other corporations such as *RAI* decided to go directly to suppliers that provide a solution that only needs to be customised. The Italian organisation did not go as far as to develop a build strategy, as they needed to have the technology immediately and did not want to spend "human resources, time or money" on the development team. The RD explains that many of his colleagues at PSM think that off-the-shelf solutions do not work and are difficult to control. Yet, they claim that they have always been successful.

(AM/*RAI*) "We go to suppliers. They basically sell their solution, and you customise it. We decided to do it this way because we wanted to have something ready as soon as possible and not to have to spend human resources, time or money on setting up a development team."

(JF/*DR*) "We used machine learning for personalisation. We created a platform for news where you can customise whatever you want. In conversations with colleagues from other PSMs they think we buy solutions that we cannot control, yet it has worked well for us. The news where the editorial factor is important is sorted by humans, while the rest is sorted by the algorithm."

Corporations such as *RTVE* or France TV complain about the lack of professionals specialised in data or engineering and architecture to be able to create these intelligent solutions. This is why *Radiotelevisión Española* follows the trend

of contracting services through public tenders, as they did at the beginning of 2020 with the *EFE* agency and the company *Narrativa* in the area of automatic news creation.

> VoD services offered by European MSPs are gaining in importance by leaps and bounds, but sometimes this increase does not cover the losses suffered in linear services

Regarding *France TV*, they are working with startups and are starting to hire staff with more technological profiles. They are in the strategic design phase, cleaning their data to optimise results and deciding what kind of algorithm they want for their system. Another alternative way of working is the one followed by *ZDF*, which takes advantage of synergies in its relationship with other corporations or with specialists from universities.

> (DC/*RTVE*) "We don't have a team of engineers to design the algorithms, our profiles are what they are. We do not have a data analyst to make user profiles for us. As we have done with *EFE* and *Narrativa* with respect to news, the trend is for this service to be contracted through a public tender."
>
> (RA/*ZDF*) "We have some internal knowledge. But we do not know enough to create the algorithm completely in-house. We are partnering. We have a good network formed by other European PSMs, specialised people from universities and with commercial companies through public offerings."

Corporations such as *RTS* or *BR* use the customisation engine offered by the *EBU* to all public broadcasters, the *Peach* project. However, in the particular experience of the Swiss broadcaster, they are not fully satisfied with the results and are trying to define a new alternative.

For them, the most important thing is "the overall experience, perception, quality and relevance of the experience", which they will try to improve in relation to the results obtained with the *EBU* technology. The *ARD*'s *BR* created its own system from this project, which is still operational and is not the same as the one used in the central corporation.

> (LB/*RTS*/*EBU*) "We are part of the *Peach* project. It is a customisation engine for all *EBU* projects. We are not completely satisfied with it, so we are taking another route now that offers more individualised results."
>
> (JB/*BR*/*ARD*) "In *BR* we now have our own recommendation system that we built within the *EBU Peach* project. We still have it implemented today."

To assess the correct functioning of the recommendation algorithms, the PSMs use both quantitative and qualitative methods. Regarding the former, they are doing A/B testing, which consists of running different alternatives for the same use and measuring the results. On the qualitative level, the *YLE* conducts "real user tests and interviews" to get feedback and improve the system based on the information collected.

An important question is the opinion of corporations on their preference to include editorial decisions in the algorithm or, on the contrary, to teach the algorithm to make editorial decisions. The conclusion is that these are complementary options that are being implemented jointly by European public broadcasters.

> (RA/*ZDF*) "You have to train the algorithm to make editorial decisions and include these decisions in the algorithm. You really need to do the training at the machine level. Feed it data that is given in a public service context. And then, as with any recommender system, you need to interpret the results. This is human work."
>
> (MM/*VRT*) "As a researcher I would say we want to explore including editorial decisions in the algorithm and teaching the algorithm to make editorial decisions. Still, I think we will be more successful if we create a hybrid approach where you feed the recommender system, but of course you give more personalisation of the recommender system to the user."

3.4. Description of the functioning of the recommendation systems of European PSMs

The recommender systems implemented by European PSMs have different strategic origins. One of them is technologies based on collaborative filtering, in which contributors (users) are analysed to establish profiles and recommend products based on the similarity between these profiles. These are the most common and understand that if one user 'x' is interested in 'x' content, another with similar behaviour will also like it.

On the other hand, there are systems that are based on content and that implement recommendations based on content. Below are two tables of results from the interviews carried out, in which each corporation is listed with a brief description of the recommendation system it applies. In the first table, broadcasters with a provider algorithm are grouped together, while in the second one, media with home-made systems or from collaborative solutions are grouped together.

> European public broadcasters have not followed the same roadmap when building or acquiring their algorithmic recommender systems

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Table 3. Description of the recommendation system of corporations with supplier algorithms

Corporation	Recommender system (purchased)	Source
RAI	Content-based filtering. Mix between editorial packaging and automatic recommendation. Editorial line still takes precedence.	3rd party
RTVE	Collaborative filtering. Algorithm that is fed by the information provided by the user through the subscription portal.	3rd party
France TV	Recommendation by algorithm built by startup.	3rd party
BBC	Multimodal audio, video, and text recommendations through algorithms. They work to provide a "universal recommendation."	Currently third-party algorithm, but they intend to switch to home production.
DR	Content curation. They mainly make recommendations with algorithms, but also include editorial decisions on news stories.	3rd party
	They bought analytics systems for the streaming platform; about news, they bought in the company *Cxense*. Their service does not require registration, it is powered by cookies.	
	FlexyBlocks: new personalisation proposal, the user creates lists from which they select the most relevant content for each moment.	
RTÉ	Recommendation algorithms together with editorial decisions, no personalisation. They do not have mandatory registration in VoD, an element of personalisation "which is not meaningful" acts on users accessing the log in.	3rd party

Table 4. Description of the recommendation system of the corporations with a home-made algorithm or from common solutions

Corporation	Recommender system (in-house or collaborative)	Source
VRT	Collaborative filtering, content curation	In-house
RTBF	Collaborative filtering and content-based filtering. Mix between "home-made PSM algorithm" and editorial decisions.	In-house
SVT	Collaborative filtering, filtered playlists. Editorial decisions assisted by a simple home-made algorithm fed by cookies/user IP number. No log in.	In-house
NPO	Content-based filtering. They use several simple algorithms for personalisation. Work with educational research institutes. They have subscription on the VoD platform.	In-house
RTS	They are part of the *EBU*'s *Peach* project.	*Peach* project (*EBU*)
YLE	Different recommendation methods. Both in VoD and in their news system they use algorithms.	They combine resources, but the concept and ideas come from their in-house team.
	In the news, they use their *Voitto* intelligent assistant. This offers personalisation from the mobile screen based on interests and location. Editorial decisions overwrite the algorithm, they are above it.	
	The streaming service acts differently, with more weight given to the user's story and the action of the algorithm. Even so, they want to give diversity to the recommendations.	
BR/ARD	At *BR* they use a shared system through the *Peach* project of the *EBU*. In the *ARD* they use their own independent system.	*Peach* project (*EBU*)
ZDF	Mix between algorithm recommendation and editorial decisions. The algorithm analyses users and collects information about them, but it is humans who interpret.	They have some in-house expertise, but mainly draw on partnerships with other entities.

Corporations differentiate between the processes of building recommendations for VoD platforms and those for news apps. The former follows a similar pattern to companies like *Netflix* or *Amazon* where personalisation is completed based on the IP number, while news pieces have higher production rates and the procedure is different. PSMs avoid mixing suggestions for one and the other space.

> (JL/*SVT*) "It is important to differentiate between recommendation in the VoD service, which is very similar to *Netflix*, and news. News has much higher production rates, thousands of stories are created. In VoD services we personalise through the IP number, we try to do that as much as we can without going over that integrity threshold. That is done transparently, and the user can decide to turn it off if they want to."
>
> (LV/*RTBF*) "The recommendations we make on the player are not breaking news, that's what we have our news site for. They are usually about new fiction that we co-produce and we want them to gain relevance. If you look at our platform, it is less about breaking news than entertainment content.

Relevant to the study of personalisation processes in news apps is the analysis of *YLE*'s platform. The Finnish broadcaster uses "different algorithmic systems for both VoD recommendation and news piece services." There are two use cases

that act completely differently. On the news side, they stress the importance of returning to the journalistic emphasis. Users can use the app without personalisation or with the use of their *Voitto* smart assistant, which delivers two different types of notifications directly to the locked screen: some based on location and some based on their interests.

> (JK/*YLE*) "We are very human-centred, so the user can always decide the level of personalisation. At the end of the day there must be a really big story for the newsroom to think it's so important that as many people as possible should know about it. That overwrites the algorithm. So, we're focused on making sure that these journalistic principles are also built into the core of our algorithmic recommendation engine."

PSMs aim to "open the minds" of users with their recommendations. Filter bubbles are one of the cornerstone problems of public service media, which is why they should focus their efforts on implementing systems that advocate diversity and plurality of content. This is also one of the premises of the public service algorithm. However, this is not about recommending content that is totally opposed to the user's interests, but about doing so in a gradual, logistically sensitive way, and with results that allow the audience to reach relevant content that they would not go to in their usual behavioural patterns.

> (LV/*RTBF*) "On the VoD platform we have a recommendation engine that was built in-house, we created it to establish an algorithm that we call the PSM algorithm. The goal was to generate a filter that didn't do the bubble effect."
>
> (BV/*NPO*) "You shouldn't recommend the opposite of what people are seeing because people are not interested in that, so you have to do it very gradually. But if you come up with something that is not in their normal viewing pattern, you still get a little bit of additional diversity."

Not all corporations include user registration procedures in their systems. In the case of *SVT* they decided to dispense with log in, as they understand that public services should not monitor audiences, so they focus exclusively on cookies to build recommendations. The misuse that *Facebook* and other large companies make of these logs is what makes people believe that they are a threat, when in the opinion of the Swedish public broadcaster this should not be the case. At *RTÉ*, the service offered after registration is improved, although it is not a mandatory requirement for using the platform. *YLE* even personalises the cover images of content that users see on its streaming site.

> (JK/*YLE*) "We are experimenting with the automatic creation of images that are used in recommendation systems. For example, in our audio-visual services or in our streaming service we are using different images for different people when we recommend audio-visual content."

European PSMs are already working on the next generation of recommendations, multimodal recommendations, which combine text, audio, and video. The *BBC* calls them "universal" and says there is still "a long way to go" to master them, but they understand that they will be of great value to users. For their part, the *DR* says they have seen poor results in their attempts, but they are not giving up on trying in the future. They point out that their metadata structure does not work correctly for all types of content, so they will have to work on them to polish this new form of recommendation.

> (JF/*DR*) "We couldn't get our multimodal recommendations to work. It was like telling the user to read your economists' magazine, then watch an episode of *Peppa Pig* and then listen to a podcast. We couldn't make it work, but we haven't given up on it."
>
> (JA/*BBC*) "The future is in universal recommendations, in multimodal, multi-modal, audio, video and text recommendation experiences. We still have a long way to go, we're still pretty much driven by editorial value and manual curation."

4. Conclusions

The role of public media has historically occupied a special position in the media landscape, since in exchange for public funding they have had the arduous task of contributing to social inclusion and cohesion, of reinforcing local culture, and of fostering democratic processes with plural and diverse content (**Sørensen**, 2019).

Recommender systems have established themselves in this sense as a fundamental tool for individualising attention to each user, providing them with content that best suits their tastes and interests. Even so, the socio-political contexts of each country make it impossible to establish a common model for all of them, even though, in order to comply with the premise of offering each viewer what they need, all public media must guarantee the principles of diversity of exposure and surprise in their proposals (**Fields**; **Jones**; **Cowlishaw**, 2018).

In the case of European public broadcasters, corporations agree that their linear services will be maintained in the future, but insist on the growing relative weight of VoD platforms and digital news applications. They also insist on the need to implement effective recommendation systems to offer viewers the content they want, without producing the isolation of filter bubbles. It will be interesting to monitor the coming years to identify whether this upward forecast is consolidated in the next media stage, and whether the recommendation systems of public media will definitely manage to broaden the field of vision of society without incurring in the isolation typical of private operators' recommenders.

> "Corporations agree that the PSM algorithm is necessary to appropriately target content to the population"

In this study, corporations from the three media models described by **Hallin** and **Mancini** (2004) have been analysed, without obtaining coinciding results between corporations belonging to the same blocks, so it is concluded that their particular characteristics do not affect the approach, construction and implementation of their recommendation systems. The main results collected from the research questions formulated at the beginning of this research are presented in Table 5 below.

> "Corporations differentiate between the processes of building recommendations for VoD platforms and those for news apps"

Table 5. Results obtained for each research question in this study

Research question	Results of the study
Q1. What is the perception and intention of corporations in relation to these algorithmic recommender systems?	They see them as a prerequisite for optimising the user experience and offering an individualised and tailored service.
	They seek differentiation from private operators' systems.
	They intend to establish recommendations with different guidelines on their VoD platforms and news sites.
	They maintain a rigorous control of GDPR compliance.
Q2. What is the concept of the public service algorithm, and what is the procedure proposed by the corporations for its construction and implementation?	Algorithm integrating traditional public media values.
	Necessary to appropriately target content to the population.
	It should be a pluralistic algorithm reflecting all parts of the country of origin, geographical diversity, and diversity of perspectives.
	The utility values must be represented by numerical codes in order to enter them in the construction of the system.
	It is essential to establish valid evaluation criteria that analyse their functioning from the outset.
Q3. Do the recommendation systems used by these broadcasters come from external companies, collaborative projects, or are they developed by their own internal teams?	There is no unanimity on the origin of the systems. Most often they are purchased from third parties.
	The *EBU*'s *Peach* project is the most widely used collaborative solution.
	The lack of specialised data or computer engineering professionals in corporate teams hampers home-grown developments.
	The long development times and cost also motivate corporations to turn in the first instance to off-the-shelf solutions to adapt them to their infrastructures.
	Corporations are putting a lot of effort into cleaning and organising their metadata, as it is the central input to the recommendation.
Q4. How is content recommendation executed in each of the systems of the corporations studied?	Collaborative filtering is the most used method, although content-based recommendations are also common.
	The system employed (collaborative or content-based) is always supported by the editorial decisions of the professionals involved.
	Avoiding filter bubbles is one of the main objectives of broadcasters.
	Multimodal recommendations (text, audio and video) mark the new line of work of these corporations.

The PSM's efforts to translate its traditional values into numerical scoring codes to be introduced in the creation phases of the systems will form the basis of the public service algorithm models that will begin to be implemented in these corporations. For this reason, the testing of these solutions to check their validity and effectiveness, in comparison with the results obtained from commercial proposals, is consolidated as a line of study. It will also be interesting to monitor whether these media decide to hire more professionals with technological profiles to dedicate themselves to these processes internally, or whether they will continue to rely on external companies for most of the tasks.

As the most promising initiative, multimodal text, audio, and video recommendations represent a new dimension in the task of personalisation, understanding the particular situation of each user at the specific moment when the viewer requests content, in order to offer the piece that is most needed at that moment. This is why the most technologically advanced corporations will be the first to polish and establish these solutions on a permanent basis, which will guide the rest of the operators to propose a model that is expected to be the protagonist in the coming years.

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Innovation analysis of national scale public media in the Iberian Peninsula: strategic, technological and youth audience engagement vision in RTVE and RTP.

Radiografía de innovación de los medios públicos de escala nacional de la península Ibérica: visión estratégica, tecnológica, y de captación de audiencias jóvenes en RTVE y RTP.

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This article is part of the activities of the project "Public audiovisual media in the face of the platform ecosystem: management models and evaluation of the public value of reference for Spain" (PID2021-122386OB-I00), funded by the Ministry of Science and Innovation (Micin, Spain), Agencia Estatal de Investigación (AEI, Spain), and European Regional Development Fund (EU). In addition to being integrated in the activities of the 'RTVE-USC Chair on Public Service Media in Europe'.

How to reference this article / Standard reference.

Fieiras Ceide, C., Túñez López, M., & Pedro Sousa, J. (2023). Innovation analysis of national scale public media in the Iberian Peninsula: strategic, technological and youth audience engagement vision in RTVE and RTP. *Revista Latina de Comunicación Social*, 81, 353-374. https://www.doi.org/10.4185/RLCS-2023-1957

ABSTRACT

Introduction: The multiplication on the offer of current news and audiovisual entertainment content in the renewed digital context, motivates public and broadcasting corporations to implement and internalise innovative processes that allow them to be relevant in people's lives. These processes are not only limited to the development and integration of sophisticated technological prototypes, but are closely linked to a philosophy of constant change and renewal of ideas and ways of thinking. This research project offers a complete deep insights of the innovative proposals of the state-owned public service media from the Iberian Peninsula, Radiotelevisión Española and Rádio e Televisão de Portugal, with a particular focus on the strategic, technological and young audience engagement prism. **Methodology:** In-depth interviews were conducted with the directors of the innovation and technology departments of the corporations, as well as with the heads of their main youth content projects, PlayZ and RTP Arena, respectively, complemented by a review of the online products and social networks of both groups. **Results:** It was identified that RTVE's proposal has a greater disruptive component, with initiatives aimed at optimising the user's experience, mobile first or technologies such as AI, 5G or 4K; while RTP's approach has a greater cultural cut, trying to renew the language and routines of creation of its traditional and native contents. **Conclusions:** The innovation strategies of both corporations start from a central objective of updating, with cautious approaches to new technologies. The recent creation of a bubble department in RTP contrasts with the reality of RTVE, with the intention of blurring the limits of this section in its structure in order to achieve a fully transversal innovation.

Keywords: Innovation; Media; Public service media; Public broadcasters; Technology; Strategy; Young audiences; RTVE; RTP.

RESUMEN

Introducción: La multiplicación de la oferta de contenidos audiovisuales de actualidad y entretenimiento en el renovado contexto digital motiva a las corporaciones de radiotelevisión pública a ejecutar e interiorizar procesos innovadores que les permitan ser relevantes en la vida de las personas. Estos procesos no solo se limitan al desarrollo e integración de sofisticados prototipos tecnológicos, sino que se vinculan estrechamente con una filosofía de cambio constante y renovación de ideas y formas de pensar. En este proyecto de investigación se ofrece una radiografía completa de las propuestas innovadoras de los medios de servicio público nacionales de la península ibérica, Radiotelevisión Española y Rádio e Televisão de Portugal, con un enfoque particular en el prisma estratégico, tecnológico y de captación de nuevas audiencias. **Metodología:** Para ello se realizan entrevistas en profundidad a los directores de los departamentos de innovación y tecnología de las corporaciones, así como a los responsables de sus principales proyectos de contenidos juveniles, PlayZ y RTP Arena, respectivamente, lo que se complementa con una revisión de los productos online y redes sociales de ambos grupos. **Resultados:** Se identifica que la propuesta de RTVE tiene un mayor componente disruptivo, con iniciativas destinadas a optimizar la experiencia de usuario, el *mobile first* o tecnologías como la IA, 5G o 4K; mientras que el enfoque de la RTP tiene un mayor corte cultural, tratando de renovar el lenguaje y rutinas de creación de sus contenidos tradicionales y nativos. **Conclusiones:** Las estrategias de innovación de ambas corporaciones parten de un objetivo central de actualización, con cautelosas aproximaciones a las nuevas tecnologías. La reciente creación de un departamento burbuja en la RTP se contrapone a la realidad de RTVE, con la intención de difuminar los límites de esta sección en su estructura para alcanzar una innovación plenamente transversal.

Palabras clave: Innovación; Medios de comunicación; *Public service media*; Radiotelevisiones públicas; Tecnología; Estrategia; Audiencias jóvenes; RTVE; RTP.

USC UNIVERSIDADE DE SANTIAGO DE COMPOSTELA

1. Introduction

European public service media have undergone significant changes in recent years due to social and technological transformations in their respective regions, as well as the global media environment.

These changes in regulation, governance, financing, and the implementation of new technologies (Tambini, 2015; Khajeheian and Tadayoni, 2016; Van den Bulck et al., 2017) respond to a need for corporations to adapt to communicative demands of a digital society (Van den Bulck et al., 2017) and can be framed in the context of the debate on updating public service values and fulfilling their commitments to society.

The European Broadcasting Union (EBU) also considered, internalized and structured these transformations. With its 73 members in 53 countries, the EBU agreed at its General Assembly on the six fundamental values that public broadcasting entities must have in order to fulfill their commitment to public service: universality, independence, excellence, diversity, responsibility and innovation (EBU, 2014), becoming the reference attributes that today mark the roadmap of these radio-television companies..

Strategic innovation in traditional media has often been limited to the mere adoption of new technologies, without truly identifying opportunities for substantial changes to their business model (Mitchelstein and Boczkowski, 2009; Ostertag and Tuchman, 2012; Schmitz and Domingo, 2010; Spyridou et al., 2012). Economist Schumpeter (1975) was the first to explore the concept of innovation as a fundamental factor for companies. Meanwhile, Fagerberg (2003) notes that innovation affects both "technology and the organization of production processes," thus it can manifest in both the product itself and its preparation.

To renew and update public media, a combination of public service, creativity, innovation, and interaction will be essential (Glowacki and Jackson, 2013), along with relevant experiences that have emotional impact for educational and public content. As for information, the goal is to preserve journalism in terms of diversity and quality (Ferrell-Lowe and Stavitsky, 2016).

Social networks have become a fundamental space for establishing conversations between European public service media and their audiences. All European corporations have a presence on these platforms with multiple profiles and a large number of followers, demonstrating that these broadcasters understand the importance of these tools in fostering a stable dialogue with their users (López-Golán et al., 2019). Through this close relationship, media can learn from the concerns and preferences of their audiences and approach the typical scenarios of young users to offer more personalized and relevant services to them.

European public broadcasters must prioritize innovation to trigger an evolution of their corporate culture, renew their content production and distribution processes, business communication, and recapture young audiences who have turned to privately-owned digital communication offerings (Ranaivoson et al., 2013). Despite financial, structural, and political challenges, these media outlets are seeking to respond to the impact and emergence of new technologies and platforms through strategic innovation. They seek greater interaction and forms of social conversation, particularly with young audiences who are farthest from the content grid of public broadcasters (López-Golán et al., 2019).

The public service media face a situation in which the majority of adolescents use their mobile phones as their usual device, consume information and the main news through publications on social networks (Reuters Institute, 2016) and in which these audiences go to digital platforms to satisfy their intermittent and short periods of entertainment time.

Received: 19/12/2022. **Accepted:** 30/01/2023. **Published:** 17/04/2023.

"In the realm of technological innovation, public broadcasters are increasingly adopting solutions based on Artificial Intelligence (AI) prototypes, Ultra High Definition (4K) video, and virtual reality technologies. RTVE was one of the pioneering broadcasters in Europe to produce a television program in 4K.In 2013, the channel collaborated with the EBU, Sony, and production companies Apuntolapospo and Ovide to create a short film about Barcelona (RTVE, 2013).Later, in 2017, the channel broadcast the first live event in 4K - the changing of the Royal Guard at the Royal Palace of Madrid (RTVE, 2017).

Currently, Radiotelevisión Española is increasingly incorporating this technology into its production and broadcasting, as demonstrated by the standardization of documentaries in 4K and the free-to-air UHK-4K broadcast of the World Cup in Qatar (RTVE, 2022). RTP started broadcasting in Ultra High Definition in June 2018 for the World Cup in Russia, during which a total of 28 matches were broadcast. However, this was a one-time initiative in the Portuguese case and has not been continued since (Real et al., 2020).

Regarding artificial intelligence, the European Commission recommended in its 2020 White Paper on AI that member states review their national plans on the matter by the end of that year (p. 6). In line with this recommendation, Spain launched its National Strategy on Artificial Intelligence (ENIA) in November 2020, which aims to provide "a framework for the development of inclusive, sustainable, and citizen-focused AI." Similarly, the Portuguese Government presented its own strategy in 2019, which seeks to "mobilize citizens towards the construction of intensive knowledge with a strong community of cutting-edge companies." (European Commission, 2020; Portugal, 2019; Spain, 2020).

According to the Global Artificial Intelligence Index, compiled by Tortoise Media (2022), which analyzes various parameters related to artificial intelligence, such as talent, infrastructure, operational environment, research and development, government strategy, and commercial viability, Spain is ranked 21st globally. The United States occupies the first place in the ranking, while Spain's government strategy is considered the fourth best in the world. Portugal, on the other hand, is positioned at number 35 on the scale (Figure 1).aunque esta personalización en los medios de servicio público debe atender a objetivos diferentes que los de las operadoras comerciales (López-Golán *et al*, 2019).

Figure 1: *Position of Spain and Portugal in Tortoise Media's Global AI Ranking (2022).*

Source: Author's own work.

European public broadcasters prioritize the establishment of stable communities of followers that generate valuable interactions by providing relevant services such as creating playlists, marking content, and enabling downloads. This connection also provides the broadcasters with the necessary data to establish algorithmic recommender systems, which offers new possibilities in terms of content management. However, personalization in public service media must meet different objectives than those of commercial operators (López-Golán et al., 2019).

The strategic and technological innovation priorities of each broadcasting company are significantly influenced by their own historical background and the prevailing political and social circumstances in their respective countries. In the case of RTVE, the company is facing a profound crisis of reputation and audience loss, which has led to a questioning of its credibility by its followers (Costa-Sánchez, 2018). This situation is mainly fueled by a debate regarding its independence from political power (Villafane et al., 2020). On the other hand, RTP faces limitations in the digitization of its proposals and the testing of its tools due to the country's culture, which is closely linked to traditional channels and a historical interest in local news and Portuguese musical entertainment content (Ortiz and Lopez, 2012).

While it is possible to identify common ideas and practices among all European public service media, it is essential to conduct an individual analysis of their activities and structures to gain a precise understanding of their motivations, goals, and innovative approaches. The purpose of this study, as outlined in section 2, is to conduct a detailed comparison of the innovative activities of Radiotelevisión Española and Rádio e Televisão de Portugal. Through this analysis, we aim to gain insights into their distinct approaches and strategies related to innovation.

2. Methodology and Objectives

This article aims to critically review and compare the innovation strategies of two major national public broadcasters, namely Radiotelevisión Española (RTVE) and Rádio e Televisão de Portugal (RTP), based on their respective strategic visions, technological proposals, and plans to attract young audiences. In order to achieve this goal, the study aims to define a clear strategy and identify a set of priorities for each of these key areas. As such, the research objectives are as follows:

Objective 1: Conduct an analysis and establish a comprehensive list of the strategic innovation priorities for both corporations.

Objective 2: Investigate the primary technological initiatives currently in progress and identify future intentions concerning digitization and emerging technologies.

Objective 3: Examine their plans/strategies to attract new audiences and increase relevance to them.

The research is proposed in an exploratory and descriptive manner with a null hypothesis. In-depth qualitative interviews were conducted with the directors of strategic and technological innovation, as well as with the individuals in charge of the primary project aimed at attracting young audiences in each of the companies: Playz for RTVE and the RTP Arena esports platform for Portuguese television. The Delphi method was used in two rounds. The final panel of six interviewees is specified in Table 1:

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Table 1. *Intentional convenience sample.*

Abbreviation	Name	Corporation	Position
(GM/RTP)	Gonzalo Madail	RTP	Innovation manager
(CB/RTP)	Carlos Barrocas	RTP	Technology Directorate
(DR/RTP)	Daniel Rodrigues	RTP/RTP Arena	RTP Arena Director
(UG/RTVE)	Urbano García	RTVE	Director de Innovación y Digital
(PV/RTVE)	Pere Vila	RTVE	Director of Technology, Innovation and Systems
(PA/RTVE)	Patricia Alonso	RTVE/PlayZ	PlayZ Executive Producer

Source: Author's own work.

The video meetings were conducted between September 15 and November 20, 2022, via video conferencing, with an average duration of 35 minutes. A semi-structured questionnaire was used that included specific questions for each interviewee based on the subject being analyzed (strategy/technology/attraction of young audiences). Nevertheless, the questionnaire also consisted of common blocks such as the innovation priorities in their respective departments, common practices developed, and future challenges and forecasts.

Prior to conducting the interviews, a thorough analysis of the corporate communications and social media publications of the broadcasting corporations was carried out, along with an examination of the digital products that had the greatest impact on their various platforms. This allowed for the development of the questionnaires and the identification of topics of interest for discussion during the meetings. Additionally, an analysis of the PlayZ and RTP Arena channels was conducted, including an evaluation of their usual formats, social media following, distribution channels, and cutting-edge content.

3. Results

The subsequent sections provide a comprehensive description of the innovation strategies of both corporations from the perspectives of strategy, technology, and youth engagement. The results presented in this section are derived from the inputs provided by the responsible personnel of the respective departments of the broadcasters, as well as from the monitoring and analysis of their digital footprints. Additionally, the section also highlights the plans, priorities, and forecasts of the corporations in the short and medium term.

3.1. Analysis of the strategic innovation process in RTVE and RTP

The public service media corporations Radiotelevisión Española and Rádio e Televisão de Portugal have integrated innovative processes transversally into their content creation and distribution proposals. They view innovation as a strategic concept that must be diffused throughout their structures, sections, and actions. This strategic approach to innovation is reflected in the constant updating of work routines, structures, and ideas to remain relevant to their audiences in an ever-changing, highly competitive, and unpredictable context.

The following Table 2 specifies the priorities for strategic innovation of both corporations, which are subsequently explored individually.

Received: 19/12/2022. **Accepted:** 30/01/2023. **Published:** 17/04/2023.

Table 2. *Strategic innovation priorities in RTVE.*

Strategic innovation priorities in RTVE	
Radiotelevisión Española	They differentiate two perspectives: existential innovation and ordinary innovation.
	Priority: optimizing the user experience, innovating in storytelling, mobile First approach.
	Independence from political power, reverse crisis of reputation and credibility.
	Innovation path aimed at establishing an innovative and fully transversal ecosystem.
	Three innovative structures: Innovation Center, Innovation Lab and New Media Section.
Rádio e Televisão de Portugal	Priorities: development of new formats and production routines.
	Recent creation of an innovation bubble department.
	Renewal of the language of the television channel, renew the presenters, and strategic revolution led by an active presence in social networks.

Source: Author's own work.

3.1.1. Strategic and conceptual innovation at RTVE

In the case of *Radiotelevisión Española*, their strategic innovation proposal is divided into two perspectives: an existential one, focused on defining their role and position in the new content creator ecosystem; and what they call ordinary innovation, which includes a set of tools and actions aimed at modernizing and digitizing processes and structures.

As a strategic priority, *Radiotelevisión Española* focuses on optimizing the user experience and innovating in content creation and storytelling, with special attention given to the mobile-first approach, as the smartphone is the most commonly used device by its audience. Independence from political power, credibility, and competition with private media are also key issues that contribute to gaining relevance among its audience by offering them "not only what they want, but also what they need."

The Director of Innovation at RTVE, Urbano García, notes that for this broadcasting corporation, innovation means the need for change in order to survive, since their presence in people's lives is not guaranteed in the new digital context, with such a wide range of platforms and content on offer.

> (UG/RTVE): "While in other media, innovation takes the form of a particular tool or technology, in our case, before talking about AI, Metaverse, or virtual reality, we must establish a radical change in our model and determine what type of media we should really be."

At RTVE, they define incremental or structural innovation as a process in which they continue to carry out the same actions, but through new processes; whereas disruptive innovation consists of carrying out “radically different” activities from what they have always done. However, they emphasize that their path towards innovation aims to establish and internalize an innovative and transversal ecosystem within their structure, rather than having an innovation department that acts on the rest of the sections.

> (UG/RTVE): My objective as the head of the department is for my role to become redundant in 4 years, essentially because it would mean that innovation and digitalization have become so embedded within the company that no one will need to oversee them. This is the direction of our innovation efforts.

The corporate culture shift that the corporation envisions will be based on incorporating an innovative gene into the company's ADR (Learn, Unlearn, and Relearn). This will involve placing the user at the center of processes, adopting a product and service mindset, implementing effective leadership, and building strategy based on big data and analytics rather than relying on gut feeling.

At RTVE, there are two types of innovation processes: ascending processes from journalists to managers, and descending processes from managers to communication professionals. To support these processes, RTVE has established three structures: the Innovation Center, which is responsible for building relationships with university chairs, companies, startups, and other external processes. The Innovation Center has the Innova website, which allows employees to propose topics internally. The Innovation Lab is where new narratives, products, and formats are tested. Finally, the New Media section determines their line of action on new platforms such as Twitch and TikTok. These structures aim to incorporate innovation in a transversal way within the company, going beyond having a specific innovation department.

In this corporation, professional profiles that will settle in the short and medium term are expected to have a greater emphasis on soft skills rather than specialization in specific tools or technologies. Adaptability to change, emotional intelligence, versatility, and teamwork will be essential in a constantly evolving context where routines are always at risk of becoming obsolete. These soft skills will be crucial for professionals to keep pace with the latest technological advancements and maintain relevance in the industry.

> (UG/RTVE): A good communicator must be able to fulfill each of the tasks that are presented to him. Before, the work ended when we published a piece of news, now it starts there, we have to maintain a social community based on that and analyze the results.

In regards to the challenges that RTVE expects to face, they aim to cover all communication needs of citizens, including information, education, and entertainment, while also providing a tool for media literacy to help young people learn how to deal with problems related to misinformation and fake news. Additionally, they believe that public media should no longer differentiate between what people need versus what they want, and instead offer a combination of both to reinforce their reputation and value.

3.1.2. Strategic innovation in RTP

At Radio e Televisão de Portugal (RTP), a specific team for audiovisual creativity, new formats, and production models was created in 2015. This innovation department operates independently from the rest of the corporation, and the number of professionals involved has progressively expanded from 10 to around 20 communicators. However, the strategic decision has been made not to continue expanding the innovation lab.

Gonzalo Madail, the head of this department and the director of the RTP Memoria channel, decided to link both spaces to promote broadcasts related to the corporation's archive. This move was prompted by a deficit of equipment, resources, and personnel. They undertook a revolution in which they renewed the production team, and the youngest management of RTP took charge of the oldest channel.

In general terms, RTP has focused on renewing the language of its television channels, providing opportunities to young communicators and content creators, and generating high-quality content adapted to social media platforms, where they plan to actively engage with their audience on a daily basis.

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This line of action involves the way they communicate with their audience, placing special emphasis on aesthetics, graphics, and music, elements that compose dynamic narratives with which they aim to move away from the traditional creation model that defined them. They have rejuvenated this model by incorporating ideas from the new team.

> (GM/RTP): This team operates as a true "bubble" within the company, utilizing some corporate resources but striving to be self-sufficient in order to avoid becoming a production-line factory. This isolated team model has been successful and has even won awards, as it remains unaffected by external processes.

In relation to the development and implementation process of this innovation bubble, Radio e Televisao de Portugal encountered typical difficulties associated with any renewal process. The mentality and culture of the corporation's personnel did not initially conceive the launch of a new, more creative department focused on the qualitative improvement of products, but this changed from the first positive results.

At present, RTP notes an opposite situation in the department, as different workers within the corporation are requesting to join the team en masse, attracted by the production dynamics and initiatives promoted. The management's idea is to allow for new progressive adhesions while maintaining coherence and the bubble's boundaries, covering emerging needs without diluting the innovation lab's focus.

> (GM/RTP): Right now we live in limbo, at the opposite peak, which means that half the company wants to come work on innovation. It is important to always maintain the bubble of this team, although it has already grown, but it has grown very slowly case by case, person by person, because if it gains size it will become a small factory. It is a bit like a gastronomic restaurant, which should not have more than 10 tables. From then on, it will no longer be a boutique, but a factory.

Regarding the professional profiles sought by RTP to join their innovation laboratory, they are looking for journalists who are versatile, possess technological skills and are adaptable to any situation that may arise. Additionally, they emphasize the need for each team member to specialize after passing through various creative and production phases, in order to optimize processes and utilize the full potential of each creator.

3.2. Technological innovation proposals on RTVE and RTP

Both corporations are investing in the progressive digitalization of their infrastructures, while also exploring disruptive technologies such as artificial intelligence, 5G implementation, and ultra-high definition (4K) to improve their offerings. However, their efforts are often limited by cultural barriers within their organizations, as well as their responsibilities as public service media, which may slow down the integration of new technologies to safeguard their interests and traditional values. The following 'Table 3' provides a summary of the technological innovation priorities of RTVE and RTP:

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Table 3. *Technological innovation priorities in RTVE and RTP.*

Technological innovation priorities in RTVE and RTP	
Radiotelevisión Española	Migration and renovation of your IT infrastructures (Information Technology).
	Three processes or pillars of technological innovation: ultra high definition (4K); 5G and permanent audiovisual connectivity; AI.
	AI innovation: simple automatic realization, file metadata, automatic text generation, subtitling, user recognition and conversation personalization, automatic video production, disinformation control, social media monitoring or verification.
Rádio e Televisão de Portugal	Native audio and video broadcast.
	Development of algorithmic personalization. For editorial time.
	Automated content verification.
	Digitization of its structure, tools and productive routines. Optimization of customer service.
	Renewal of work teams towards technological profiles.

Source: Author's own work.

3.2.1. Technological innovation priorities in RTVE

One of the technological innovation priorities of RTVE is the migration and renewal of its IT infrastructures, including software, cameras, computers, and other tools. The corporation has allocated approximately 450 million euros for the replacement of technological support assets, with an estimated completion time of every 10 years, resulting in a 10% annual renewal rate.

Furthermore, three pillars of disruptive innovation in Radiotelevisión Española have been identified in relation to technology. The first of these is ultra-high definition, which involves producing content of the highest quality to ensure that audiences do not associate lower-level productions with the public broadcasting system, and to dispel any perception that 4k resolution is only available on private platforms.

> (PV/RTVE): We won't do a 4K newscast, but we have to do it in a documentary that lasts over time. The scriptwriter costs you the same, and the cameras are already 4K. It is true that the jump to this dimension has a cultural prism, since it implies managing next-generation audio, more creative and artistic possibilities with colors or the adaptation of editing rooms. It is an innovation process that can take years.

The second aspect worked on by the corporation is permanent audiovisual connectivity linked to 5G. RTVE's claim is to keep the cameras connected 24 hours a day to share the material with colleagues remotely and for them to format, prepare and distribute it. With 5G it is possible to send this signal to the cloud from smaller and more powerful backpacks so that the production team can work with it directly. Likewise, it is also an interesting technology to bring content closer to places where the connection was historically limited, and that now it is possible to stabilize.

> (PV/RTVE): There are very interesting mixer models in the cloud. I don't know if it works for a big game at the moment, but it will admit the use of 5/10 inputs, which will greatly reduce production costs compared to a mobile unit. 5G is also interesting for bringing public service content to areas or towns where the FM radio signal did not reach.

Received: 19/12/2022. **Accepted:** 30/01/2023. **Published:** 17/04/2023.

RTVE has been recognized for its advances in 5G technology with the Technology & Innovation Award from the European Broadcasting Union (EBU) in June 2022. The award acknowledges and supports outstanding technical solutions developed by corporations within the organization. The award-winning candidacy, known as 'RTVE-5G and beyond', was presented for the advancements in the new generation of mobile networks for public media. According to Pere Vila, director of Technology, Innovation and Systems at RTVE, this progress "provides more bandwidth, lower latency, more security, and less energy consumption within the framework of this digital transition".

In addition, innovation in AI is the third fundamental pillar of the technological development proposal of Radiotelevisión Española in the production section. AI is used in various ways such as simple automatic production, file metadata, automatic text generation, subtitling, user recognition and conversation personalization, automatic video production, disinformation control, social media monitoring, and verification.

> (PV/RTVE): In the application of AI we must add human control in each process, in the same way that a control is carried out there must be feedback that allows the machine to continue learning and improving. In the same way, the algorithm must learn with the user, get to know him. Not just recommend content, but personalize the conversation and make the experience enjoyable. Let him tell you: “Welcome, do you want to see what happened the other day again, or something similar? Are you still interested?"

Another tool that the corporation is developing is dedicated to voice synthesis linked to an automated locution. After around seven hours of narration by an announcer, the system is capable of capturing and emulating his way of narrating, counting numbers, pauses, breathing rate and tone. They already have active prototypes on RTVE that they intend to progressively incorporate, tools that, based on the data received, write a headline that can be adapted depending on the recipient, a lead, photos, graphics, as well as the subsequent locution, and insertion of cuts with the corresponding edition.

The integration of these applications poses a challenge for RTVE due to the cultural barriers inherent to the organization, even though the purpose of this technology is to streamline the work of related professionals and enhance and specialize coverage, providing customized pieces to different audience groups, and even to individual users.

3.2.2. Technology development in RTP

The technological priorities of Rádio e Televisão de Portugal (RTP) include the optimization and maintenance of its audio and video broadcasts, the development of an algorithmic personalization system to enhance its editorial recommendations, the digitization of its infrastructure, tools, and production workflows, and the recruitment of young professionals with a technological background to strengthen its internal teams responsible for managing and launching various applications.

From a practical standpoint, Rádio e Televisão de Portugal (RTP) envisions innovation in radio broadcasting, which includes the routines of production, realization, and cloud distribution. They aim to conduct all operations within their facilities natively, while maintaining the traditional model of the corporation and the internal culture that characterizes the country's leading public service medium.

Regarding content recommendations, RTP currently lacks a personalization system and an active technique to identify users who visit its platform. They are working on implementing a registration system to personalize different areas while adhering to the values of public communication services, which require offering a selection and linking of content based on impartiality and plurality.

> (CB/RTP): The next phase of multimedia is that the time on the site, everything that is multimedia, will have a personalization and will have indexing tools, personalization, around the user himself.

Radio e Televisao de Portugal believes that the combination of partiality and personalization is the key factor that differentiates public service from other commercial broadcasters. Their goal is to encourage audiences to seek out and receive diverse content, avoiding isolation or filter bubbles caused by algorithms that aim to attract and retain users for as long as possible on their platforms.

> (CB/RTP): On Netflix, for example, I choose a content and all the pieces that are offered to me below are dangerously related. He will never recommend a content that I rejected at first or for which I did not show interest. This isolates the user, makes them view the same story over and over again.

Regarding the use of artificial intelligence, RTP applies it to different self-learning multimedia tools, but not purely from a practical AI perspective. The instruments based on this technology will be placed at the top of the recommendation process for tracking and managing information that comes from the algorithm, outlining an operational and quality operation complemented by automation to increase efficiency.

In the short and medium term, the company hopes to promote actions related to content verification, ensuring veracity and preventing "copy-paste" of information. Additionally, they propose a progressive innovation that affects customer service, such as expanding the website to televisions by embedding a button in the controls that redirects the audience directly to the digital section of RTP.

Regarding the challenges expected from Radio e Televisao de Portugal in the coming years, they anticipate a radical change in roles, where most physical or traditional tasks will become virtual, on the web or in the Cloud. They will gradually shift focus from physical maintenance to software and artificial intelligence.

> (CB/RTP): The change is going to be brutal from a labor point of view. We are going to switch to machine learning tools, software development and customization software to completely abandon what is called electronic technology. Computer technology will lead to a radical change in the profile of people who work in these areas.

Even so, at RTP they are clear that these changes and advancements will be carried out gradually, at a safe pace, and without compromising or disrupting the central values and objectives of the public broadcasting service. Many of these actions will be progressively implemented and subjected to continuous testing and monitoring.

3.3. Strategy to attract young audiences on RTVE and RTP

The progressive aging of the audiences of traditional television channels, in this case RTVE and RTP, motivated corporations to articulate a new way of attracting, attracting and generating value for the youth audience group (18-24), which crystallized in the structure of Radiotelevisión Española in a native digital channel for young content, PlayZ, destined to cover the gap between its children's channel 'Clan' and the rest of the adult content proposals.

In this regard, Rádio e Televisão de Portugal has made a deliberate strategic decision to prioritize electronic sports and has successfully established RTP Arena as the preeminent digital platform in the

country for this genre. Through RTP Arena, the organization disseminates informative and entertaining content related to electronic sports, experiments with co-creative formats in collaboration with their audiences, and has expanded into new frontiers such as Twitch, where they have achieved the highest number of followers in the country.

The origin of these projects, as well as the formats developed, distribution channels, creation routines, work teams, professional profiles, and objectives are analyzed in the following sections and summarized in the following Table 4.

Table 4. *Projects to attract young audiences on RTVE and RTP.*

Projects to attract young audiences on RTVE and RTP	
PlayZ	**RTP Arena**
Year of creation	
2017	2015
Theme	
Youth generalist	Electronic sports
Formats	
Fiction series; debates or focus groups on current affairs; varied factual: science, urban music, comics, etc.; documentaries.	Live streaming of gaming events, comprehensive coverage and transmission of national and international competitions, talk shows, and linear broadcasts dedicated to gaming-related topics constitute the range of offerings provided by the broadcaster.
Distribution channels	
Website dependent on the parent website RTVE Play. Social networks, mainly: Instagram, TikTok, YouTube, Twitch.	RTP Arena website, independent from the corporation's parent website. Networks: Twitch as a reference, small pills on Twitter, Facebook and Instagram. Weekly broadcast on linear TV.
Work Team	
12 full-time people; assistance from colleagues from other sections.	12 full-time people; assistance by colleagues from other sections and freelance at large events.
Professional profiles	
Journalists, audiovisual communicators or publicists with multidisciplinary knowledge, digital natives and with an average age of less than 30 years.	Journalists and audiovisual communicators with knowledge in digital content creation, editing and live broadcasting.

Source: Author's own work.

3.3.1. RTVE digital channel for young content

PlayZ was launched in 2017 by RTVE's digital and content management team in response to the aging audience of traditional television channels. Recognizing that the youth audience segment aged 18-24 was being underserved by the gap between the children's channel 'Clan' and the rest of the broadcaster's offerings, a decision was made to create a dedicated digital channel for this demographic. While successful formats such as the music competition *Operación Triunfo*, which integrated a strong digital strategy, attracted young viewers, they remained disconnected from the broadcaster's traditional programming. PlayZ aimed to address this gap and provide tailored content to the youth audience.

Fiction series are the hallmark of PlayZ, as well as the Gen PlayZ format, oriented towards coverage and debate on current issues for young people, with a youthful and humorous style. Factuals are frequent on the channel (programs based on real events), such as Cam On, the first photography talent show in Spain, others on science, urban music or comics, and documentaries.

At PlayZ they are committed to continuous experimentation in formats, spaces and distribution channels, as well as in audiovisual language and aesthetics. In addition to broadcasting on their website, linked to the RTVE Play parent page, they maintain an active presence on the main social media outlets browsed by their target audience: Instagram (164,000 followers), Twitch (27,700 followers), YouTube (838,000 subscribers) or TikTok (776,000 followers), with progressive growth that has been on the rise since the pandemic.

Patricia Alonso, executive producer of PlayZ, explains that their strong network strategy allows them to be closer to their audience and increase participation rates, with surprising quantitative results as reflected in the growth of their profiles, as well as the qualitative ones, with constant value conversations established from the contents. The learning and feedback originated from these contributions is one of the main values and pillars of RTVE's digital channel for young content.

PlayZ's production strategy is based on the creation of native digital content, betting on interactive transmedia series and productions in vertical format designed to be distributed on Instagram Stories, as in the case of "Circular" (Figure 2). They also have a line focused on urban content, with a close relationship with freestyle or improvised rap, numerous documentaries and current formats, such as the aforementioned Gen de Playz.

Figure 2: *Vertical cover for Instagram Stories from PlayZ's 'Circular' series.*

Source: RTVE.

The work team of this space is made up of 12 professionals dedicated exclusively to the channel, in addition to the participation of colleagues from other sections who actively collaborate, such as the

network team. The PlayZ organization chart is based on the supervision of the content manager of the digital area of RTVE Play, and the contributions of two executive producers, one more dedicated to current events and the other focused on entertainment. The rest of the team is made up of journalists, filmmakers or producers with experience in digital environments and social media.

The professional profiles correspond to young communicators with multidisciplinary knowledge, with an understanding of digital languages and an average age of less than 30 years. These creators come from degrees in Journalism, Audiovisual Communication or Advertising, and combine more journalistic knowledge with other more technical ones such as editing, production or post-production.

> (PA/RTVE): For us, social networks are not a showcase where we sell content, they are distribution spaces that we almost conceive of as channels with their own entity. We create specific content for these channels in vertical format and short duration, which is how our audience consumes it. TikTok is the one that has grown the fastest, it is a very powerful network with unimaginable possibilities.

PlayZ's short and medium-term objectives consist of continuing to resolve and cover the concerns of young audiences, in a modern and innovative way and placing this content in the spaces frequented by this audience segment at all times, being agile in migrations and being attentive to new trends.

> (PA/RTVE): It's not just that we make content for young people, but that they themselves are part of the creation process, both by being on staff and introducing them as sources or as featured artists. We have served as a showcase for new creators who later made the leap to large productions or international brands.

Regarding the results obtained in these first five years of the channel's life, they have received two Ondas Awards, the first in 2019 for their series "Boca Norte" and in 2021 another for the best entertainment content, which was the recognition to the PlayZ path. Another example of success is his series "Si fueras tú", published 4 years ago and which has already accumulated more than 35 million views.

3.3.2. Digital electronic sports platform: RTP Arena

Portugal's public television has directed its efforts towards attracting young audiences through the inclusion of gaming and esports in its programming strategy. To this end, the broadcaster has established a comprehensive 360º platform called RTP Arena, which is dedicated to providing informative coverage of electronic sports, broadcasting national and international live events, and featuring talk show and analysis formats specifically tailored for linear broadcasts.

The content produced by Portugal's public television for its gaming and esports audience is distributed through a dedicated web page, which is independent from its news portal (see Figure 3). Additionally, the broadcaster maintains a strong presence on social media platforms, particularly Twitch, where its RTP Arena CS:GO channel has been the most followed in Portugal for the past three years. As of December 2022, the channel had amassed 209,312 followers. On other social media platforms such as Facebook, Instagram, and Twitter, the broadcaster uses short and engaging content to entice users to visit its dedicated web page.

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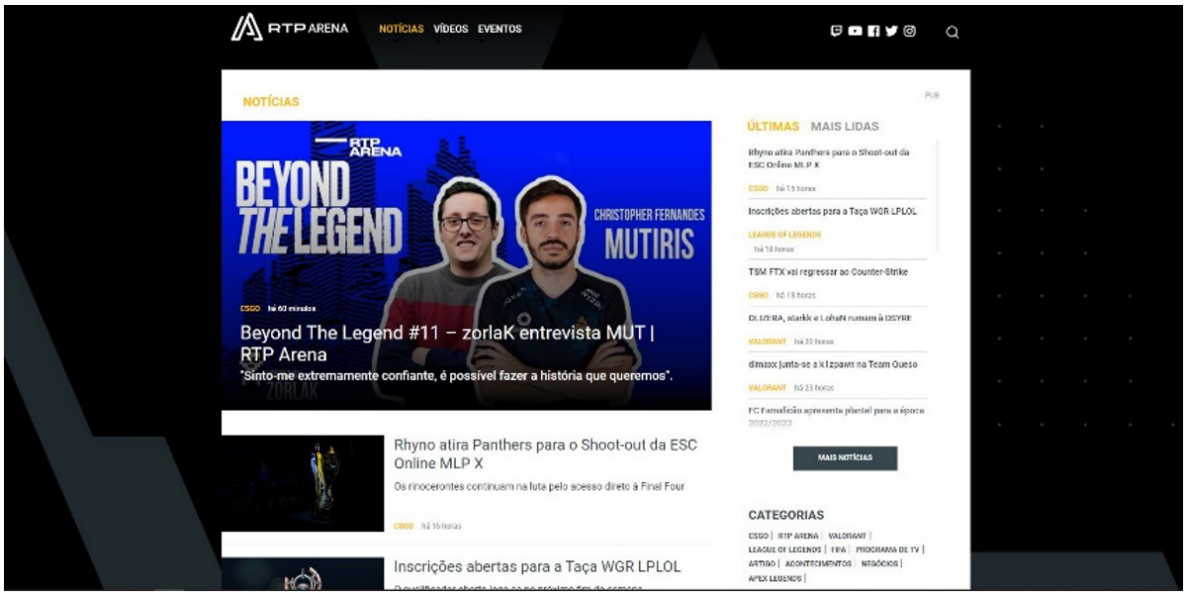
Figure 3: *Home interface of the RTP Arena parent website.*



Source: RTP.

In linear broadcasts, they project a weekly format every Friday during prime time in which they conduct interviews with well-known personalities from the world of cyber sports, as well as specialists who offer value judgments and recommendations for followers of this discipline. With this, they managed to move part of the frequent users of their digital sites to conventional television, an unprecedented success in the corporation.

> (DR/RTP): On traditional television we broadcast 35 times a year, and at powerful schedules on the grid. The show started out as a rundown of the week's top gaming news, but we realized it was too superficial and turned it into a talk show with industry professionals. They give clues to their methodology, and even play live games explaining some tricks.

Figure 4: *Game methodology program at RTP Arena with gaming professionals.*

Source: RTP Arena.

Received: 19/12/2022. **Accepted:** 30/01/2023. **Published:** 17/04/2023.

RTP Arena's primary tool for fostering a community around its various formats is the interaction and active two-way conversation between content creators and consumers. By doing so, they maintain a loyal and stable audience that grows in a structured manner. This audience is drawn to a gaming proposal associated with the values of a public service medium. These values are represented in the diverse selection of video games used, the coverage of local content and competitions, and the promotion of national identity. RTP Arena prioritizes the participation of young local players in its programs to reinforce this identity.

The professionals involved in this project have clear objectives. Their primary focus is to continue to be a reference platform in the country's esports ecosystem while also expanding their presence internationally. Their medium-term goal is to become a space where users from all over the world can come to watch the broadcast and organization of major events and competitions.

> (DR/RTP): As project coordinator I try to give as many opportunities as possible to all creators, as well as options for making decisions and contributing ideas. We do not want this project to be an isolated initiative, we want it to continue to grow, with more and more content, and of higher quality, to create a powerful community. The forecast for the coming years is optimistic, we want to be a platform where the competitions want to be broadcast.

The work team responsible for this platform consists of 12 dedicated professionals who focus entirely on the project. They occasionally collaborate with colleagues from the sports, audiovisual, or technology departments, and hire freelancers to cover major events. The team operates under a horizontal hierarchy, with coordination provided by Daniel Rodríguez, who serves as both the person in charge of RTP Arena and the product manager.

4. Discussion and Conclusions

The political, budgetary and technological pressures to which European public media have been exposed since the first decade of this century (Iosifidis, 2010), as well as other pressures triggered by the loss of audience, the need to innovate, or editorial independence (Bonini and Pais, 2017), makes the exploration of strategic innovation policies, and the analysis of the fit of technologies in the current media context, a necessary task to project the value of public service media into the future.

On the preceding pages, a descriptive analysis was conducted of the innovation proposals put forward by the national public broadcasting entities of the Iberian Peninsula, RTVE and RTP. The analysis covered three main sections: strategy, technology, and attracting young audiences. Based on the results obtained, it is possible to conclude that both companies prioritize an incremental or evolutionary update in the strategic innovation section, while remaining true to their public service values. In this regard, they challenge the conventional mindset and embrace open or disruptive innovation (Chesbrough, 2003) to support the development of new digital platforms.

The proposed conceptual innovation, aimed at fully and progressively renewing public broadcasters in a transversal manner, will be crucial in the media's next stage to address the five main issues identified by Tambini (2015) in relation to public service media. These issues include declining audiences, reduced funding, contested missions, the impact of digitization on traditional proposals, and aggressive competition from private operators.

Radiotelevisión Española (RTVE) has adopted an innovative philosophy focused on optimizing the user experience, reinventing narratives, and adopting a mobile-first approach. Meanwhile, at Rádio e Televisão de Portugal (RTP), efforts are focused on renewing the language and modernizing its

traditional content creation model. This includes incorporating new communicators with revitalized ideas adapted to social networks.

Innovation laboratories, also known as medialabs or labs, have been expanding globally and consolidating as a phenomenon since 2010 in leading international media (Salaverría, 2015). These labs are internal units within journalistic companies, equipped with a certain degree of operational autonomy and a dedicated team, with the mission of devising and promoting technological innovations.In this context, RTP recently established a bubble department to manage and execute innovation, while RTVE has taken a different approach with three different structures: the Innovation Center, Innovation Lab, and space for New Media. Furthermore, RTVE seeks to blur the boundaries of innovation to enable its instinctive flow throughout the entire organization.It will be interesting to analyze over the next few years whether innovation will finally be internalized within the television staff or whether departments for accelerating and promoting innovation processes will continue to exist and consolidate.

In the technological section, both corporations agree on the need to progressively digitize their IT infrastructures (information technology), which includes audiovisual resources, systems, or software. In this sense, RTVE has consolidated a greater commitment to disruptive initiatives based on artificial intelligence, permanent audiovisual connectivity or ultra-high definition, while RTP gives preference to a greater cultural component, such as the optimization and maintenance of its broadcasts. native audio and video.

The professionals involved in these aspects of production and distribution begin with specialized profiles native to digital environments, possessing multidisciplinary skills where adaptability to change stands as the most valuable skill in a constantly changing context. Nonetheless, the corporations agree that the traditional journalist's classic values and skills must be preserved since technology alone "does not improve the skills or abilities of the communicator". Therefore, university training must reinforce and preserve both facets (López-García et al., 2017).

Since the emergence of social media in 2006, public television's experiences in digital environments have focused on testing new formats and transmedia content for both information and entertainment sections (Azurmendi, 2018). In line with this, RTVE's need to capture and consolidate itself as an attractive alternative for young audiences is embodied in PlayZ, a general-purpose digital-native youth channel with modern news and entertainment formats. Meanwhile, Rádio e Televisão de Portugal's RTP Arena platform is exclusively focused on electronic sports and is more geared towards live broadcasts. They have successfully transferred this format to their linear broadcasts, resulting in a significant transfer of users from online to traditional television.

The content of RTP Arena is projected on a website independent from the RTP parent website, with Twitch as the reference social platform for the project. This contrasts with the situation of PlayZ, which has a website dependent on RTVE Play, and where it has been most difficult to penetrate Twitch, in contrast to TikTok where they have experienced exponential growth in the last period.

The limitations that these corporations encounter in their innovative work are related to cultural barriers within their own structures, the reputational crisis that affects the public television system, and which often conditions the development of risky proposals, disinformation, and competition with the proposals of private operators, making it difficult to have a real and relevant presence in people's lives. The ultimate objective of all the efforts of RTVE and RTP is to regain the trust of their audiences because, in their view, a public service medium that does not have an audience loses its reason for existence.

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A new scenario in digital communication: eSports coverage on public broadcasters in Europe

Un nuevo escenario en la comunicación digital: la cobertura de deportes electrónicos en las televisiones públicas de Europa

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This article is part of the activities of the project "Public audiovisual media in the face of the platform ecosystem: management models and evaluation of the public value of reference for Spain" (PID2021-122386OB-I00), funded by the MCIN, AEI and FEDER, EU.
In addition to being integrated in the activities of the 'RTVE-USC Chair on Public Service Media in Europe'. The author Isaac Maroto-González is a recipient of a Research Training Grant for PhD Training 2019 from the Spanish Ministry of Science, Innovation and Universities (ref. PRE2019-090667).

How to cite this article / Normalized reference

Fieiras Ceide, C., Túñez López, M. y Maroto González, I. (2022). A new scenario in digital communication: eSports coverage on public broadcasters in Europe. *Revista Latina de Comunicación Social,* 80, 88-113. https://www.doi.org/10.4185/RLCS-2022-1782

RESUMEN
Introducción: La investigación se centra en el análisis de la cobertura de deportes electrónicos por parte de las televisoras públicas europeas, prestando especial atención a sus contenidos principales, formatos producidos, dimensión y estructura de los equipos de trabajo, rutinas y perfiles profesionales, canales y estrategias de distribución, así como a las previsiones y retos de futuro que se esperan de los e-sports en ellas. **Metodología:** Se realiza un seguimiento online de la actividad de los medios de servicio público (PSM en inglés) con respecto a los ciberdeportes y se contacta con 16 de estas corporaciones europeas para determinar una muestra intencional de estudios de caso. A partir de sus aportaciones se deciden efectuar entrevistas en profundidad semiestructuradas con método Delphi a los

responsables de los proyectos RTP Arena, Yle eSports y SVT eSports; así como un análisis descriptivo con lectura horizontal y vertical de sus plataformas, contenidos más representativos y redes sociales. **Resultados:** Se identifican dos bloques de corporaciones dentro del PSM: un grupo que incluye a los deportes electrónicos en su agenda mediática, limitando su actividad a la cobertura informativa; y otro que introduce a los e-sports en su programación y genera plataformas adhoc de contacto con audiencias más jóvenes. En conjunto, se detecta una migración progresiva de los contenidos de las televisiones públicas hacia plataformas de terceros y medios sociales, con prestaciones en términos tecnológicos, de interactividad e interconectividad. **Discusión y conclusiones:** El interés creciente de las radiotelevisiones públicas en los e-sports choca con la dificultad de contratar nuevos profesionales para potenciar los servicios de producción y distribución vinculados a ellos, y con la incerteza de determinar quién asumirá estas funciones. La calidad técnica y narrativa de los contenidos se mantiene en una escala ascendente, y las comunidades de usuarios generadas en torno a ellos se enriquecen constantemente en términos cualitativos y cuantitativos.

PALABRAS CLAVE: e-sports; deportes electrónicos; ciberdeportes; medios de servicio público; televisión; periodismo; innovación; redes sociales; internet.

ABSTRACT

Introduction: The research focuses on the analysis of e-sports coverage by European public broadcasters, paying special attention to their main contents, formats produced, size and structure of the work teams, professional routines and profiles, distribution channels and strategies, as well as the forecasts and future challenges expected for e-sports in them. **Methodology:** An online monitoring of the activity of public service media (PSM) with respect to e-sports is carried out and 16 of these European corporations are contacted in order to determine a purposive sample of case studies. Based on their contributions, it was decided to carry out in-depth semi-structured interviews with Delphi method with the heads of the RTP Arena, Yle eSports and SVT eSports projects; as well as a descriptive analysis with horizontal and vertical reading of their platforms, most representative contents and social networks. **Results:** Two blocks of corporations are identified within the PSM: one group that includes e-sports in its media agenda, limiting its activity to news coverage; and another one that introduces e-sports in its programming and generates ad hoc platforms for contact with younger audiences. Overall, a progressive migration of public television content towards third-party platforms and social media, with benefits in terms of technology, interactivity and interconnectivity, can be detected. **Discussion and conclusions.** The growing interest of public broadcasters in e-sports clashes with the difficulty of hiring new professionals to boost production and distribution services linked to them, and with the uncertainty of determining who will take on these functions. The technical and narrative quality of the content remains on an ascending scale, and the user communities generated around it are constantly being enriched in qualitative and quantitative terms.

KEYWORDS: e-sports; cyber sports; public service media; broadcasting; journalism; innovation; social media; internet.

CONTENIDO

1. Introducción. 2. Objetivos. 3. Metodología. 4. Resultados. 5. Discusión y conclusiones. 6. Bibliografía. 7. Currículum Vitae

CONTENT

1. Introduction. 2. Objectives. 3. Methodology. 4. Results. 5. Discussion and conclusions. 6. Bibliography. 7. Curriculum Vitae.

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Translation by **Paula González** (Universidad Católica Andrés Bello, Venezuela)

1. Introduction

The disruptive evolution of technological resources and capabilities, together with the digital connectivity provided by the Internet, has driven the growth and proliferation of e-sports in recent years, an environment in which certain video games compete and which represents a social, economic, labor, and entertainment reality that is experiencing a global expansion (DEV, 2016; Hamari and Sjöblom, 2017; Stanton, 2015).

The analysis of the coverage of e-sports by the conventional media arouses interest as it is an incipient reality that is causing a change in the communication model. Even so, no studies have been published to date that examine the activity of public service television regarding cybersports.

The progressive fading of the limits of audience participation in a scenario with an interactive trend leads to a change of roles in which the users and the athletes themselves adopt the position of creators, as they all intervene in the construction of the story with comments, screen appearances, and competing in the different games.

Public television channels in Europe see gamification and content related to video games as a formula for attracting audiences that can serve as a solution to the aging of the public and the loss of relevance for young viewers, which is why they have integrated cybersports into their media agenda for the production of news, retransmission of events, and production of entertainment formats linked to them.

On the other hand, there are still few large-scale projects, the 'RTP Arena' platform of the RTP of Portugal being the reference among the initiatives of public corporations, as it is the only one that has its own website and that works formats on set which are broadcast on their linear broadcasts and Twitch. The common trend on these television channels is to maintain news coverage that only refers to the most important news events, such as the major events of League of Legends (LoL), Counter-Strike, or the main national competitions in their respective countries.

The basic scheme of the cyber-communicative scenario that revolves around e-sports is based on a video game, a regulated competition, and one or more players who meet online, which originates the concept of e-sports, such as a game of FIFA. This is observed, interpreted, and projected by journalists, on the Internet, and to a community of users that interacts, with which two-way cyber communication is established.

The communicative act can also be initiated directly by the players themselves -streamers- during the competition, without the need for a media outlet or journalist to retransmit it, which differentiates it from the communication model characteristic of traditional sports. With this, a participating bidirectional cyber communication arises, since, in this case, the agent who initiates the process has direct participation in the events that have occurred. One last nuance is that both journalists and gamers are the ones who simultaneously intervene in a shared communicative scenario, with which the participating bidirectional communication starts from a formula of co-creation between the agents involved, as represented in Figure 1.

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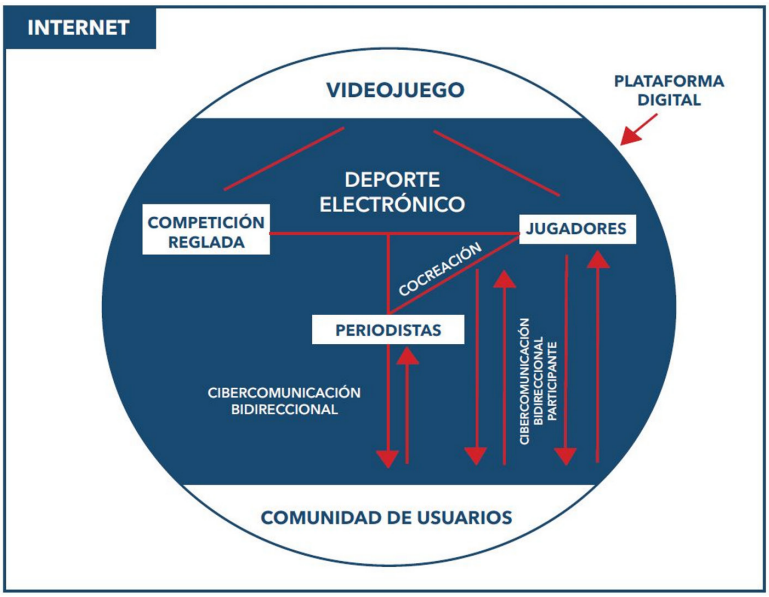

Figure 1: Basic diagram of the e-sports cyber-communicative scenario. Source: own elaboration

This research aims to analyze how the coverage of e-sports by public television in Europe is currently being carried out, as well as to specify the communication model that is articulated around them. In this line, it seeks to identify the relevant cases and their growth forecasts and contextualize the origin and characteristics of e-sports, the latter through a review of the existing scientific literature that is specified in the following section.

1.1. Background: origin, characteristics, and classification of e-sports

Cyber sports arise from the regulated, competitive, and professional activity of certain video games that, at first, were only played for leisure and recreation (Hamari and Sjöblom, 2017; Taylor, 2012). In this way, different competitions have been established that are increasingly closer to the dynamics of traditional sports.

DEV (2016) points out that the main video games that are most competed for globally are League of Legends, Dota 2, Counter-Strike, FIFA, or Call of Duty; while in Europe, although these are recurring games, there are regional preferences, such as Counter-Strike in the Nordic countries, Call of Duty in Italy, and in Spain, besides the above, Clash Royale, FIFA, or Hearthstone (BBVA, 2021).

Various authors have studied the relationship between the concept of e-sports and traditional sport, analyzing its most relevant aspects to confirm or deny that both start from the same point. ONTIER (2018) indicates that six reasons unite both modalities: (i) there is mainly mental and also physical performance; (ii) participation is organized; (iii) the competitions are regulated; (iv) there is training; (v) they are subject to regulations, and (vi) they are competitive.

With time and the advancement of this discipline, it has been proven that regularly playing video games "improves perception, attention, and spatial cognition" (Bediou et al., 2018, p. 8). E-sports are a type of sport in which people develop and enhance cognitive abilities such as reaction time and decision

making; mental skills such as motivation and self-confidence; physical abilities such as strength in the face of fatigue; and the traditional values linked to these practices such as effort and self-improvement (García-Naveira et al., 2018).

Regarding the motivations that lead users to enter the e-sports ecosystem, Fuster et al. (2013) specified that the usual profiles corresponded to curious people, eager to explore and establish new social relationships, since video games bring players closer to a space of experimentation in which they have the possibility of belonging to a group where they feel recognized and get social support and entertainment, which is far from the conception of the solitary player.

When defining the structures under which these athletes are included and compete, most of them are integrated into professional clubs with an organization and disposition similar to conventional organizations. Those are legally constituted with their technical team, management leadership, players, and specific positions that emerge hand in hand with professionalization, as is the case of physical trainers, sports psychologists, nutritionists, or those responsible for marketing and advertising. This is an infrastructure through which they pursue sporting objectives, as well as economic and business performance, which they mainly achieved by broadcasting the competitions.

To classify e-sports, issues such as the role played by physical effort in them, the condition of the spectator, the precedent and historical context, or the degree of interaction are analyzed. Under this model, links are frequently established between e-sports and chess, poker, and traditional sports (Holt, 2016). The development of these disciplines, both in physical and digital spaces, is possible thanks to the media and the information flow, while Taylor (2012, p.14) adds that "e-sports have codified in their own raison d'etre and environment a deep relationship, both in technology and in the media".

One of the sections that dominate the interests of media researchers concerning e-sports is the study of community creation, live broadcasting, and interaction with streamers (Reitman et al. 2020). The context caused by the confluence of the virtual and physical scenarios has resulted in a point of interest for academics in the sector, who seek to delimit the field of action of both realities.

The organization of e-sports tends to be articulated around specific game genres, such as the case of online multiplayer combat arenas (League of Legends, Dota 2); first-person shooters (Counter-Strike: Global Offensive); real-time strategy (Starcraft 2); trading card games (Hearthstone or Ultimate Team), or sports games (FIFA series). Even so, e-sports are not conceived as electronic versions of conventional sports, even though some, such as soccer, tennis, or baseball, do have representation in games with FIFA or the NHL (Hamari, Sjöblom, 2017).

Taking into account the aforementioned concepts, it is possible to define e-sports as a sports typology in which the main aspects "are facilitated by electronic systems and the entry of players and teams into the scene is mediated by human-computer interfaces" (Hamari, Sjöblom, 2017, p.11). Regarding this definition, the exercise linked to e-sports can be considered, superficially and in general terms, as an activity similar to that of any sport.

The social component of video games is another of the sections that permeate e-sports, in which it has been shown that close relationship with peers is of great importance, just as it happens in conventional modalities. Likewise, e-sports are connected to a live chat that allows the user community to post comments and provide value judgments about the events of the game and encourage the teams and players (Woerman and Kirschener, 2015).

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Although the scientific literature that relates e-sports with Public Service Media (PSM) is limited to date, several studies have e-sports as their object of study, as reflected in the previous paragraphs. The same happens with research linked to public service media, of which a prominent bibliography has been completed over the years.

Among the different thematic approaches that lead research on these media, the interest in the concept of public value stands out (Evens and Donders, 2020; Rodriguez-Castro and Campos-Freire, 2019; Lestón-Huerta et al., 2021), as well as the performance in innovation in public media (Sørensen, 2020; Jones and Jones, 2019), the participation and creation of audiences (Vaz et al., 2020, Lünich et al., 2021; López-Cepeda et al., 2019), the analysis of governance and independence (Masduki, 2020; Rodriguez-Castro et al., 2021; Kostovska et al., 2021), or the transformations that public media are undergoing towards platformization (Bonini-Baldini et al., 2021; van Es and Poell, 2020; Duffy et al., 2019).

In the Spanish context, the area of e-sports has been examined by various research disciplines, and there are still no studies that analyze its presence or development in public media infrastructures. In this way, González and Pérez (2018) approach cybersports from an educational perspective and its relationship with the development of skills. In turn, Dilek (2019) provides an approach from the tourism industry and how e-sports events are a tourist attraction. In this line, Muñoz and Esteban (2021) point to the consolidation of e-sports as a leisure and training market. Other authors analyze the cybersports sector from sociology, based on the analysis of the players (Lárez, 2012) or from the sponsorship capacity offered by e-sports in the sports industry (Cuesta-Valiño et al., 2022).

In the following two sections of this article (objectives and methodology) the different purposes that motivated carrying out this study and the mechanisms selected to try to answer the posed research questions are specified.

2. Objectives

This study analyzes the current coverage of e-sports carried out by European public television, both due to its growing interest, as it is an incipient topic with a growing presence in the media, and due to its role regarding the time to determine a new communicative scenario where gamification, interactivity, the change of roles of the agents involved, and the disappearance of the limits of participation mark a trend that will transfer to other formats and topics in the short term.

In this sense, the aim is to identify the most relevant projects in these corporations regarding cybersports, as well as to examine the origin of these proposals, their activity, formats of produced content, work teams that compose them, professional routines, and their distribution strategies, both on their own platforms and the communicative use they make of social networks; and anticipate the progress of the sector based on the behaviors that are already beginning to be sensed.

The research questions raised to achieve the objectives described above are the following:

Question 1. What are the most relevant e-sports projects in quantitative and qualitative terms in the context of public television in Europe?

Question 2. What are the origins and current activity around e-sports on television schedules?

Question 3. What are the main formats worked by these corporations regarding e-sports?

Question 4. What are the professional profiles that make up the work teams in charge of cybersports coverage? What is the structure and organization of these groups?

Received: 14/04/2022. **Accepted:** 22/06/2022. **Published:** 28/07/2022.

Question 5. How are professional routines linked to e-sports different from those applied in conventional sports?

Question 6. What does the distribution strategy of these initiatives consist of? What communicative use do they make of their web pages and social networks?

Question 7. How is the public value proposition of corporations applied to this content?

Question 8. What are the challenges and future forecasts that are expected concerning this sector?

3. Methodology

Once the bibliographic review of the existing scientific literature on e-sports has been completed, it is appropriate to point out the absence of previous similar studies on the object of study of this analysis: the coverage of cybersports in the European public service media. That is why, since there is no precedent, the research is proposed in an exploratory-descriptive way with a blind hypothesis. Likewise, qualitative methods are used, and in-depth personal interviews are carried out with those responsible for the most relevant e-sports projects in the panorama of European public television, whose positions range from product managers to journalists producing content.

For the selection of the final sample and the projects, a search of the platforms of interest was completed and the public television stations of Germany (ARD and ZDF), Austria (ORF), Belgium (VRT and RTBF), Denmark (DR), Spain (RTVE), Finland (YLE), France (France TV), Great Britain (BBC), Netherlands (NPO), Ireland (RTÉ), Italy (RAI), Portugal (RTP), Sweden (SVT), and Switzerland (RTS) were consulted; who were asked about their corporation's coverage of cybersports and reference projects in the European context. This round of consultations was carried out between September 15th and November 10th, 2021, via email, with the following questions being submitted:

Question 1. What is your corporation's activity regarding esports?

Question 2. What would you say are the leading e-sports projects in the context of European public television?

In this way, in the initial sample of 16 television stations to determine the cases under study (Table 1), the PSM of the three media models described by Hallin and Mancini (2004) are represented: RTVE, FranceTV, RAI, and RTP by the polarized pluralist model, characterized by the integration of the media in party politics and an active role of the State in the media system; the ORF, VRT, RTBF, DR, RTS, SVT, ZDF, ARD, NPO, and the YLE for the corporatist-democratic model, in which there is also a high level of political parallelism and an active role on the part of the State that is legally limited; and the BBC and RTÉ for the liberal model, in which "a relative dominance of market mechanisms and hegemony of commercial communication companies is maintained, with little state intervention" (Hallin and Mancini, 2004, p. 5).

USC UNIVERSIDADE DE SANTIAGO DE COMPOSTELA

Table 1. Intentional sample relationship of corporations according to the media models of Hallin and Mancini (2004)

POLARIZED PLURALIST	CORPORATIST-DEMOCRATIC	LIBERAL
FRANCE TV (France) RAI (Italy) RTP (Portugal) RTVE (Spain)	ARD (Germany) DR (Denmark) NPO (The Netherlands) ORF (Austria) RTBF (Belgium) RTS (Switzerland) SVT (Sweden) VRT (Belgium) YLE (Finland) ZDF (Germany)	BBC (Great Britain) RTÉ (Ireland)

Source: own elaboration

Taking into account the size criteria of the work teams, quantitative and qualitative production of content, a convenience sample was chosen that responded satisfactorily to the proposals for participation and was made up of three projects: the RTP of Portugal -RTP Arena-, Finland's Yle -Yle eSports-, and Sweden's SVT -SVT eSports-. The meetings are held by video call, in Delphi mode, and in two rounds, through Microsoft Teams between November 19th, 2021, and February 25th, 2022, with an average duration of about 35 minutes. We work with a semi-structured questionnaire that never exceeded 10 questions, in which specific questions were included for each corporation based on the information collected from each of them to delve into each case study. Even so, the main blocks in all of them were: the origin of the project and objectives, number of workers involved, content produced, professional routines, and distribution strategy. The final panel of 4 interviewees was made up of:

Table 2. List of the intentional sample of convenience of members of the projects analyzed

NAME	ABBREVIATION/ CORPORATION	POSITION
Daniel Rodrigues	DR/RTP	Product Manager (RTP Arena)
Juha Lahti	JL/YLE	Producer Yle eSports
Otto Rönkä	OR/Yle	Producer Yle eSports
Simon Engstrand	SE/SVT	Producer SVT eSports

Source: own elaboration

USC UNIVERSIDADE DE SANTIAGO DE COMPOSTELA

The methodological triangulation is completed with a bibliographical sweep of the existing scientific literature on cybersports or e-sports and a descriptive analysis of the projects, consisting of a horizontal and vertical reading of the online platform of each corporation, with special emphasis on the contents related to e-sport and analyzing the presence of each platform in social networks and the communicative use made of them.

For this, a strategy based on virtual ethnography is established from a partial observation of the elements regarding the object of study (Hine, 2011; Kozinets, 2014). Qualitative content analysis (Krippendorff, 1990; Ruiz, 1996) is the ideal technique for collecting the information required in the study and is based on the preparation of an analysis table for each of the elements of interest.

The platform analysis sheet (Table 3) integrates variables that allow a comparative review of them to be carried out. These variables deal with formal and functional aspects of the projects, as well as aspects related to the accessibility, design, and browsing of the contents. In the case of Yle and SVT, for example, access to content is partial as many of their pieces are geographically limited, so the variables presented in the following Table 3 are of interest to contextualize the strategies of production and distribution of these projects.

Table 3. Platform analysis sheet

PLATFORM ANALYSIS	
VARIABLES	**CATEGORIES**
Access type	#Independent platform #Integrated section #Browser
Sections	-
Integrated events	Yes/No
Number of events	Nº
Posting frequency	nº/day nº/week
Access to content	#open #partial #closed

Source: own elaboration

For the analysis of the main shows, the use of a file is established that allows defining the characteristics of the audiovisual content in terms of its frequency and television genre, which is accompanied by a qualitative observation around its plot, variables that are specified in Table 4.

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Table 4. Analysis sheet of the main shows

ANALYSIS OF MAIN SHOWS	
VARIABLES	**CATEGORIES**
Show name	-
Channel Name	#RTP #YLE #SVT
Release date	Month/Year
TV genre	nº/day nº/week
Frequency	nº seasons/nº episodes /duration

Source: own elaboration

As a last element of analysis, to study the social networks linked to the projects, a Table is proposed from the review and proposal of indicators (KPIs) of the social media library (González et al., 2013) (Table 5) to analyze the tactical performance of the social network profiles of the platforms under study, considering the characteristics offered by each social medium.

Table 5. Social media analysis sheet

ANALYSIS OF SOCIAL NETWORKS	
SOCIAL NETWORKS	**INDICATORS**
Twitter	Profile name
	Profile creation date
	Number of users you follow
	Number of followers
Twitch	Profile name
	Profile creation date
	Number of followers
	Number of videos
	Maximum number of views in a video
Instagram	Profile name
	Profile creation date
	Number of publications
	Number of followers
	Number of followed
Facebook	Profile name
	Profile creation date
	Number of followers

USC UNIVERSIDADE DE SANTIAGO DE COMPOSTELA

Source: own elaboration

4. Results

4.1. E-sports coverage on European public television

Once the vertical and horizontal reading of the platforms and digital spaces linked to the selected projects has been carried out, and the interviews have been carried out with Daniel Rodrigues, product manager of RTP Arena, Juha Lahti and Otto Rönkä content producers at Yle eSports, and Simon Engstrand, producer at SVT eSports, the following results are obtained on the structure of the work teams, professional profiles, produced content and formats, distribution channels, and communicative use of their social networks.

Regarding the work templates, the RTP Arena team is made up of 12 professionals who are fully dedicated to the project. Its organization chart is based on a 'product manager', in charge of making editorial decisions and organizing teams, which, in turn, are subdivided into two groups: a first of content creators, with journalistic and digital professional profiles; and another of 6 people in the studio in charge of audiovisual tasks of production, editing, assembly, or directing.

The situation of the other two radio and television stations analyzed is radically different, as is well reflected in Table 6. While Yle has two full-time producers, at SVT there is only one specialized journalist focused on cybersports. Both corporations receive assistance from their sports newsroom, and in the case of Finnish television, there are different journalists with partial ties to the project. Likewise, both RTP and Yle are reinforced with occasional freelance hires that provide them with assistance in massive events.

Table 6. Structure and professional profiles of the work teams of the analyzed projects

PROJECT	WORK TEAM
RTP Arena	***12 people are 100% dedicated to the project, with occasional collaborations from the rest of the departments. Punctual freelance hiring for large events.***
	1 product manager: Daniel Rodrigues
	5 content creators (journalists, presenters, and social media managers)
	6 people in the studio (producers, editors, camera operators, and directors)
Yle eSport	2 full-time producers.
	Different journalists from the sports team linked to the project by 25/50 or 75% depending on the needs.
	Contributions from superiors for the strategy in content management or negotiations for licenses.
	Freelance announcers or technicians accompanying large broadcasts.
SVT eSport	A single full-time producer specializing in e-sports: Simon Engstrand
	Support from the rest of the sports team, as if it were the coverage of another sports modality.

Source: own elaboration

The contents and formats used in the European public media landscape range from informative news coverage, broadcasts of events and competitions, live broadcasts, magazines, interview programs for players and specialists, as well as fiction formats such as the series ' Gamerne' by Yle, or 'E-sports Saga', by SVT, based on the creation of an e-sports team, which is specified in Table 7.

Received: 14/04/2022. **Accepted:** 22/06/2022. **Published:** 28/07/2022.

Table 7. Contents and formats produced in the analyzed projects

PROJECT	CONTENTS
RTP Arena	Informative coverage of e-sports.
	Coverage and transmission of national and international events.
	Live broadcasts.
	RTP Live Plays: test new games (weekly)
	Talk shows with well-known figures in the sector
	Analysis talk shows with specialists: game methodologies, strategy, analysis.
Yle eSport	Broadcasts of competitions.
	Informative coverage.
	Docu-series: Gamerne.
	Magazines: Kiosky Games.
SVT eSport	Documentary series 'E-sports saga'
	Documentary about the e-sports industry.
	Good Gaming: Magazine for testing new video games.

Source: own elaboration

Regarding distribution channels, the only project that deviates from the main page of radio and television content is RTP Arena (Table 8). The Portuguese corporation is also the only one that allocates space for its linear broadcasts to an e-sports format. Yle gives an entire section of its website to cybersports, while SVT has not yet established a differentiation from the rest of the sports categories.

Table 8. Distribution channels of the analyzed projects

PROJECT	DISTRIBUTION CHANNELS
RTP Arena	RTP Arena: own platform
	Linear TV: weekly 30' space.
	Social media: Twitch as a reference; small videos on the rest of the social networks (Twitter, Facebook, and Instagram)
Yle eSport	Yle Sand. Integrated e-sports section on its main website.
	Social Media: Twitch, Twitter, Facebook, and Instagram
SVT eSport	SVT main website
	Social networks, promotional use: Twitter, Instagram.

Source: own elaboration

Rádio e Televisão de Portugal combines its profiles on social networks in a complementary way, without its content competing with each other in the different digital spaces, in such a way that each site offers specific content linked to the characteristics of each tool. The RPT Arena platform offers different types of access to content that are related to each other to offer comprehensive information that is based on its own main web page.

For its part, Yle is in a growth phase where its community is progressively increasing around e-sports content and broadcasts, while SVT reduces the use of its networks -Twitter and Instagram- to a promotional purpose, with hardly any interaction or relevant actions with their followers. The date of creation and the current number of followers of each project in the different social networks is specified in Table 9.

Table 9. Results of the mapping of social networks of the projects

	RTP	YLE	SVT
TWITTER	@rtparena	@Yle.fi/eurheilu	@SVTesport
Creation date	abr-16	jul-14	feb-14
Following	1035	341	171
Followers	14.400	8335	1888
TWITCH	rtparena	yleeurheilu	-
Creation date	nov-17	jun-19	-
Followers	59.729	26.765	-
Videos	448	26	-
Maximum viewings	60.170	8633	-
INSTAGRAM	rtparena	yleeurheilu	svtesport
Creation date	ago-16	2017	1/3/17
Posts	1735	256	47
Followers	18.500	1694	111
Following	190	371	50
FACEBOOK	rtparena	Yleeurheilu	-
Creation date	abr-16	ene-15	-
Followers	26.365	5040	-

Source: own elaboration

From the mapping of data from social networks, the numbers of RTP Arena stand out compared to the rest of the profiles analyzed, not only in the number of followers in each of these spaces but also in the number of posts, which is notably higher than the rest. On the other hand, taking into account the date of creation of the profiles, a simultaneous origin of all the RTP Arena accounts can be seen around 2016, which contrasts with the sporadic creation of the Twitter profiles in YLE and SVT (2014), from which an incipient interest in this topic is extracted, which is not strategically coordinated with the creation of a community around e-sports.

Based on the results presented in the previous paragraphs, it is possible to affirm that the new communicative scenario structured around cybersports is becoming more and more extensive, becoming a recurrent theme worked in a precise, specialized way, and with ever greater depth, by public television in Europe. Although initially, the productive routines linked to e-sports followed the creation models of conventional sports, a progressive migration towards platforms and social media is identified, with interesting features in terms of technology, interactivity, interconnectivity, and impact on the age group (16-34) wanted by these corporations.

Received: 14/04/2022. **Accepted:** 22/06/2022. **Published:** 28/07/2022.

Among the three selected projects, the 'RTP Arena' of the RTP of Portugal is the platform indicated as a reference by the interviewed professionals of the public media in Europe and the only one consolidated as an independent product. This 360º project[1] has its own website and an active presence on social networks, especially on Twitch, where its account dedicated to the game CS:GO -RTP Arena CS:GO[2]- is the most followed channel in Portugal in absolute terms in the last three years according to the corporation -currently: 182,000 users from the last check-. The other two projects analyzed for their qualitative and quantitative potential, SVT Esports and Yle Esports, present a growing production in breadth and diversity but are integrated as a section within the main web pages of these television stations. The rest of the public television channels such as DR, BBC, France Tv, Rai, or RTVE, among others, timidly began to cover news related to e-sports but without reaching relevant activity as they are isolated pieces.

Figure 2. Interface of RTP Arena, Yle eSport, SVT eSport Saga. Source: RTP, Yle, SVT

According to Daniel Rodrigues, product manager of RTP Arena, the origin of cybersports coverage stems from the intention of these corporations to reach and retain young audiences for whom they were unable to be relevant. In the case of Rádio e Televisão de Portugal, they moved their format from e-sports interviews to linear broadcast once a week, which ensure that this audience followed them to conventional television. In this sense, a progressive adaptation of the conversational tone is identified, originally intended for children and their parents, and increasingly focused on avoiding technical redundancies such as the excessive explanation of the dynamics of the games for a specialized audience often made up of the players themselves.

The presence of 'influencers' or familiar faces for users in these countries is projected as one of the main tools for recruitment, search for notoriety, and impact, as can be seen in Figure 3. Active bidirectional interaction and conversation between creators and consumers emerge as a fundamental factor in this new digital scenario, a link that is reinforced when the participants in the formats are professional gaming players or relevant personalities, as is the case of Magisk at RTP Arena, an iconic Danish player from *Team Vitality.*

[1] RTP Arena has its own website that is unrelated to the RTP main website, which is complemented by profiles on social networks such as Twitch, Instagram, Facebook, and Twitter and broadcasts on its traditional linear television channels.

[2] RTP Arena has different channels on Twitch: a central one, 'RTP Arena', and several specific secondary ones for certain video games, such as 'RTP Arena CS:GO', or 'RTP Arena FIFA'.

Received: 14/04/2022. **Accepted:** 22/06/2022. **Published:** 28/07/2022.

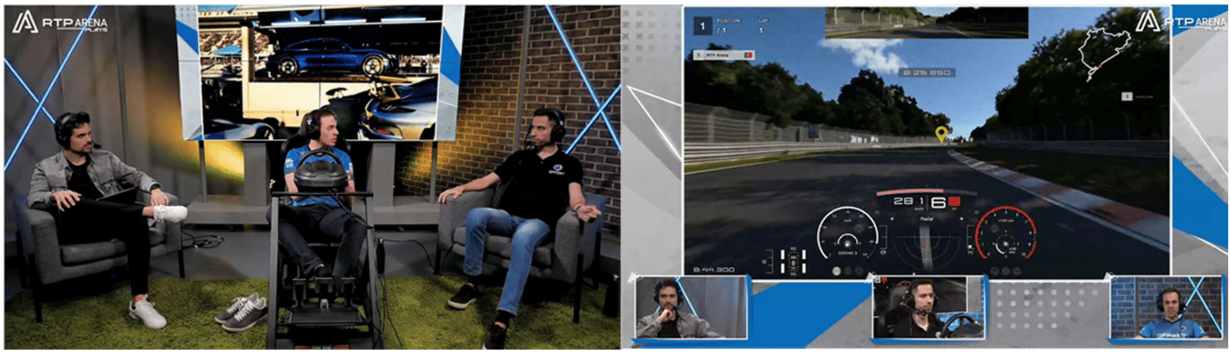

Figure 3: Creation model of RTP Arena with influencers on Twitch. Source: RTP

RTP, Yle, and SVT associate their differential proposal of public value with a greater plurality of games used, with coverage of local content and competitions, and with reinforcing national identity by projecting the image of young players, according to the professionals interviewed. The retransmission rights of the main events are already part of the market dynamics of the great sports tournaments, being affordable to date for the budgets of the public broadcasters studied.

They point to the corporations that are in a phase of ideological openness in their internal structure regarding cybersports, increasingly internalized and integrated into their media agenda. This movement is subject to the uncertainty of knowing who will be the professionals in charge of fulfilling the tasks related to e-sports in the future. At the moment, it is the sports journalists themselves who carry them out, with a greater or lesser degree of specialization, which requires the expansion of teams to achieve significant progress.

The televisions assume their role as producers and transmitters of content, but they do not contemplate occupying the point of the chain of organization of great events or competitions. Their work teams are small -12 people in the case of RTP Arena and two and a content producer in Yle and SVT, respectively-, with essentially journalistic profiles that they complement with technical assistance from freelance professionals on the dates that arouse the greatest interest, as is the case of the LoL World Cups (Figure 4).

Figure 4: League of Legends (LoL) World Cup Final, 2019. Source: Marca

USC UNIVERSIDADE DE SANTIAGO DE COMPOSTELA

4.2. The opinion of the professionals interviewed

To explain the reasons that motivated the corporations to start their coverage of e-sports, the producers of the analyzed projects specify two main causes: the irruption of this new sports category on the international scene, and its close relationship with young audiences aged between 16 and 34 years old, far removed from its traditional broadcasts. The public value proposition of each project, as well as the changes they have been making to their routines and the future forecasts they foresee, are reflected in Table 10.

(DR/RTP). "We wanted to start a relationship with this incipient reality that is breaking through. I would say that it has been a success story, both quantitatively, due to the number of users, and qualitatively, due to network fidelity and the migration to linear broadcasts".

(JL/ Yle) "Each national station has its own strategy, for us, it has always been a challenge to bring together young people. It is clear that the majority are interested in these contents, now they are the engine of transmissions".

(SE/SVT) "E-sports are here to stay, so we have to push it as much as we can."

Table 10. Scheme of results based on the opinion of the experts

CONCEPT	RTP Arena	YLE eSport	SVT eSport
Origin of the project	Young audience recruitment	Young audience recruitment	Market opportunity
Public value proposition	Plural testing of little-known video games. Instructional content.	National identity: projection of local	Production of less common formats on private platforms
Coverage changes	First a fiction project, then information, and now a hybrid between information and entertainment.	Adaptation of the conversational tone to a young audience (originally intended for parents and children).	Adaptation of the language, now with greater technicalities to avoid redundancies.as.
Future forecast	Multiplication of technological resources linked to e-sports.	Expansion of the work team linked to e-sports.	Deeper, specialized, and more diverse coverage of e-sports.

Source: own elaboration

Regarding their position as public service media in the context of cybersports, these broadcasters are aware of the search for a differential value from less common formats, such as documentary series, a plural testing of video games, using lesser-known narratives, and reinforcing national identity through the transfer of spaces and programs to local athletes and competitions.

(JL/Yle). "We have thought a lot about what formats to do and what our position here is. We tried the documentary format, little exploited on private platforms, and it was very popular, achieving very good numbers in Finland".

(OR/Yle). "There are relevant competitions and players in our country, so from our position as a public company, we make sure to give visibility to their talent and effort. We also select a wide catalog of games, with different titles and genres".

The productive routines of e-sports content have undergone a series of variations since the first broadcasts. On the one hand, the corporations analyzed that the participation of well-known personalities or 'influencers' in the different formats projects the impact of these contents. Likewise, it was necessary to adapt the tone of the conversation to adapt it to its most loyal audience, made up of young people and professionals in the sector.

(JL/Yle). "You need the stars, once you have those familiar faces you ensure a certain impact that would be impossible to achieve without them."

(OR/Yle) "At first, many parents wrote to us thanking us for showing them games that they had never seen before and that were not bad for their children. When they stopped seeing the content, we adapted the tone of the conversation to a more technical language".

(SE/SVT). "It is essential to set the tone of the conversation correctly, not to explain too much, speak the language of the game, and avoid redundancies."

The decision to locate on third-party platforms, as is the case with the main social networks, led to a debate at the core of corporations between veteran professionals, in favor of hosting content in their own spaces, and content producers, in favor of moving to those environments frequented by the target audience. The technical advantages of media such as Twitch were understood by these television stations as a creative opportunity to improve their content and strengthen the relationship with the audience through co-creation proposals.

(DR/RTP) "Content co-creation was one of the main focuses when we launched RTP Arena. Our analysis is constant to find out what the public needs and what interests them, we reward participation and loyalty with raffles and invitations to our programs".

(OR/Yle). "Some people with more years in the corporation think that everything should be located in Yle Arena since it is a very popular service. However, our strategy with young people is to move them to the platform they frequent".

The corporations consider that in the coming years a qualitative specialization in the coverage of e-sports will continue. These advances will be represented in the establishment of new projects or sections, and in the consolidation and expansion of existing work teams. The technical capabilities provided by platforms such as Twitch will then be better known by the professionals linked to them, which will allow them to better exploit these resources, pointing to creativity as the axis of change.

(DR/RTP): "The technology linked to e-sports will multiply its benefits in the coming years, and we will also grow together with it. The greater knowledge of these resources will allow us to be more creative and better apply our ideas".

(OR/YLE): "I wouldn't be surprised if in a couple of years our team of two e-sports producers was made up of 8/10 pros. The demand is increasing, and we must be there to satisfy it as much as possible".

USC UNIVERSIDADE DE SANTIAGO DE COMPOSTELA

Received: 14/04/2022. **Accepted:** 22/06/2022. **Published:** 28/07/2022.

(SE/SVT): "We are in the first phase of exploration, but in the organization, we are clear that cybersports will be very important in the future. Everyone at SVT wants coverage to be expanded, but we still don't know who will be in charge."

4.3. Descriptive analysis of the platforms

The RTP Arena website concentrates specific information on e-sports in different formats. The high frequency of news publication in the 'Articles' section stands out, with an average of ten daily publications. The 'Videos' section integrates access to the different audiovisual formats of interviews and talk shows created by the platform, while its third space offers analysis and monitoring of the covered e-sports events.

The platform's interest in integrating open and non-invasive organic access to the different social networks to broadcast content stands out. In this sense, the Rádio e Televisão de Portugal cybersports project offers access links to the sessions on Twitch to accompany the specific analysis of the event. Also, they use the YouTube channel as a player for their audiovisual formats, and, in some cases, they redirect to the RTP PLAY player itself.

The representation of e-sports within the YLE platform is offered integrated within a specific section on its main website. The structure is made up of three subsections that give access to various contents of the platform, among which news about the sector, game manuals, interviews with players, a docu-series, and retransmissions of events from the website itself stand out.

The frequency of e-sports news posts on Yle is weekly. Access to content is partial, it is geographically restricted, limiting the broadcast of its docu-series and retransmissions of events, but releasing news related to e-sports. In this sense, the exponential increase in retransmissions from the platform stands out, increasing from an average of 18 retransmissions in 2018 to 58 in 2021.

In the case of SVT, this corporation offers limited access to cybersports content, which invites the use of the platform's internal search engine using terms such as "e-sport" or "e-games". Even so, the results it projects are limited to the contents highlighted in this analysis. The SVT website limits the viewing of the docu-series but offers access to the contents of its magazine through the YouTube platform.

Table 11. Analysis of the platforms of the explored projects

	RTP	**YLE**	**SVT**
Access type	Independent platform	Integrated section	Browser /Catalog
Sections	Articles /Videos /events	Recommended/ News/ Most viewed	-
Broadcast competitions	yes	yes	no
Number of events	-	94	-
Freq. Publications	10 p/ day	3/ weekly	-
Content access	Open	Partial	Partial

Source: own elaboration

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4.4. Descriptive analysis of the main contents

The star content of the Portuguese cybersports project consists of an interview program born in 2016, which besides these conversations, includes gatherings between players and an informative review of the news of the sector. It uses a tone of irreverent humor that is a characteristic symbol of its presenter, Sara Lima. It consists of 6 seasons with a weekly broadcast and a duration of approximately 20 minutes. Its access is open from the RTP Arena platform and its YouTube channel.

Likewise, the fictional e-sports series 'Os players', also produced by RTP, develops a plot centered on a group of friends who form an e-sports team that finally manages to reach a European final. This one-season series with 8 12-minute episodes stands out for its pioneering content, making its exclusive premiere on the RTP Arena platform in December 2016.

Concerning Finnish public television, 'Gamerne' is a documentary series produced in August 2021 that tells the point of view of four Finnish e-sports stars. It focuses on the relationships between the protagonists and the management of professional teams and consists of a season with 12 episodes of 12 minutes each. This documentary stands out for the transversal vision it shows of cybersports in Finland, and it is noteworthy that access to the content is restricted outside the country's territory.

Another content that stands out on Yle is an informative magazine called 'Kiosky Games' in which topics related to e-sports are discussed from a casual and provocative point of view. It premiered in 2019, and since then it has accumulated three seasons with a weekly 10-minute program. Access to the magazine is open from the Yle platform and the program's YouTube channel.

Sweden's SVT they have also produced a documentary series on e-sports, called 'E-sport Saga'. This format narrates the creation of a cyber sports team with non-professional players who achieve success in a Counter-Strike championship. Its premiere is dated December 2021 and consists of a season of 10 20-minute episodes. The documentary portrays the path taken by the players from their position as anonymous gamers to professional life. The Sveriges Television platform does not allow viewing outside of Swedish territory.

The last of the contents selected as the object of analysis is 'Good gaming', an informative magazine on Sweden's public radio and television. The presenters and streamers Ida Ángela and Laura Sipilä lead the program, in which they analyze and test different video games. Acid and provocative humor define the style of a format that, since its premiere in 2019, has completed three seasons with 14 short episodes. Its access is open on the SVT website, as well as on its YouTube profile. The main technical details of each of the selected contents are collected in Table 12.

USC UNIVERSIDADE DE SANTIAGO DE COMPOSTELA

Table 12. Analysis of the main contents of the projects

	RTP	YLE	SVT
CONTENTS (1). NAME	Os Players	Gamerne	E-SPORT SAGA
Channel	RTP	Yle	SVT
Premiere	December 2016	August 2021	December 2021
Genre	Series- Fiction	Series- documentary	Series- documentary
Seasons	1	1	1
Number of chapters	8	12	10
Duration per chapter	12’	20’	20’
CONTENTS (2). NAME	RTP Arena	Yle Kioski gaming	Good Gaming
Channel	RTP	Yle	SVT
Premiere	2016	2019	2019
Genre	Interviews Reviews	Magazine Informative	Magazine Informative
Seasons	6	3	3
Number of chapters	Weekly	Weekly	14
Duration per chapter	20’	10’	15’

Source: own elaboration

5. Discussion and Conclusions

E-sports broke into the context of public broadcasting as a new theme that has ended up settling down and establishing itself as a new section. The growing specialization of the professionals dedicated to their coverage is linked to the progressive distancing from the work routines applied in conventional sports. In this sense, it is still early to anticipate whether there will be a reconversion of the profile of the traditional sports journalist to an adapted professional, with greater technological and digital skills, or whether it will be the players or experts themselves who cover these functions in corporations in the long term.

The ideological openness that is taking place in the media regarding cybersports is due to quantitative reasons, such as the following and interest showed by a large group of users; and qualitative, as it is a loyal, participative public, belonging mostly to the age group (16-34), very valuable due to its level of involvement and sought after by public companies as it is a broad segment that they will have to serve in the future. However, there is a certain reluctance on the part of the media personnel to multiply their functions for the production of e-sports, and from the management domes there is no question of massive hiring to amplify these services, so the growth of these departments will be consolidated progressively and structurally.

Of the three projects analyzed in this research for their quantitative and qualitative potential, only Portugal's RTP has a platform independent of its main website, and while Yle has reserved a specific section for e-sports, SVT still classifies them along with other sports. Rádio e Televisão de Portugal is the only one that has transferred one of its formats to linear broadcasts, thereby achieving a migration of loyal users from social networks to conventional television. The rest of the public corporations in Europe are beginning their informative coverage of cybersports, which does not yet provide evidence as to whether they will opt for an integrating strategy such as Yle or a disaggregating one such as RTP.

Received: 14/04/2022. **Accepted:** 22/06/2022. **Published:** 28/07/2022.

The cross-sectional analysis of the projects and the interviews carried out, allow us to respond satisfactorily to the research questions, the conclusions of which are concentrated in the following Table 13:

Table 13. Relationship of research questions/conclusions

QUESTION/CONCEPT	CONCLUSION
1. Most relevant projects	RTP Arena/Yle eSports/ SVT eSports
2. Origin of projects and current activity	**Origin:** interest in a new communicative ecosystem and in capturing young audiences. **Activity.** Two blocks within the PSM: a group of corporations includes e-sports in their media agenda, limiting their activity to news coverage; and another in which they introduce e-sports in their programming and generate ad hoc platforms for contact with new, younger audiences
3. Main formats	Broadcasts of events and competitions, live broadcasts, magazines, interview programs for players and specialists, and fiction formats.
4. Work teams (profiles/structure	**-Mainly journalistic profiles** with digital skills. Also, more technical profiles related to audiovisual communication tasks (recording, production, editing, or graphic design). -Small size of work teams, made up of one or several full-time professionals. RTP Arena is an atypical case, with a general coordinator and two teams (6 journalists and 6 audiovisual communicators).
5. Professional routines	Increasingly specialized, precise, and differentiated from those of conventional sports. Objective: avoid the redundancy of technical concepts and enrich the narration.
6. Distribution Strategy	Use of proprietary platforms and migration to third-party platforms and social media with benefits in terms of technology, interactivity, and interconnectivity.
7. Public value proposition	Production of less common formats; plural test of video games and reinforcement of national identity through the promotion of players and local competitions.
8. Challenges and prospects	**-Challenges:** Bring communication professionals together with influencers or familiar faces; offer a differential service with public value; adapt to the technical requirements of external platforms and obtain the rights to retransmit events. **-Forecasts:** growth of the sector; expansion of coverage and work teams, with greater specialization, depth, and infrastructure.

Source: own elaboration

The origin of these projects stems from the intention of corporations to counteract the effect of the aging of their audiences and the loss of relevance for young audiences so that e-sports were understood as a market opportunity. It is expected that the cyber-communicative environment that is articulated around e-sports will pass over in the short term to other themes and contents, where the change of roles, the disappearance of the limits of participation, and interactivity will rise as main actors.

Regarding the current activity and the projected coverage by public corporations in Europe, most of them still maintain a timid but growing news coverage, while RTP, Yle, and SVT already broadcast events and competitions, broadcasts live, magazines, interview programs for players and specialists, as well as fiction formats.

The public value proposal outlined by these corporations in their relationship with electronic sports consists of the production of less common formats on private platforms, such as documentary series. Also, they structure this strategy based on the plural testing of video games and the reinforcement of national identity through the promotion of local players and competitions. It will arouse interest in the coming years to see if public broadcasters can boost national tournaments to catch them on the same wave of success that is expected for major world events.

Those responsible for the projects analyzed foresee that in the next stage there will be a multiplication of technological resources linked to electronic sports, which, together with the creative component of the professionals involved, will give rise to new ideas, relationship models with audiences, and products. In this sense, the corporations estimate that the work teams dedicated to cybersports grow to offer a deeper, more specialized, and diverse coverage, increasingly demanded by the audiences.

The phrase "we need the stars", enunciated by Juha Lahti, producer of Yle e-sports, shows that one of the keys to the future will consist of public television giving part of the prominence of their brands to well-known personalities with good management of the tools available and with the ease to create content adapted to social networks. This issue, together with the negotiating capacity of television channels for retransmission rights, the adaptation to the technical requirements demanded by third-party platforms, and the insistence on providing a plural, diverse, inclusive service with public value, will be the main challenges that public television will face regarding e-sports in the coming years.

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Received: 14/04/2022. **Accepted:** 22/06/2022. **Published:** 28/07/2022.

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Received: 14/04/2022. **Accepted:** 22/06/2022. **Published:** 28/07/2022.

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ESTUDIOS

Estudios sobre el **Mensaje Periodístico**
ISSN-e: 1988-2696

EDICIONES COMPLUTENSE

https://dx.doi.org/10.5209/esmp.88582

Actividad empleadora en la televisión pública de la era de la automatización: employer branding, canales de contratación, procesos de selección, competencias y perfiles profesionales demandados*

César Fieiras Ceide[1], María José Ufarte Ruiz[2] y Martín Vaz Álvarez[3]

Recibido: 5 de mayo de 2023 / Aceptado: 22 de julio de 2023

Resumen. Esta investigación profundiza en la actividad empleadora ejecutada por las radiotelevisiones públicas de Europa en el contexto actual de desarrollo de la inteligencia artificial generativa, analizando los canales de contratación empleados, los procesos de selección seguidos las competencias y perfiles profesionales más demandados, las ofertas laborales vigentes, y los procedimientos de creación de marca empleadora. El diseño metodológico para alcanzar estos propósitos requiere una ejecución por etapas a partir de la aplicación de una triangulación metodológica de técnicas cualitativas. Se analizan las propuestas de 10 emisoras públicas europeas, que se complementan con entrevistas semiestructuradas en profundidad a los responsables de innovación o tecnología de parte de estas corporaciones. Los resultados revelan que la proliferación de ofertas para puestos digitales no supone un desvanecimiento de las tradicionales, y que estas oportunidades de empleo tecnológicas se relacionan principalmente con procesos de ingeniería de datos, ciberseguridad, gestión de big data y cloud, y solo en casos aislados se vinculan a funciones concretas de aprendizaje automático o IA. Los hallazgos demuestran, igualmente, que las habilidades interpersonales como la adaptabilidad al cambio se imponen a las eminentemente técnicas, y que las emisoras buscan con la construcción de su marca empleadora y con la optimización de sus portales de contratación una ventaja competitiva en el disputado mercado del talento.
Palabras clave: Marca empleadora; perfiles profesionales; periodismo; medios de servicio público; automatización.

[en] Employer activity in public television in the age of automation: employer branding, recruitment channels, selection processes, skills and professional profiles in demand

Abstract. This research delves into the employment activity carried out by public broadcasters in Europe in the current context of development of generative artificial intelligence, analyzing the recruitment channels used, the selection processes followed, the most demanded professional skills and profiles, current job offers, and the procedures for creating an employer brand. The methodological design to achieve these purposes requires a phased execution based on the application of a methodological triangulation of qualitative techniques. The proposals of 10 European public broadcasters are analyzed, which are complemented by in-depth semi-structured interviews with those responsible for innovation or technology on behalf of these corporations. The results reveal that the proliferation of offers for digital positions does not imply a fading of traditional ones, and that these technological employment opportunities are mainly related to data engineering, cybersecurity, big data and cloud management processes, and only in isolated cases. they are tied to specific machine learning or AI functions. The findings also show that interpersonal skills such as adaptability to change prevail over the eminently technical ones, and that broadcasters seek a competitive advantage in the disputed market of talent by building their employer brand and optimizing their recruitment portals.
Keywords: Employer branding; professional profiles; journalism; public service media; automation.

Sumario. 1. Introducción. 1.1. El impacto de la automatización y de la IA en el perfil de los periodistas. 1.2. El impacto de la IA en las rutinas productivas de las radiotelevisiones públicas europeas. 2. Metodología. 3. Resultados. 3.1. Canales empleados, tipos y funcionamiento de los procesos de selección. 3.2. Ofertas de empleo vigentes y habilidades interpersonales y técnicas demandadas. 3.3. Creación de marca empleadora: lema de captación, recursos empleados, atributos y prestaciones promocionadas. 3.4. La opinión de los expertos. 4. Conclusiones. 5. Referencias bibliográficas.

Cómo citar: Fieiras-Ceide, C., Ufarte-Ruiz, M.J., & Vaz-Álvarez, M. (2023). Actividad empleadora en la televisión pública de la era de la automatización: employer branding, canales de contratación, procesos de selección, competencias y perfiles profesionales demandados. *Estudios sobre el Mensaje Periodístico* 29 (4), 855-868. https://dx.doi.org/10.5209/esmp.88582

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1. Introducción

El talento personal es el mayor activo del que disponen los medios de comunicación en el renovado contexto actual. Es por ello por lo que las empresas informativas han iniciado campañas permanentes de atracción, captación y retención de profesionales, y su actividad empleadora ha ascendido progresivamente puestos en su escala de prioridades.

Lo que décadas atrás consistía en una actividad accesoria, secundaria, y con escasa relevancia para las cúpulas directivas, ahora se encumbra como un valor diferencial preferente, en el que las corporaciones de radiotelevisión pública proyectan sus principales fortalezas para la construcción y gestión de su marca empleadora o *employer branding*, con la que pretenden aventajar al resto de emisoras en el competido mercado del talento.

El concepto de marca empleadora se define como una estrategia a largo plazo destinada a gestionar las percepciones de los empleados actuales y/o potenciales de una empresa (Sullivan, 2004), y se basa en la aplicación de conceptos relacionados con el marketing para destacar el posicionamiento de una empresa como empleador. Su intención es la misma que la de una marca comercial: captar a nuevos clientes manteniendo a los actuales; pero siendo el cliente su propio personal o los candidatos a ingresar en su estructura (Blasco-López, Rodríguez-Tarodo & Fernández-Lores, 2014).

En el caso de las radiotelevisiones públicas europeas, no se identifican investigaciones previas a este estudio que profundicen en el análisis de su actividad empleadora, por lo que se pretende obtener una panorámica completa en la que se examinen los canales de contratación empleados, los procesos de selección seguidos, las competencias y perfiles profesionales demandados, las ofertas laborales vigentes y los procedimientos de creación de marca empleadora. Este trabajo pretende dar respuesta a las siguientes preguntas de investigación: Q1. ¿A través de qué canales ejecutan las radiotelevisiones públicas europeas su actividad empleadora?; Q2. ¿Son estos canales independientes a su página web matriz?; Q3. ¿Cuáles son las ofertas laborales vigentes en las corporaciones?; Q4. ¿Las oportunidades de empleo digitales se relacionan con funciones específicas de aprendizaje automático o IA?; Q5. ¿Los procesos de selección se presentan mediante ofertas cerradas para un puesto específico o la recepción de currículums está abierta de forma permanente?; Q6. ¿Cuáles son las principales habilidades técnicas e interpersonales demandadas en la actualidad en estos medios?; Q7. ¿Cuál es el procedimiento seguido para la presentación de candidaturas y la selección de solicitantes?; Q8. ¿Recurren estas corporaciones a técnicas de *employer branding* para la atracción, captación y retención de talento?; y Q9. ¿Qué lema, acciones, atributos o prestaciones promocionan estas corporaciones para la construcción de su marca empleadora?

Para tratar de responder a estas preguntas se establece una estrategia basada en la etnografía virtual desde una observación parcial de los elementos en relación con el objeto de estudio (Hine, 2011; Kozinets, 2014).

1.1. El impacto de la automatización y de la IA en el perfil de los periodistas

En el nuevo ecosistema mediático, el uso de bots y algoritmos para automatizar la redacción de contenidos ha abierto un camino para la definición de un renovado perfil profesional. Sobre este tema hay varias aproximaciones, aunque pocas investigaciones con amplios estudios de campo. El impacto de la automatización en el perfil de los periodistas ha sido analizado en el país por Salazar (2018), Peña-Fernández et al., (2023), Ufarte y Manfredi (2019) y Túñez, Toural y Valdiviezo (2019), entre otros. La atención de la academia por este tema se produce después de que esta tecnología realice algunas de las tareas que hasta ahora se habían considerado exclusivamente humanas en la profesión periodística (Brennen, Howard & Nielsen, 2022).

El periodismo generado con inteligencia artificial (IA, en adelante) se caracteriza por su transdisciplinariedad y multidimensionalidad, donde la transgresión de las disciplinas configura una nueva realidad que otorga al periodismo un carácter dinámico que permite su evolución y adaptación a los nuevos entornos. Asimismo, se caracteriza por un uso intensivo de la tecnología disruptiva, no sólo como pieza clave para el proceso de creación de las noticias, sino también como aliada para mejorar la productividad y eficiencia (Papadimitriou, 2016), aumentar el beneficio empresarial (Mittal & Kumaraguru, 2014), reforzar la precisión (Silverman, 2013) y la objetividad (Graefe, 2016), examinar la credibilidad (Wölker & Powell, 2018) y la calidad de las noticias automatizadas (Sandoval *et al.*, 2019), reconocer patrones y tendencias (Lemelshtrich, 2018), diluir el impacto de la desinformación y las noticias falsas (Manfredi & Ufarte, 2020), localizar perfiles en redes sociales (Dickerson, Kagan & Subrahmanian, 2014) y personalizar las informaciones (Newman *et. al.,* 2019).

Toural-Bran y Vizoso (2022) advierten que todavía no es posible precisar con claridad el perfil del periodista que trabaja con IA, pero lo cierto es que estos profesionales se han ido definiendo a medida que esta tecnología ha creado nuevos empleos en los medios. Es el caso de los encargados de supervisar los contenidos generados mediante algoritmos (Diakopoulos, 2019), un perfil que surge en el momento en el que un medio de comunicación ha creado su propio software o ha contratado a una empresa proveedora para que le suministre contenidos automatizados y recibe más de un centenar de textos al día. Los cometidos y funciones de estos nuevos profesionales se centran en garantizar que esos contenidos automatizados sean fiables, y no contengan errores. En definitiva, es un especialista en la vigilancia y revisión del periodismo artificial (Tuñez, Toural & Valdiviezo, 2019), *robot journalism* (Burrell, 2016; Kim *et al.,* 2007; Levy,

2012; Van Dalen, 2012), periodismo algorítmico (Anderson, 2013), periodismo automatizado (Caswel & Dörr**,** 2018; Clerwall, 2014), o periodismo de alta tecnología (Salaverría**,** 2016).

Para Arias y Sixto-García, estos profesionales deben poseer habilidades desconocidas hasta hace poco tiempo y Túñez, Fieiras y Vaz (2021) apuntan que lo que realmente los caracteriza son las habilidades cognitivas especializadas (formación sobre tecnología y generación de lenguaje natural), y las habilidades personales y sociales (actitud receptiva ante los bots y los algoritmos y reputación personal).

Por su parte, Dörr (2016) y Marconi y Siegman (2017) tienen claro que las competencias se enmarcan principalmente en el dominio de la lingüística computacional y de la computación científica, además de otras herramientas y programas informáticos, como las plataformas de optimización TweetDeck, Hootsuite, SocialFlow o Dogtrack, el dominio de herramientas como Open Refine y Overview y el conocimiento de plataformas generadoras de lenguaje natural aplicadas a la transformación de datos en noticias, como Wordsmith de Automaded Insights, Quill de Narrative science, OpenCalais, o API Natural Language de Cloud.

Estas aplicaciones tienen un papel destacado en este nuevo perfil profesional, por lo que se considera la opción de formar a los futuros periodistas en estas competencias y habilidades a corto o medio plazo, como ya advirtieron Calvo-Rubio y Ufarte-Ruiz (2020). Sobre todo, cuando en la próxima década impactará sobre el sector de la comunicación una nueva ola tecnológica que tendrá como protagonistas a la IA, el big data y a las nuevas interfaces visuales y basada en voz (Newman, 2020).

Esta vía de especialización profesional no ha sustituido hasta el momento a otros perfiles periodísticos, como advirtió Graefe (2016), sino que ha incrementado las opciones del modelo que configura los cometidos del trabajo periodístico en el ecosistema mediático actual (Sirén-Heikelet al., 2019). Ha introducido lo que Powers (2012) denomina formas de trabajo tecnológicamente específicas, que exigen una mayor colaboración de los periodistas con personal técnico (De-Lara-González & García-Avilés; Arias, 2022) y que constituye uno de los ejes sobre los que se sustenta el trabajo híbrido (Deuze & Beckett, 2022), entendido como una alianza que aúna los avances tecnológicos en el campo del procesamiento del lenguaje natural y el *deep learning* con los conocimientos adquiridos por el campo de las ciencias humanas y sociales. Con este concepto lo que se pretende es que el ser humano controle en todo momento el proceso, rechazando la idea ficticia de que las máquinas sustituirán el trabajo humano.

1.2. El impacto de la IA en las rutinas productivas de las radiotelevisiones públicas europeas

Los medios de servicio público (Public Service Media –PSM– en inglés) han tratado de garantizar su supervivencia aplicando fórmulas que les permitan explorar nuevos formatos para frenar su estancamiento y anticiparse a las nuevas audiencias (Túñez; Campos; Rodríguez, 2021). Entre las propuestas tecnológicas, destacan las soluciones automatizadas para todos los departamentos y empleados, a pesar de que la aplicación de herramientas inteligentes que seleccionan, filtran y distribuyen contenidos es especialmente delicada en estos medios que se constituyen con el objetivo de garantizar acceso a la información, la diversidad y la universalidad (Aslama-Horowitz & Nieminen, 2017).

Para Lindén (2017), la IA comenzó por cambiar las rutinas del periodista automatizando alguna de las funciones de búsqueda, clasificación o tratamiento de la información. En el caso de los PSM europeos, el impacto en las rutinas productivas ha sido diverso, al emplearse en la mayoría de los procesos de la cadena de producción periodística. En concreto, Sanjinés (2020a; 2020b) apunta que ha afectado a todas las rutinas profesionales, desde las más tempranas, como la detección de hechos noticiables, hasta las últimas de presentación de las noticias, pasando por la preservación digital de estos contenidos en el archivo. Sin embargo, Fieiras, Vaz y Túñez (2022) resumen este impacto en cuatro ámbitos diferentes: 1) producción: noticias, producción automatizada, metadatos; 2) gestión de contenidos: gestión de archivos, recomendaciones; 3) verificación; y 4) ampliación de servicios: traducción automática de contenidos, subtitulado automático para la accesibilidad de personas con discapacidad auditiva.

Sin embargo, no existe una gran homogeneidad entre los efectos que ha ocasionado en las radiotelevisiones públicas europeas, ya que depende, en gran medida, de la capacidad presupuestaria de cada corporación. No obstante, lo que está claro es que la implementación ha sido gradual desde 2014, cuando Yle Finlandia recurrió a la IA para distribuir y personalizar contenidos y redactar textos con herramientas inteligentes, permitiendo a los periodistas dedicarse a otras tareas menos repetitivas y más creativas. Esta experiencia pionera sirvió de estímulo para que otras corporaciones europeas se enfrascaran en prácticas similares, a pesar de que el desarrollo de prototipos basados en IA es costoso y complejo (Montal & Reich, 2017).

De esta manera, en las empresas del modelo corporativista democrático se registran diferentes grados y tendencias. La VRT belga recurre a esta tecnología para el subtitulado y la verificación de las noticias, mientras que en la RTBF la utiliza para el etiquetado automático de metadatos, el análisis del proceso de postproducción y la recomendación de contenidos. En Suecia, ayuda a los profesionales de la SVT en la creación automática de contenidos, al igual que en la corporación de radiodifusión pública de Dinamarca. Sin embargo, en la NPO, en los Países Bajos, se utiliza en toda la cadena de medios, desde la producción hasta la agregación y la difusión, a la vez que redacta subtítulos en directo, traduce en tiempo real y genera

de manera automática trailers y promociones. También realiza búsquedas de información en grandes bases de datos. En la ARD alemana se encarga del análisis de vídeo y de la traducción automática, mientras que en la RTS de Suiza genera los metadatos y realiza las búsquedas en archivo.

En las corporaciones del modelo pluralista polarizado, los profesionales de la RAI italiana experimentan con el procesamiento del lenguaje natural para generar el subtitulado automático de la voz en la transcripción de noticias, la recuperación de información y la recomendación automática de material informativo. En España, ayuda a los periodistas de RTVE en el subtitulado de programas informativos en lenguas regionales, en el reconocimiento facial y de voz para la generación de metadatos y en la generación automática de noticias con Narrativa y EFE. Por último, en France TV se aplica para indexar contenidos a mayor velocidad, en la redacción automatizada de partidos de fútbol y de procesos electorales, en la creación de vídeos automáticos para su difusión en redes sociales y en la recomendación de informaciones.

Por su parte, en las empresas del modelo liberal, la BBC recurre a sistemas de IA para adaptar automáticamente los contenidos a diferentes formatos bajo demanda, *y en* Irlanda, los profesionales de la RTÉ se sirven del aprendizaje automático para el análisis automatizado de bases de datos.

En todos los casos se aprecia un comportamiento adaptativo. La IA se ha incorporado a rutinas de redacción reiteradas que son identificadas y codificadas porque se basan en la simulación de lenguaje natural a través software que permite la creación robotizada de textos informativos elaborados por ordenador, pero con características idénticas a otro elaborado por un humano. Ante este escenario, las expectativas de la Unión Europea de Radiodifusión (2019) son elevadas, ya que considera que el avance de las tecnologías del lenguaje, como la traducción automática, el reconocimiento del habla y la transcripción de voz a texto, ofrecerá posibilidades apasionantes para los medios de comunicación del futuro.

2. Metodología

Esta investigación se plantea a modo exploratorio y descriptivo, con hipótesis ciega. El objetivo principal es ofrecer un análisis de la actividad empleadora de las radiotelevisiones públicas europeas en el contexto actual, protagonizado por la inteligencia artificial generativa (Carlson, 2015). Para este propósito se ha optado por un diseño metodológico ejecutado por etapas (Igartua, 2006), en las que se ha producido una triangulación metodológica (Gaitán & Piñuel, 1998), que es recomendada por Gómez-Diago (2010) y Soler y Enríquez (2012) para contrastar información entre distintas fuentes para obtener una contextualización suficiente de los fenómenos estudiados. Cada fase del proceso se describe a continuación de manera clara para que los investigadores puedan replicar el procedimiento en diferentes momentos y situaciones (Ortega, Pereira & Igartua, 2016).

En una primera fase, se ha realizado una revisión de la literatura científica, que forma parte de la investigación secundaria (Codina, 2017), y que ha permitido conocer las principales aportaciones sobre el tema objeto de estudio. En segundo lugar, se han delimitado las unidades de análisis. En concreto, se trabaja con una muestra intencional de conveniencia formada por diez corporaciones de radiotelevisión públicas de Europa: ARD (Alemania); BBC (Gran Bretaña); France TV (Francia); RAI (Italia); RTP (Portugal); RTVE (España); SVT (Suecia); VRT (Bélgica); Yle (Finlandia); ZDF (Alemania).

La técnica utilizada para examinar su actividad empleadora ha sido el análisis de contenido (Krippendorff, 1990; Ruiz, 1996), de naturaleza cualitativa, que ha permitido recoger la información necesaria a través de una ficha de análisis compuesta por cinco variables y catorce categorías acordes al objetivo que se persigue (Tabla 1). En cuanto a los parámetros de análisis, la variable canales (V1) analiza las plataformas o herramientas a través de las que las corporaciones ejecutan su actividad empleadora. En concreto, estudia si se produce mediante una página web independiente (C1), una sección en página web matriz corporativa (C2) o a través de la red profesional Linkedin (C3). La segunda variable permite identificar las ofertas laborales vigentes (V2), analizando si hay candidaturas abiertas para recibir currículums o si lanzan ofertas cerradas para puestos concretos (C4). Dentro de esta variable también se examinan si las ofertas están destinadas a cubrir puestos tradicionales (C5) o son de corte tecnológico y digital relacionadas con la automatización (C6). La variable tercera persigue detectar las principales habilidades demandadas (V3), diferenciando entre competencias blandas (C7) y técnicas (C8). La ficha de análisis también contempla el mecanismo de contratación (V4), es decir, los pasos y trámites a seguir para presentar una candidatura (C10). Por último, estudia el *employer branding* (V5), examinando si el medio cuenta con un lema de captación (C11), con testimonios de los empleados (C12), o bien presenta sus atributos (C13) y prestaciones (C14).

Los investigadores han aplicado estos parámetros en paralelo a cada unidad de estudio entre el 1 y el 15 de abril de 2023, para garantizar la fiabilidad de la codificación, previa definición de las pautas (*double-check*), siendo revisadas las posibles contradicciones en reuniones precedentes. Los resultados obtenidos se complementan, en cuarto lugar, con la realización de entrevistas cualitativas en profundidad a profesionales responsables de los departamentos de innovación y tecnología de France TV, RTVE, RTP, ZDF y de la EBU, siendo la muestra final de seis entrevistados (Tabla 2). La selección responde a criterios de accesibilidad para los investigadores.

Tabla 1. Ficha de análisis de la actividad empleadora de las corporaciones.

VARIABLES	CATEGORÍAS
V1. Canales	C1. Página web independiente
	C2. Sección en página web matriz corporativa
	C3. Red profesional: Linkedin
V2. Ofertas laborales vigentes	C4. Tipos de procesos de selección: ofertas cerradas/candidaturas abiertas
	C5. Ofertas tradicionales:
	C6. Ofertas digitales
V3. Habilidades solicitadas	C7. Competencias blandas
	C8. Competencias técnicas
V4. Mecanismo de contratación	C9. Buscador de empleo por Palabras clave: SI/NO
	C10. Pasos de tramitación de candidatura
V5. Employer branding	C11. Lema de captación: Sí/No
	C12. Testimonios de los empleados: Sí/No (textualidad, videos, audios)
	C13. Atributos
	C14. Prestaciones

Fuente: elaboración propia.

Tabla 2. Muestra intencional de conveniencia de profesionales entrevistados.

Abreviatura	Nombre	Corporación	Cargo
(UG/RTVE)	Urbano García	RTVE	Director de innovación
(PV/RTVE)	Pere Vila	RTVE	Director de tecnología
(GM/RTP)	Gonzalo Madail	RTP	Director de innovación
(SS/EBU)	Sasha Scott	EBU	Director de Servicios de Transformación
(KB/France Tv)	Kati Bremme	France TV	Directora de AI Insights
(RA/ZDF)	Robert Amlung	ZDF	Director de estrategia digital

Fuente: elaboración propia.

Los encuentros se realizaron mediante Microsoft Teams, entre el 10 de diciembre de 2022 y el 30 de enero de 2023, con una duración media de 25 minutos. Se ha trabajado con un cuestionario semiestructurado que nunca ha superado las 8 preguntas y en el que se han incluido cuestiones específicas para cada corporación. Los bloques temáticos en torno a los que se han agrupado las preguntas han sido: habilidades interpersonales y técnicas demandadas a los nuevos profesionales; peso relativo de los perfiles digitales y tecnológicos en su corporación; previsión de cambio en las competencias y tareas de los periodistas; y retos de las corporaciones en relación con la digitalización de sus equipos humanos y departamentos, así como con la actualización de sus perfiles.

Las entrevistas han sido grabadas y transcritas para proceder a un análisis de contenido que ha permitido una interpretación en profundidad de los datos en relación con los objetivos de la investigación. El análisis de contenido se ha desarrollado con la asistencia del software Atlas.ti en su versión 9.1.7 para Windows y se ha realizado en cuatro etapas: 1) Registro de la información a partir de la transcripción de las entrevistas; 2) Codificación de los datos; 3) Identificación de la información recabada sobre cada uno de los aspectos vinculados a los objetivos; y 4) Interpretación final de los resultados obtenidos. La codificación y categorización de los datos han sido replicadas y consensuadas para evitar posibles subjetividades y garantizar la fiabilidad de los resultados.

Irvine, Drew y Sainsbury (2012) sostienen que las entrevistas son útiles para conocer las perspectivas de los sujetos entrevistados, así como sus categorías mentales, interpretaciones, sentimientos y prospectivas. Con esta combinación metodológica se ha visualizado el problema de investigación desde diferentes ángulos y se han evitado sesgos y fallas metodológicas para optimizar la validez y la consistencia de los hallazgos (Okuda & Gómez, 2005).

3. Resultados

Una vez completado el análisis individualizado de cada una de las corporaciones de la muestra se observa que la proliferación de ofertas de componente digital no supone la desaparición de oportunidades de empleo para puestos periodísticos tradicionales, sino que hay un equilibrio de publicación entre ambas tipologías. En tanto que en el apartado convencional se siguen reclamando profesionales especializados para todas las fases del *newsmaking*, los puestos tecnológicos se vinculan principalmente a funciones de ingeniería de datos, ciberseguridad, gestión de big data

y *cloud*, sin reclamar las emisoras, salvo en casos excepcionales, profesionales especializados en aprendizaje automático o expertos en inteligencia artificial.

Se identifican semejanzas entre corporaciones en las habilidades técnicas e interpersonales demandadas, siendo la adaptabilidad al cambio y la polivalencia las competencias más valoradas en las *soft skills*, mientras que en el aspecto técnico se solicitan destrezas en análisis, administración y uso de bases de datos, en diseño UX/UI (experiencia de usuario), diseño 3D, redes sociales, SEO, o marketing digital, y SI (sistemas y redes de transmisión), sin ser frecuente la demanda de habilidades específicas para el desarrollo de prototipos basados en *machine learning* o IA.

Conforme a los procedimientos relacionados con su actividad empleadora, la mayor parte de las emisoras operan de forma semejante en cuanto a canales, tipos de procesos de selección, y funcionamiento de estos. En el proceso de construcción de su marca empleadora, los discursos corporativos de empresas como la BBC, France Tv, VRT o ARD son los más elaborados y trabajan con propuestas de *storytelling* y campañas de atracción a nuevos talentos y profesionales. La RTP es la corporación que tiene menos explotado este apartado, al emplear su portal de contratación únicamente para la aplicación a puestos y tramitación de solicitudes.

El resto de las emisoras comienzan tímidamente a incorporar herramientas y recursos para la captación de trabajadores, y se identifica una reorientación de sus mensajes corporativos y frases de venta, antes orientados a la promoción de productos y servicios, y ahora otorgando un mayor énfasis a publicitar entornos de trabajo idílicos, con perspectiva de género, inclusividad, y proyección futura digital, tecnológica e innovadora.

3.1. Canales empleados, tipos y funcionamiento de los procesos de selección

Los principales canales empleados por las radiotelevisiones públicas europeas para desempeñar su actividad empleadora son herramientas propias desarrolladas en sitios web independientes a su página matriz corporativa; secciones dentro de su web principal; o la sección 'Empleos' de su perfil de Linkedin, sin recurrir a otras redes sociales o portales de empleo para promocionar sus ofertas o ejecutar los trámites de selección y contratación.

BBC, France Tv y Rai trabajan con sistemas alojados en sitios independientes a su página matriz, mientras que el resto de las corporaciones observadas integran una sección dentro de su web principal. Las acciones acometidas en estos espacios incluyen la proyección de ofertas laborales, la gestión y tramitación de las solicitudes a los puestos y envío de currículums, la construcción de marca empleadora y la promoción de los atributos y prestaciones que brinda cada corporación a sus empleados.

A excepción de RTVE y RTP, el resto de las emisoras vuelcan sus ofertas en la sección de 'Empleos' de su perfil de Linkedin, pero sólo contemplan este canal para replicar las propuestas, redireccionando al candidato interesado a sus herramientas en el momento de formalizar la solicitud (Tabla 3).

Tabla 3. Canales empleados por las corporaciones en su actividad empleadora.

Corporación	Canales empleados en su actividad empleadora
BBC	Herramienta propia. Página web independiente: BBC Carreras
	Linkedin: Perfil BBC, sección 'Empleos'
France TV	Herramienta propia. Página web independiente: France TV Contratación
	Linkedin: Perfil France TV, sección 'Empleos'
RTP	Sección en su página web matriz corporativa: Candidaturas
	No usan Linkedin para ofertar empleos
ZDF	Sección en su página web matriz corporativa: Ofertas de trabajo /ZDF como empleador
	Linkedin: Perfil ZDF, sección 'Empleos'
VRT	Sección en su página web matriz corporativa: VRT Trabajos
	Linkedin: Perfil VRT, sección 'Empleos'
RTVE	Sección en página web matriz corporativa: Convocatorias
	No usan Linkedin para ofertar empleos
YLE	Sección en su página web matriz corporativa: Carreras
	Linkedin: Perfil Yle, sección 'Empleos'
ARD	Sección en su página web matriz corporativa: Carreras
	Linkedin: Perfil ARD, sección 'Empleos'
SVT	Sección en página web matriz corporativa: 'Trabaja aquí'
	Linkedin: Perfil SVT, sección 'Empleos'
RAI	Herramienta propia. Página web independiente: 'Trabaja con nosotros'
	Linkedin: Perfil RAI, sección 'Empleos'

Fuente: elaboración propia.

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La mayor parte de las televisiones estudiadas presenta ofertas laborales cerradas para puestos específicos, sólo la Rádio e Televisão de Portugal centra su actividad en una convocatoria abierta permanente, y tanto France Tv, como la VRT, SVT o Rai combinan ambas tipologías de procesos. RTVE es la única corporación que trabaja exclusivamente con convocatorias de oposiciones, y todas reservan un apartado con las ofertas destinadas a profesionales noveles o en prácticas (Tabla 4).

Tabla 4. Tipos de procesos de selección utilizados por las corporaciones.

Corporación	Tipos de procesos de selección utilizados
BBC	Ofertas para puestos concretos
	Sin convocatoria abierta permanente para recepción de CV
France TV	Combinan ofertas para puestos concretos y convocatoria abierta permanente
RTP	Principalmente trabajan con una convocatoria abierta permanente
	Diferencian entre candidaturas a puestos oficiales o para la realización de prácticas.
	Reservan un espacio para introducir la referencia de oferta a un puesto concreto. En el momento de consulta la única opción activa es: 'Candidatura espontánea'
ZDF	Ofertas para puestos concretos
	Sin convocatoria abierta permanente para recepción de CV: "las candidaturas no solicitadas para la entrada directa en un puesto no son muy prometedoras, y solo se pueden asignar a los anuncios de trabajo actuales disponibles".
VRT	Combinan ofertas para puestos concretos y convocatoria abierta permanente
	Ofrecen la suscripción a un boletín semanal con ofertas de empleo
RTVE	Concursos de oposición
	Sin convocatoria abierta permanente para recepción de CV
YLE	Ofertas para puestos concretos
	Sin convocatoria abierta permanente para recepción de CV
ARD	Ofertas para puestos concretos
	Sin convocatoria abierta permanente para recepción de CV
SVT	Combinan ofertas para puestos concretos y convocatoria abierta permanente
RAI	Combinan ofertas para puestos concretos y convocatoria abierta permanente

Fuente: elaboración propia.

Para simplificar la localización de ofertas, las corporaciones incluyen buscadores de empleo a partir de Palabras clave: La herramienta de la VRT contiene los filtros más precisos, al permitir búsquedas por departamentos o por tipo de contrato, mientras que ni RTVE ni ZDF integran este instrumento en sus propuestas. Con relación al funcionamiento de los procesos de selección, la aplicación a las ofertas se estructura de forma semejante desde las corporaciones: envío de una carta de motivación y del currículum; entrevistas personales para realizar pruebas específicas en función del puesto; y resolución del proceso.

Las primeras entrevistas suelen consistir en un filtro con el equipo de recursos humanos, que redirige a los candidatos seleccionados a un segundo encuentro con la persona responsable del departamento de destino. Las pruebas más comunes realizadas a los solicitantes incluyen idiomas; test de cultura general; entrevistas cognitivo-motivacionales; pruebas psicotécnicas intensivas; y evaluación de habilidades específicas en función del puesto (redacción; locución; edición; resolución de casos prácticos).

Para otras modalidades de contratación, la BBC tiene una base de datos 'BBC Talent Cloud' dirigida a *freelancers* que buscan reservas o contratos de trabajo a corto plazo en el Reino Unido, y brindan un soporte inclusivo para la presentación de candidaturas a personas con discapacidad a través de diferentes soluciones: subtítulos sobre Zoom, tiempo adicional de respuesta, o adaptación de preguntas.

3.2. Ofertas de empleo vigentes y habilidades interpersonales y técnicas demandadas

La irrupción de la inteligencia artificial generativa en el sector de la comunicación recondujo gran parte de las tareas periodísticas tradicionales vinculadas a las diferentes fases del *newsmaking*, lo que urgió a los medios a poner en marcha planteamientos estratégicos de reconversión y de captación de nuevos profesionales cualificados y especializados en estas tecnologías.

Sin embargo, este fenómeno no se traduce por el momento en el caso de las radiotelevisiones públicas europeas en un reclamo activo de profesionales con conocimientos específicamente enlazados a la IA o al aprendizaje automático, sino que lo habitual es que se soliciten perfiles tecnológicos asociados a procesos digitales de gestión, arquitectura o tratamiento de big data, más que otros destinados a funciones de desarrollo de prototipos automatizados o generativos. Esta circunstancia se está propagando de forma paralela a la actividad empleadora convencional de las corporaciones, manteniendo sus necesidades tradicionales de personal orientado a las funciones clásicas del periodismo audiovisual (Tabla 5).

Tabla 5. Ofertas de empleo vigentes en las corporaciones relacionadas con puestos tradicionales.

Corporación	Ofertas de empleo vigentes relacionadas con puestos tradicionales
BBC	Periodista redactor; editor de vídeos; comercial
France TV	Jefe de sonido; técnico de medios; técnico de operaciones de vídeo y audiovisuales; redactor reportero; documentalista multimedia; prevención de riesgos; documentalista; electricista; mezclador de sonido; recursos humanos y diversidad
RTP	Sin ofertas para puestos concretos
ZDF	Abogado; ingeniero de sonido; contabilidad; mezclador de imagen; administrativo; jefe de producción; redactor; editor de vídeo
VRT	Recursos humanos; reportero corresponsal; jefe de género entretenimiento; gerente en el departamento de logística
RTVE	Documentación; edición, montaje y procesos audiovisuales; efectos especiales; iluminación; información gráfica y captación de imagen y sonido; información y contenidos; producción de contenidos audiovisuales y multimedia; producción; realización y edición audiovisual; imagen, sonido y luminotecnia
YLE	Diseño y producción; productor de estudio y exterior; periodista/redactor; redactor digital
ARD	Editor en redacción; periodistas producciones de gran formato; gestor de proyectos editoriales; director de tecnología de producción; redactor/reportero; publicista; puestos multimedia; gestión de programas de radio; gestión de grabación; diseñadores gráficos, producción
SVT	Editor de fotos, productor, periodista/redactor, reportero, gerente de programa
RAI	Técnicos de producción, diseñadores, redactores, programadores multimedia y publicista

Fuente: elaboración propia.

Las ofertas con componente digital en las corporaciones son cada vez más diversas y especializadas. Se identifican puestos relacionados con la gestión y analítica de bases de datos, con la producción de contenidos en redes sociales y plataformas alternativas, ciberseguridad, investigación y desarrollo, ingeniería de software, diseño de experiencia de usuario, servicios en la nube, *business intelligence*, 3D o aprendizaje automático, entre otras.

En el caso de la BBC, ofertan programas de aprendizaje intensivo para talento joven en su sección 'BBC Early Careers', a través de lo que forman internamente en sus estructuras a nuevos profesionales en los puestos que comienzan a irrumpir en el renovado contexto televisivo digital (Tabla 6).

Tabla 6. Ofertas de empleo vigentes con componente digital en las corporaciones.

Corporación	Ofertas de empleo vigentes con componente digital
BBC	Arquitecto principal de infraestructuras de BBC Studios; periodista de noticias de audio digital; analista de datos; jefe de YouTube BBC Children's and Education; jefe de social media en BBC Children's and Education.
	Oferta para talento joven en BBC Early Careers: secciones de periodismo; producción; negocio; y diseño, ingeniería y tecnología, en la que ofertan las siguientes becas: seguridad cibernética; ciencias de datos; aprendizaje profesional basado en datos; ingeniería en sistemas de radiodifusión y medios; investigación y desarrollo; ingeniería de software; o diseño de experiencia de usuario
France TV	Gerente de publicaciones digitales; analista de datos CRM; aprendizaje digital; *community manager*; diseñadora gráfica; QA Front Engineer; gerente de publicaciones digitales; asistente de ciberseguridad; ingeniero de infraestructuras digitales; *cloud* y servicios Microsoft; gerente de comunicación TI; técnico informático y redes
RTP	Sin ofertas para puestos concretos
ZDF	Gerente de distribución digital y social media; redactora de distribución y redes sociales; desarrollador de formato; ingeniero de datos, científico de datos o arquitecto de datos; líder de equipo editorial de redes sociales; soporte de TI; analista de datos y redes sociales
VRT	Ingeniero de redes sociales y formato corto; ingeniero de soporte de medios; desarrollador Android Nativo; asesor de políticas de archivo VRT; creativo visual Nws; gerente de productos digitales; experto en *business intelligence*
RTVE	Sin ofertas con componente digital en el momento de consulta
YLE	Desarrolladores de software y especialistas en datos; diseñador de gráficos en 3D
ARD	Ingeniero de medios, producción virtual, periodista especialista en redes sociales, administrador de plataformas
SVT	Desarrollador de Android, experto en datos y aprendizaje automático
RAI	Sin ofertas con componente digital en el momento de consulta

Fuente: elaboración propia.

En cada una de las ofertas, las radiotelevisiones concretan aquellas habilidades necesarias para acceder al puesto, dividiéndolas entre competencias blandas o interpersonales y técnicas. También lo hacen de forma genérica en sus discursos corporativos de creación de marca empleadora, resaltando determi-

nadas aptitudes que consideran cruciales y que son atribuibles a la mayoría de los trabajadores, independientemente de su ocupación en la corporación.

En lo referido a las habilidades blandas, requieren profesionales con talento, creativos, ambiciosos, entusiastas, positivos, con capacidad psicofísica y sensorial, con espíritu de equipo, cultura amigable, coraje periodístico, comprometidos y con facilidad para el trabajo en equipo, mientras que en el apartado técnico hacen alusión a habilidades en análisis, administración y uso de bases de datos, en diseño UX/UI (experiencia de usuario), diseño 3D, redes sociales, SEO, o marketing digital, y SI (sistemas y redes de transmisión), sin identificarse por el momento un reclamo firme de destrezas relacionadas con la ejecución de procesos de *machine learning*.

3.3. Creación de marca empleadora: lema de captación, recursos empleados, atributos y prestaciones promocionadas

La competencia existente décadas atrás entre los profesionales de la información por acceder a los puestos disponibles se traslada ahora a los medios de comunicación, con procesos activos por promocionar sus ecosistemas laborales como espacios modernos, innovadores, creativos, con proyección profesional, inclusivos, y con el mayor número de prestaciones.

Esta construcción de *employer branding* o marca empleadora se ejecuta desde todas las corporaciones analizadas a excepción de la Rádio e Televisão de Portugal, cuyo espacio de presentación de ofertas es sintético, minimalista, y sin *storytelling* para la captación de profesionales. El resto de las corporaciones emplean frases de venta en sus propuestas, integran los testimonios de sus empleados y promocionan diferentes atributos y prestaciones para llamar la atención de nuevos profesionales.

Tanto la BBC (‘Esta es tu BBC’), como France Tv (‘¿Y si mañana fueras tú?’) inciden en su lema de captación en el prestigio de trabajar en sus estructuras, mientras que el resto de las corporaciones emiten mensajes más directos, apelando al sentido de pertenencia, con alusiones constantes a “nosotros”, “únete a nosotros”, “trabaja con nosotros” (Tabla 7).

Tabla 7. Lemas de captación de trabajadores empleados en las corporaciones de la muestra.

Corporación	Lema de captación
BBC	Esta es tu BBC
France TV	¿Y si mañana fueras tú?
RTP	No emplean un lema de captación en la creación de marca empleadora
ZDF	No emplean un lema de captación en la creación de marca empleadora
VRT	Trabajar en la VRT es trabajar en una empresa dinámica e innovadora
RTVE	No emplean un lema de captación en la creación de marca empleadora
YLE	Para todos nosotros, para cada uno de nosotros
ARD	Nosotros, la ARD
SVR	¡Ven y únete a nosotros!
RAI	Trabaja con RAI

Fuente: elaboración propia.

Es habitual que las radiotelevisiones públicas de Europa recurran a los testimonios de sus trabajadores para relatar su experiencia en la corporación y convencer a nuevos profesionales. Los formatos más frecuentes son vídeos de entrevistas, citas textuales con declaraciones relevantes, o entrevistas escritas. La ZDF, RTVE, Rai o RTP no emplean esta técnica, el resto de las corporaciones reservan un espacio específico en sus portales.

Los atributos y valores de los que presumen las emisoras para la atracción de profesionales se vinculan, en líneas generales, a la innovación, diversidad e inclusividad, a la digitalización, modernidad y creatividad, a la progresión profesional, cercanía, capacitación y desarrollo, a la independencia, equidad, y confiabilidad, y al dinamismo, calidad, y sostenibilidad, entre otras. Estos términos desvelan la orientación de los discursos corporativos, así como sus percepciones sobre aquellos principios que son de interés para los candidatos y con los que pretenden convencerlos para que se presenten a sus ofertas.

Respecto a las prestaciones promocionadas para atraer al personal se identifican dos vertientes opuestas: las corporaciones que hacen especial hincapié y atienden a estas cuestiones y las que prácticamente ni lo mencionan, como es el caso de Rai, Yle, RTVE, o RTP. La SVT o la ARD se limitan a aludir a la amplia variedad de programas de prácticas para jóvenes talentos y estudiantes egresados, mientras que la BBC, France Tv, ZDF o VRT centran parte de su proceso de creación de marca empleadora en publicitar su gama de cursos y certificaciones internas y externas; sus paquetes salariales justos y competitivos; semanas laborales flexibles para el equilibrio entre el trabajo y vida personal; espacios de trabajo colaborativos; planes de pensiones, seguros dentales o de salud; convenios de discapacidad; gimnasios y clases de deporte; convenios para la igualdad de género o paternidad; transporte público gratuito; o servicios de guardería y de restaurante bonificado, entre otras.

3.4. La opinión de los expertos

Los profesionales entrevistados coinciden en que las habilidades interpersonales son las más valoradas en el perfil de los trabajadores de su corporación. La adaptabilidad al cambio se alza como la competencia prioritaria en un contexto digital acechado por permutas constantes que se han dinamizado todavía más con la aparición de la inteligencia artificial generativa. El trabajo en equipo, la empatía, la inteligencia emocional, el liderazgo, la predisposición a aprender y renovarse, serán valores clave en los nuevos perfiles profesionales, los que se complementarán con mayores conocimientos específicos para la resolución de tareas concretas relacionadas con las nuevas tecnologías, la IA y el aprendizaje automático.

Para Urbano García, director de innovación de Radiotelevisión Española la polivalencia de los periodistas no consiste en que todos sepan realizar cualquier función específica, sino que estén en condición y voluntad de poder hacerlo. Asimismo, divide las competencias de los profesionales del sector en tres grupos: las habilidades técnicas; las digitales; y las blandas.

> (UG/RTVE): "Yo distingo tres tipos de competencias: unas técnicas que son las que se adquieren en las facultades, otras digitales, que por su importancia actual las desgajo de las técnicas, y otras que para mí serán las más importantes en el entorno de la comunicación que son las *soft skills* o habilidades interpersonales".

Pere Vila, director de tecnología de RTVE, matiza una diferencia entre los perfiles necesarios para los periodistas, y para los ingenieros que comienzan a incorporar a su estructura. Se requieren profesionales experimentados en la mayoría de soportes y funciones, y con la mente abierta para adaptarse y especializarse en función de las necesidades. En cambio, en el caso de los ingenieros o especialistas en tecnologías como la inteligencia artificial, se prioriza que sean noveles, recién graduados o con conocimientos de última generación, para lo que Pere Vila considera que será fundamental que las universidades comiencen a incorporar laboratorios de innovación para profundizar en las últimas tendencias en la fase final de formación.

En este sentido, Sasha Scott, director de Servicios de Transformación de la EBU, apunta que las corporaciones ya están buscando e incorporando a "gente más enfocada a lo digital y a procesos de aprendizaje automático", con conocimientos profundos sobre la gestión y análisis de datos, para entenderlos y utilizarlos para corregir y optimizar situaciones. Considera Scott que las corporaciones de radiotelevisión pública de Europa están en el momento de hacer crecer sus equipos digitales de forma progresiva, de desarrollarlos para ejecutar una transición que no tenga efectos negativos sobre sus estructuras.

Este avance y desarrollo digital, y la implementación de soluciones automatizadas, permitirá a los periodistas liberarse de las labores más banales y rutinarias. De esta forma, los profesionales podrán ejecutar funciones que doten de un mayor valor a los contenidos de los medios de servicio público, tareas que para Kati Bremme, directora de AI Insights de France Tv, consisten en contextualizar, profundizar, investigar y verificar.

> (KB/France Tv): "Creo que el papel y la forma de trabajar periodismo cambiará. Se necesitan más competencias, pero no especialmente competencias técnicas. Son más competencias de gestión de proyectos y de ser capaces de trabajar en equipos mixtos con ingenieros expertos en inteligencia artificial, por ejemplo".

Para Robert Amlung, director de Estrategia Digital de ZDF, los roles serán los mismos que hasta ahora, pero los periodistas se deberán adaptar a nuevos entornos comunicativos, plataformas, actores y modos de interrelación. Sin embargo, la esencia del periodista no debe cambiar, ya que su papel es el de "ser curioso, tener una mente independiente, conservar su gusto por investigar la información para ser justo y escuchar todas las voces que influyen en un hecho concreto".

Gonzalo Madail, director de Innovación de la Rádio e Televisão de Portugal, incide en lo fundamental de crear equipos mixtos y polivalentes, con profesionales especializados que se complementen entre ellos. Los diferentes integrantes de los equipos tienen aptitudes y habilidades diferentes que los responsables de los departamentos deben conocer y potenciar para optimizar el rendimiento de cada profesional, atribuyéndole las funciones en las que "genera un mayor valor individual con el objetivo de contribuir al valor colectivo agregado".

4. Conclusiones

La investigación presentada es pionera en el estudio de la actividad empleadora de las radiotelevisiones públicas europeas en el contexto actual de irrupción de la inteligencia artificial generativa, de lo que se obtiene una panorámica completa que sirve de exploración tentativa preliminar y que abre futuras avenidas de análisis. En este sentido, será de interés en la próxima etapa del sector plantear un enfoque diacrónico comparado que aborde la evolución de los perfiles y de las estrategias de captación y retención de talento, así como establecer paralelismos con el papel de las universidades y las variaciones en su oferta formativa vinculadas a las demandas profesionales de los medios.

Una vez efectuado un análisis de contenido de naturaleza cualitativa a partir de 5 variables: 1) canales de ejecución de la actividad empleadora; 2) ofertas laborales vigentes; 3) habilidades demandadas; 4) mecanismos de contratación; y 5) construcción de *employer branding* o marca empleadora-; y tras realizar entrevistas cualitativas en profundidad con los responsables de innovación de estas corporaciones, es posible concluir que la proliferación y multipli-

cación de ofertas laborales cerradas con un fuerte componente digital (analítica de bases de datos, producción de contenidos en redes sociales, ciberseguridad, ingeniería de software, diseño de experiencia de usuario, servicios en la nube, *business intelligence*, 3D o aprendizaje automático) no supone la reducción de las ofertas para puestos convencionales, sino que ambas líneas se establecen de forma paralela (Q3/Q5), lo que coincide con las aportaciones previas de académicos y profesionales, que apuntan a que el avance del periodismo digital supone, ante todo, una revaloración de los principios esenciales de la disciplina (Cruz Álvarez & Suárez Villegas, 2017; Salaverría, 2016; Spyridou et al, 2013; Casero Ripollés & Castillo, 2013; entre otros). Los puestos relacionados específicamente con la automatización o la inteligencia artificial son reducidos, y por el momento no se cuantifica un número de ofertas reseñables vinculadas a estas tecnologías (Q4).

Las corporaciones incluyen en la descripción de sus propuestas laborales las competencias técnicas e interpersonales necesarias para ocupar cada puesto, pero también integran en su discurso corporativo de construcción de marca empleadora diferentes habilidades que son de interés para cualquier profesional que se integre en su estructura. En ello coinciden los profesionales entrevistados, que apuntan como competencias blandas fundamentales la adaptabilidad al cambio, el trabajo en equipo, la empatía o el compromiso; y en el apartado técnico a todas aquellas funciones relacionadas con la gestión, analítica y uso de datos para para optimizar procesos y reorientar tareas (Q5), sin estar estas *hard skills* particularmente asociadas a procedimientos de *machine learning* (Q4).

A partir del análisis de contenido se identifica que las emisoras completan una actividad empleadora semejante en relación con los parámetros estudiados, siendo la BBC, France Tv, VRT y ARD las corporaciones que más han modernizado sus portales de contratación y las que más han innovado en cuanto a las herramientas y el discurso de creación de marca empleadora, destacando los beneficios emocionales y racionales que proporcionan a sus empleados (Barrow & Mosley, 2005).

Además de los canales propios de contratación –páginas web independientes o secciones dentro de sus webs corporativas– es frecuente que las emisoras vuelquen sus ofertas laborales en Linkedin para redirigir posteriormente a los solicitantes a sus propios espacios (Q1/Q2); también, que realicen pruebas de selección basadas en idiomas, cultura general, entrevistas cognitivo-motivacionales, pruebas psicotécnicas intensivas, y en la evaluación de habilidades específicas en función del puesto. El primer corte de entrevistas suele ser un filtro con el departamento de recursos humanos para posteriormente acceder a encuentros con los responsables de las secciones de destino (Q7).

Las radiotelevisiones públicas europeas recurren a la potenciación de su marca empleadora con el objetivo de distanciarse de otras corporaciones y alcanzar una ventaja competitiva en el disputado mercado del talento (Q8) (Blasco-López, Rodríguez-Tarodo, & Fernández-Lores, 2014). Lo hacen mediante lemas corporativos que apelan a un sentido de pertenencia para los candidatos y al prestigio de incorporarse a sus estructuras; mediante los testimonios de sus empleados; promocionando atributos y valores como la innovación, diversidad, inclusividad, digitalización, modernidad o creatividad; y ofreciendo prestaciones como formaciones internas, paquetes salariales justos, semanas laborales flexibles, planes de pensiones, transporte gratuito o servicios de guardería y de restaurante bonificado, entre otros (Q9).

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* Este artículo forma parte de las actividades del proyecto “Medios audiovisuales públicos ante el ecosistema de las plataformas: modelos de gestión y evaluación del valor público de referencia para España” (PID2021-122386OB-I00), financiado por el Ministerio de Ciencia e Innovación (España), AEI y Feder, UE. Además de integrarse en las actividades de la ‘Cátedra RTVE-USC sobre Medios de Servicio Público en Europa’ y del proyecto de investigación "Inteligencia artificial y Periodismo: contenidos, audiencias, retos y desarrollo curricular (2023-GRIN-34286)", financiado dentro del Plan Propio de Investigación, cofinanciado en un 85% por el Fondo Europeo de Desarrollo Regional (FEDER). El autor César Fieiras Ceide tiene un contrato FPI del Ministerio de Ciencia e Innovación de España con la referencia (PRE2022-103954).

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Revista Mediterránea de Comunicación
Mediterranean Journal of Communication

Revista Mediterránea de Comunicación (RMC)
Mediterranean Journal of Communication (MJC)
ISSN: 1989-872X

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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

Deadlines | Received: 29/10/2024 - Reviewed: 30/04/2024 - Accepted: 12/05/2024- Published: 01/07/2024

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.

Fieiras-Ceide, C., Crespo-Pereira, V., & Túñez-López, M. (2024). Innovación y metaverso: primeras experiencias y casos de uso en los medios públicos de Europa [Innovation and metaverse: first experiences and use cases in European Public Service Media]. *Revista Mediterránea de Comunicación/Mediterranean Journal of Communication, 15*(2), e26903. https://www.doi.org/10.14198/MEDCOM.26903

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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?

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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.

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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

USC UNIVERSIDADE DE SANTIAGO DE COMPOSTELA

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 (Fieiras 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 (Fieiras et al., 2023), which is subject to the difficulty expressed by corporations to incorporate professionals specialized in AI (Fieiras 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.

USC UNIVERSIDADE DE SANTIAGO DE COMPOSTELA

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

USC UNIVERSIDADE DE SANTIAGO DE COMPOSTELA

Abbreviation	Professional	Corporation	Post
(GC/RTÉ)	Conrad Gouws	RTÉ	Technical architect
(GM/RTP)	Gonzalo Madail	RTP	Innovation Director
(LB/RTS)	Léornard 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.

USC UNIVERSIDADE DE SANTIAGO DE COMPOSTELA

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.

USC UNIVERSIDADE DE SANTIAGO DE COMPOSTELA

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.

USC UNIVERSIDADE DE SANTIAGO DE COMPOSTELA

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, bobsleighing, 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.

USC UNIVERSIDADE DE SANTIAGO DE COMPOSTELA

Corporation	Metaverse projects developed
France TV	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. 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

USC UNIVERSIDADE DE SANTIAGO DE COMPOSTELA

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

7. Acknowledgement

Translator: Martín Vaz Álvarez.

8. Funding

This paper is part of the activities of the research project "Public audiovisual media in the face of the platform ecosystem: management models and evaluation of the public value of reference for Spain" (PID2021-122386OB-I00), funded by the Ministry of Science and Innovation (Spain), State Research Agency and ERDF, EU. Besides being integrated in the activities of the 'RTVE-USC Chair on Public Service Media in Europe'. The author César Fieiras Ceide has an FPI contract from the Spanish Ministry of Science and Innovation with reference (PRE2022-103954).

This paper is part of the special issue "Communication, social innovation and sustainability" belonging to the R+D+I Project "Innovation ecosystems in the communication industry: players, technologies and configurations for the emergence of innovation in media and communication" (INNOVACOM), with reference PID2020-114007RB-I00. It was funded by the Ministry of Science, Innovation and Universities, AEI/10.13039/501100011033.

Proyecto *INNOVACOM* ***PID2020-114007RB-I00*** financiado por:

9. Declaration of conflict of interest

The authors declare that there is no conflict of interest.

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RETOS Y DESAFÍOS DEL PERIODISMO DE INMERSIÓN:

narrativas, formatos y prácticas profesionales

Tendencias y previsiones de innovación en la realización audiovisual y retransmisión de eventos deportivos: optimización de la experiencia de usuario en DAZN y Movistar Plus+

TRENDS AND FORECASTS FOR INNOVATION IN AUDIOVISUAL PRODUCTION AND BROADCASTING OF SPORTING EVENTS: OPTIMISING THE USER EXPERIENCE AT DAZN AND MOVISTAR PLUS+

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Resumen

El objetivo de este trabajo es identificar las tendencias y previsiones de innovación en la realización audiovisual, así como analizar la retransmisión y la experiencia de usuario en el consumo de eventos deportivos. El enfoque de la investigación es de carácter exploratorio y descriptivo, con una metodología cualitativa basada en el estudio de casos enfocado a dos plataformas: DAZN y Movistar Plus+. El estudio se combina con entrevistas semiestructuradas en profundidad a directores

IC – Revista Científica de Información y Comunicación 20 (2023) • pp. 253-274 • E-ISSN: 2173-1071 •
https://dx.doi.org/10.12795/IC.2023.I20.11

IC – Revista Científica de Información y Comunicación 20 (2023) • pp. 253-274 • E-ISSN: 2173-1071 • https://dx.doi.org/10.12795/IC.2023.i20.11

editoriales, gerentes y jefe de medios de ambas marcas. Los resultados revelan que los eventos deportivos son un espacio referente para la experimentación de técnicas de realización audiovisual y retransmisión en directo, a lo que se une la optimización de la experiencia de usuario en la fase de distribución, visualización e interacción con las propuestas de contenidos.

Palabras clave

Innovación; retransmisión audiovisual; realización audiovisual deportiva; experiencia de usuario; DAZN; Movistar Plus+.

Abstract

The aim of this work is to identify the trends and forecasts of innovation in audiovisual production, as well as to analyse the broadcasting and user experience in the consumption of sporting events. The research approach is exploratory and descriptive, with a qualitative methodology based on a case study focused on two initiatives: DAZN and Movistar Plus+. The study is combined with semi-structured in-depth interviews with editorial directors, managers and media managers of both brands. The results reveal that sporting events are a benchmark space for experimenting with audiovisual production techniques and live broadcasting, as well as optimising the user experience in the distribution, viewing and interaction phase with the content proposals.

Keywords

Innovation; audiovisual broadcasting; audiovisual sports production; user experience; DAZN; Movistar Plus+.

Sumario / *Summary*

1. Introducción / *Introduction.*
2. Metodología / *Methodology.*
3. 3.Resultados / *Results.*
   - 3.1. Prioridades de innovación en DAZN: optimización de la experiencia de usuario / *Innovation priorities at DAZN: optimising user experience.*
   - 3.2. Innovación técnica en la producción y distribución de contenidos en Movistar Plus+ / *Technical innovation in the production and distribution of content at Movistar Plus+.*
4. Análisis comparativo de los casos de estudio / *Comparative analysis of the case studies.*
5. Conclusiones / *Conclusions.*
6. Bibliografía / *Bibliography.*

IC – Revista Científica de Información y Comunicación 20 (2023) • pp. 253-274 • E-ISSN: 2173-1071 • https://dx.doi.org/10.12795/IC.2023.i20.11

1. Introducción

El periodismo deportivo ha experimentado en las últimas décadas un desarrollo en sus estructuras, canales y rutinas productivas en el ámbito global (Rojas, 2014), asentándose como la tipología informativa de mayor alcance social y dejando de lado su asociación a campos de poco prestigio para llegar a ganarse el respeto de la academia (Wanta, 2013). Como resultado, las retransmisiones deportivas se han convertido en uno de los espacios más codiciados para los anunciantes (Rojas, 2013).

Históricamente, las competiciones deportivas han sido un entorno apropiado y referente para la experimentación de nuevas técnicas de realización y retransmisión audiovisual. Los avances en esta área se han trasladado posteriormente a otras temáticas o materias, adaptando los esquemas ya establecidos en las diferentes disciplinas deportivas (Torres; Castro; Díaz, 2022).

Muchas de estas innovaciones provienen de una retroalimentación de la industria de los videojuegos, que en un primer momento trató de ofrecer a los usuarios una réplica del modelo de realización canónico propio de los eventos deportivos, pero cuya posibilidad de avance unida a la incorporación de las nuevas tecnologías y recursos gráficos ha permitido testar e introducir narrativas y experiencias que ahora se trasladan a la práctica profesional y difuminan la línea de influencia entre ambas disciplinas.

Los videojuegos han experimentado novedades en el diseño en los últimos años y han incorporado nuevos elementos en los guiones habituales de las retransmisiones deportivas (Marín, 2014). Así, los principales operadores televisivos han ido ofertando nuevas aplicaciones para el seguimiento de grandes eventos que potencian la experiencia interactiva del espectador con elementos que se asocian al universo lúdico, y que proporcionan a las cadenas de televisión formas innovadoras de renovar sus programas deportivos (Owens, 2010).

La experimentación en la realización audiovisual deportiva tiene su origen en el documental cinematográfico Olympia, presentado por la cineasta alemana Leni Riefenstahl en 1938 a partir de la filmación de los Juegos Olímpicos de Berlín de 1936 (Roger, 2015), dónde empleó encuadres y puntos de vista inéditos hasta entonces, siendo posteriormente pionera en el uso de una innovadora cámara slow motion, contrapicados o movimientos de cámara desconocidos (Lizaga-Villarroya, 2014, p. 68).

En España, el primer evento deportivo emitido fue el partido entre el Real Madrid y el Racing de Santander en 1954, una retransmisión experimental en diferido de TVE que tuvo su continuación dos años después con emisiones regulares de partidos de fútbol, todavía en diferido (Roger, 2015), y el asentamiento definitivo de las retransmisiones en directo a partir del 1958, con lo que la cadena estatal española marcó las líneas principales de actuación (Bonaut, 2012, pp. 256-258).

IC – Revista Científica de Información y Comunicación 20 (2023) • pp. 253-274 • E-ISSN: 2173-1071 • https://dx.doi.org/10.12795/IC.2023.i20.11

Desde entonces, las ingentes audiencias vinculadas a las retransmisiones deportivas motivan a los canales de televisión a implementar innovaciones audiovisuales sobre los tres niveles de significado centrales de una retransmisión: imagen de las cámaras y repeticiones; sonido ambiente y narración; y grafismos (Raunsbjerg y Sand, 1998), con lo que se incrementa la sensación de espectáculo y se optimiza la experiencia de los usuarios, como el uso de las cámaras situadas detrás de los tableros de baloncesto, los planos subjetivos de las cámaras on board en automovilismo, las imágenes tomadas desde helicóptero en ciclismo o las cámaras sumergibles en deportes acuáticos (Roger, 2015).

En el aspecto sonoro, el despliegue de medios técnicos varía en función de la dimensión del evento deportivo, tratando de aumentar progresivamente la información y percepción de un mayor número de detalles. Roger (2015) señala que todavía existen limitaciones importantes, como la incorporación de micrófonos inalámbricos en jugadores, entrenadores o árbitros, reacios a que se recojan sus reacciones en momentos de tensión. En el apartado de la locución, el modelo inicial de un único narrador ha evolucionado a un esquema mixto formado por un periodista y varios especialistas, lo que se complementa hoy en día con otro profesional ubicado en el espacio de juego que aproxima la información más cercana al partido (Roger, 2015).

En el apartado gráfico, en LaLiga, máxima categoría del sistema de ligas de fútbol de España, han aplicado en las últimas temporadas diferentes innovaciones tecnológicas como los mapas de calor o los videomarcadores virtuales usando como soporte la señal de la cámara aérea desde un dron (Torres; Castro; Díaz, 2022). Mediante estas herramientas proyectan también datos acumulados a lo largo de la temporada, como saques de esquina, efectividad en los penaltis o la probabilidad de anotar un gol calculada mediante estadística IA.

Desde LaLiga apuntan a que el objetivo principal de las retransmisiones deportivas actuales es conseguir que el espectador disfrute de una experiencia inmersiva, para lo que ya ofrecen la modalidad 'Be the Player' en las repeticiones 360º, en las que el usuario se sitúa en el mismo punto de vista del jugador. Mediante la combinación de los nuevos puntos de vista, las herramientas 360º y los grafismos el espectador puede llegar a sentirse uno más dentro del terreno de juego (Torres; Castro; Díaz, 2022) (Tabla 1).

La explotación de técnicas y recursos basados en las realidades mixtas guiarán las innovaciones de la próxima década, lo que irá aparejado al uso de elementos técnicos especializados, como auriculares o gafas VR. En enero de 2023, Meta y la NBA anunciaron su acuerdo para la retransmisión de partidos a través de Xtadium, la primera plataforma que ofrece de forma regular eventos deportivos en VR en el Metaverso, acercando al espectador más que nunca a la acción deportiva, con vídeos de alta calidad y la capacidad de organizar reuniones para

compartir la experiencia entre amigos o familiares. El primer partido retransmitido bajo esta iniciativa fue el que enfrentó a los Milwakee Bucks y a los Detroit Pistons el 23 de enero, lo que ha tenido su continuación todas las semanas durante los últimos meses. Esto ha derivado en la comercialización y venta de merchandising deportivo para personalizar a los avatares, como camisetas de las franquicias para que los usuarios puedan defender a su equipo favorito y exhibirla en Facebook, Instagram, Messenger y Meta Quest (Meta, 2023).

Tabla 1.

Innovaciones tecnológicas implementadas por LaLiga

Innovaciones	Descripción
Modalidad Be the player	Se ofrece al espectador el mismo punto de vista que tiene el jugador sobre el campo.
Goal Probability	Repetición de gol desde cámara aérea con la inserción de un grafismo que determina la probabilidad de gol existente en la jugada.
Tracking óptico y cámaras tácticas	16 cámaras de tracking óptico y 3 cámaras tácticas rastrean movimientos de jugadores y balón por el campo con una velocidad de 25 veces por segundo.
Heat map	Mapa de calor que analiza los desplazamientos de los jugadores en los partidos.
Videomarcadores virtuales	Simulación de los videomarcadores del estadio para los telespectadores sobre la señal de una cámara aérea situada en un dron.

Fuente: Torres; Castro; Díaz (2022)

En MediaPro clasifican las futuras líneas de trabajo de las retransmisiones deportivas en buscar una mayor inmersión del espectador y en permitir la máxima personalización posible de la señal para adaptarla a los gustos e intereses de los usuarios. En opinión de Carretero (2023), estos propósitos se están implementando mediante tres ejes estratégicos: 1) la selección multicámara y de narración en las retransmisiones, 2) la integración natural de la data de los partidos mediante estadísticas en tiempo real y 3) la socialización. De hecho, el grupo fue pionero en introducir la cámara cinematográfica en la producción deportiva, una innovación tecnológica con la que se logran planos cortos en los que el fondo pierde nitidez, otorgando todo el protagonismo al jugador, y recreando situaciones próximas a los deportivas propias de un videojuego (Panorama Audiovisual, 2023).

IC – Revista Científica de Información y Comunicación 20 (2023) • pp. 253-274 • E-ISSN: 2173-1071 • https://dx.doi.org/10.12795/IC.2023.i20.11

IC – Revista Científica de Información y Comunicación 20 (2023) • pp. 253-274 • E-ISSN: 2173-1071 • https://dx.doi.org/10.12795/IC.2023.i20.11

En definitiva, la combinación de técnicas y recursos de los videojuegos seguirá abriendo canales de actuación para las productoras, medios de comunicación y empresas responsables de las retransmisiones. Como resultado, se generarán nuevos yacimientos de empleo y oportunidades laborales para futuros periodistas (López Redondo, 2021). Esta situación supone un gran desafío para la industria, a pesar de que los estudios se suelen centrar en grandes medios con redacciones amplias, pasando por alto la fragmentación actual del sector. Es por ello que cada vez son más los autores que establecen la necesidad de desterrar de la academia la perspectiva del centralismo de las redacciones para centrarse en manifestaciones del sector que van más allá de las formas del periodismo tradicional (Deuze; Witschge, 2017).

La finalidad de esta investigación no es producir unas conclusiones generalizables, sino sedimentar conocimiento descriptivo en torno a un problema de investigación que necesita aportaciones científicas para avanzar en su definición. Por su carácter prospectivo, se parte de hipótesis ciega y se formula como objetivo principal la identificación de casos significativos pioneros a través de los que dar respuesta a las siguientes preguntas de investigación:

Q1 ¿Cuáles son las tendencias actuales de innovación y herramientas disruptivas empleadas en la realización audiovisual y retransmisión de eventos deportivos?

Q2 ¿De qué forma se está innovando y optimizando la experiencia de los usuarios durante el consumo de competiciones deportivas?

Q3 ¿Cuáles son las prioridades de innovación y previsiones de avance en las retransmisiones deportivas?

2. Metodología

Esta investigación se plantea a modo exploratorio y descriptivo para identificar las tendencias y previsiones de innovación en la realización audiovisual, así como analizar la retransmisión y la experiencia de usuario en el consumo de eventos deportivos. La técnica utilizada para alcanzar este propósito ha sido el estudio de casos, que proporciona al investigador una variedad de recursos; como las entrevistas, la observación participante, los cuestionarios y los documentos bibliográficos; y permite una contextualización suficiente de los fenómenos estudiados (García-Avilés; González-Esteban, 2012). En línea con las investigaciones de Yin (1981) sobre esta técnica de investigación cualitativa, este trabajo no busca realizar una generalización estadística, sino más bien un análisis profundo, ya que se centra en identificar patrones de comportamiento en lugar de enumerar frecuencias de la muestra (Villareal-Larrinaga; Landeta-Rodríguez, 2010).

El estudio de casos se ha aplicado a una muestra no probabilística intencional por conveniencia, de acuerdo con las aportaciones Hernández-Sampieri, Fernández-Collado y Baptista-Lucio (2010, p. 396), que sostienen que este tipo de muestra se utiliza en las investigaciones cualitativas no probabilísticas o dirigidas, cuya finalidad no es la generalización en términos de probabilidad. También se les conoce como «guiadas por uno o varios propósitos», pues la elección de los elementos depende de razones relacionadas con las características de la investigación.

En concreto, se analizan dos proyectos: DANZ y Movistar Plus+. El primero es un servicio de streaming dedicado al ámbito deportivo, que ofrece retransmisiones de eventos en vivo y bajo demanda, mientras que el segundo es una plataforma de televisión de pago propiedad de Telefónica. Para llevar a cabo la investigación, se han analizado datos de cada una de las unidades, extraídos de búsquedas en profundidad.

El trabajo de campo también ha comprendido la realización de entrevistas semiestructuradas en profundidad a diferentes profesionales de las dos compañías con perfiles complementarios y con una visión cualificada sobre el tema. En el caso de DAZN, se ha entrevistado a Eugenio Blanco González, director editorial y de programación en España e Italia, mientras que para abordar los aspectos de Movistar Plus+ se ha conectado con Javier Riloba Prada, jefe de medios de producción; Juan Andrés García Ropero, director de entretenimiento; y José Manuel Úbeda-Portugués Santos, gerente de Data & Insights TV (Ver Tabla 2). La elección de esta muestra responde a la responsabilidad de estos profesionales en el campo del periodismo y la innovación (Ufarte-Ruiz; Peralta-García; Murcia-Verdú, 2018)(Tabla 2).

En opinión de Howitt (2019), estas entrevistas garantizan que las respuestas de los entrevistados cubran los asuntos más relevantes de la investigación. Para su realización se ha seguido el procedimiento habitual sistematizado por autores como Young (1960). En este sentido, se ha trabajado con un cuestionario semiestructurado que nunca ha superado las 12 preguntas y en el que se han incluido cuestiones específicas en función del perfil entrevistado. Los bloques temáticos en torno a los que se han agrupado las preguntas han sido los aspectos relativos a la innovación y las herramientas de realización audiovisual; la retransmisión de eventos deportivos; la experiencia de usuario; la producción de contenidos y la distribución/recomendación de productos audiovisuales.

Para Tejedor-Calvo *et al.* (2020), esta técnica proporciona información sobre un fenómeno que no ha sido suficientemente abordado en la bibliografía científica, al mismo tiempo que ofrece elementos explicativos e indicios de posibles nuevos fenómenos prospectivos que pueden servir como variables de estudio en investigaciones futuras. Además, Irvine, Drew y Sainsbury (2012) sostienen que las entrevistas son una herramienta útil para comprender las perspectivas de los sujetos entrevistados, así como sus categorías mentales, interpretaciones, sentimientos y perspectivas.

IC – Revista Científica de Información y Comunicación 20 (2023) • pp. 253-274 • E-ISSN: 2173-1071 • https://dx.doi.org/10.12795/IC.2023.i20.11

IC – Revista Científica de Información y Comunicación 20 (2023) • pp. 253-274 • E-ISSN: 2173-1071 • https://dx.doi.org/10.12795/IC.2023.i20.11

Tabla 2.

Muestra intencional de conveniencia

Abreviatura	Nombre	Corporación	Cargo
(EB/DAZN)	Eugenio Blanco González	DAZN	Director Editorial y de Programación en el Sur de Europa (España e Italia)
(JR/Movistar Plus+)	Javier Riloba Prada	Movistar Plus+	Jefe de medios de producción de Movistar Plus+
(JG/Movistar Plus+)	Juan Andrés García Ropero		Director de entretenimiento de Movistar Plus+
(JU/Movistar Plus+)	José Manuel Úbeda-Portugués Santos		Gerente de Data & Insights TV de Movistar Plus+

Fuente: elaboración propia

Las entrevistas se realizaron entre el 14 de diciembre de 2022 y el 26 de febrero de 2023 a través de las plataformas Zoom y Meetings de Google, con una duración media de 30 minutos aproximadamente. Estos encuentros fueron grabados y transcritos para analizar el contenido e interpretar en profundidad los datos en relación con el objetivo central de la investigación. Este análisis de contenido se ha completado con la asistencia del software Atlas.ti en su versión 9.1.7 para Windows y se ha ejecutado en cuatro etapas: 1) Registro de la información a partir de la transcripción de las entrevistas; 2) Codificación de los datos; 3) Identificación de la información recabada sobre cada uno de los aspectos vinculados a los objetivos; y 4) Interpretación final de los resultados obtenidos.

Con los resultados obtenidos se ha elaborado una descripción detallada de cada uno de los casos de estudio. Cabe destacar que se cuenta con el permiso explícito por parte de las fuentes para publicar sus declaraciones de manera no anónima.

La triangulación metodológica se consigue a través de la revisión de bases documentales para realizar un barrido bibliográfico que permita construir el estado de la cuestión y con el análisis del estudio de casos. Con esta combinación metodológica se analizan las tendencias y previsiones de innovación en la realización audiovisual y retransmisión de eventos deportivos desde diferentes ángulos, evitando sesgos y fallas metodológicas para optimizar la validez y la consistencia de los hallazgos (Okuda-Benavides; Gómez-Restrepo, 2005).

IC – Revista Científica de Información y Comunicación 20 (2023) • pp. 253-274 • E-ISSN: 2173-1071 • https://dx.doi.org/10.12795/IC.2023.i20.11

3. Resultados

3.1. Prioridades de innovación en DAZN: optimización de la experiencia de usuario

DAZN se ha asentado, desde su lanzamiento en 2016 en Austria, Alemania, Japón y Suiza, como una de las plataformas de referencia en la retransmisión de eventos deportivos en vivo y bajo demanda en el ámbito global, llegando actualmente a más de 200 países y reuniendo los derechos de emisión de diferentes competiciones referentes del contexto internacional, como LaLiga, la Premier League, MotoGP, F1, torneos de la WTA de tenis, combates de Matchroom Boxing o la EuroLeague de baloncesto, entre muchas otras (DAZN, 2023).

En España, su entrada en el mercado audiovisual se produjo en 2019, y actualmente con su plan anual más completo –DAZN TOTAL–, la marca brinda acceso a todas las competiciones de su parrilla, a 5 partidos de LaLiga durante 35 jornadas, a los resúmenes de todos los encuentros de LaLiga EA Sports y de LaLiga Hypermotion, a todos los reportajes, documentales y producciones originales de DAZN, así como los canales Eurosport 1 y 2, y Red Bull TV. El precio mensual de esta suscripción, si se contrata de forma anual, es de 29,99 euros, y el servicio es compatible tanto con dispositivos móviles (smartphones o tabletas), como con smart tv o sistemas de gaming. Los contenidos pueden ser disfrutados en dos dispositivos de forma simultánea, siempre y cuando se realice desde el mismo punto de acceso a la red (DAZN, 2023).

Además de la ampliación constante de su catálogo de contenidos y de los nuevos acuerdos por las licencias de campeonatos, desde la directiva de este servicio de streaming plantean innovaciones constantes con la intención de optimizar y renovar la experiencia de sus usuarios en el interior de su propuesta, lo que pretenden lograr mediante herramientas que indicen directamente sobre la navegación, el engagement, las pautas de consumo, el tono conversacional, la construcción de comunidad, la interacción o la propia posición del espectador durante las retransmisiones. Las prioridades de innovación de DAZN se concretan en la Tabla 3.

En DAZN pretenden influir en la forma en la que los usuarios consumen deporte, alejándolos de las pautas tradicionales de visualización. Esta propuesta la consiguen mediante contenidos y formatos ajustados a cada condición de consumo, y a través de un tono conversacional reconocible que les permita diferenciarse del resto de operadoras deportivas. De igual modo, buscan constantemente la interacción del usuario, apelando al sentimiento y construcción de comunidad, lo que se refleja en su función *'Watch Party'*, en la que hasta cuatro amigos y familiares pueden visionar de forma conjunta un evento en directo sin

IC – Revista Científica de Información y Comunicación 20 (2023) • pp. 253-274 • E-ISSN: 2173-1071 • https://dx.doi.org/10.12795/IC.2023.i20.11

estar en el mismo lugar, empleando la cámara, el altavoz y el micrófono, lo que permite conversar mientras se desarrolla la acción.

> (E.B/DAZN): «Queremos que a los usuarios les atraiga nuestro tono cuando visualizan contenidos, que se sientan parte de una comunidad que tiene sus mismas pasiones y que les hace sentir especiales. Buscamos una mayor interacción dentro de nuestra propuesta, lo que se refleja en el 'Watch Party', un consumo colectivo remoto donde el contenido se sitúa en el centro».

Tabla 3.

Prioridades de innovación de DAZN

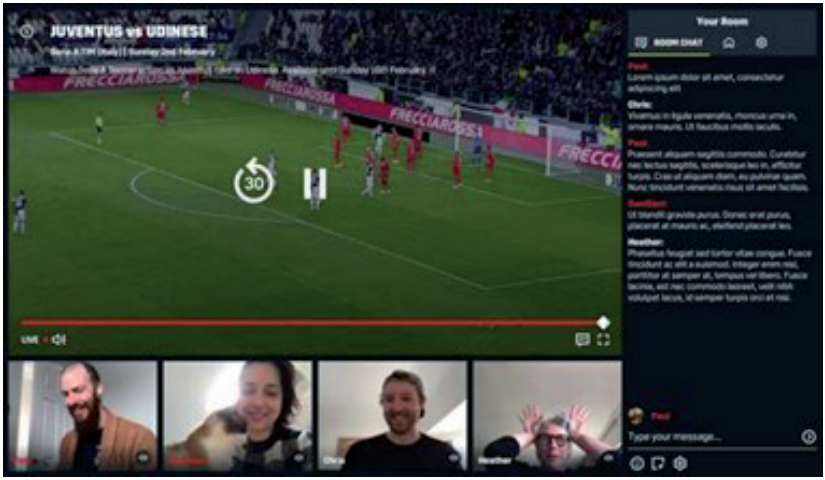
Corporación	Prioridades de innovación
DAZN	**Destacan tres pilares:** experiencia de usuario, recomendación de contenido y la influencia sobre la forma de consumir
	Experiencia de usuario: navegación sencilla y directa
	Recomendación de contenido que genere engagement positivo para el espectador
	Influenciar sobre las pautas de consumo de deporte: cada vez en más soportes y con tendencia al visionado colectivo remoto
	Ofrecer contenidos y formatos ajustados a cada condición de consumo
	Tono conversacional reconocible de la marca
	Construcción de comunidad; conversación bidireccional constante e interacción
	Consolidación de un consumo colectivo entre usuarios remotos: **WatchParty**
	Asentamiento de un sujeto activo que realice en directo su propio contenido
	Reto: brecha generacional y extrema fragmentación de las conversaciones

Fuente: Elaboración propia

IC – Revista Científica de Información y Comunicación 20 (2023) • pp. 253-274 • E-ISSN: 2173-1071 • https://dx.doi.org/10.12795/IC.2023.i20.11

Imagen 1.

Función 'Watch Party' de DAZN durante un partido de fútbol en directo



Fuente: DAZN

El siguiente nivel de desarrollo en las pautas de consumo que prevén en DAZN está relacionado con la posición del usuario durante las retransmisiones. Apuntan a la consolidación de un sujeto activo que quiere tener cada vez una mayor participación y protagonismo, hasta el punto de que sea el propio usuario el que realice el evento, seleccionando las cámaras que quiere ver en cada momento. El desarrollo de estas soluciones y su velocidad de implementación en los diferentes deportes dependerá de lo interesante que vean las plataformas como DAZN las correspondientes inversiones, así como la receptividad de los usuarios a la hora de cambiar una industria que vive en una disrupción constante.

> (E.B/DAZN): «Sabemos que en el consumo de deporte el nuevo usuario no quiere ser únicamente un sujeto pasivo, quiere ser protagonista y generar conversación. No pasarán más de 10 años sin que los usuarios puedan elegir ver un partido desde la visión del portero, o desde la mirada del banquillo o un jugador concreto».

No obstante, la brecha generacional entre los consumidores de deportes es más grande que nunca, lo que supone uno de los principales retos de estas empresas a la hora de acometer cambios disruptivos o lanzar nuevas iniciativas. De forma simplificada, es posible afirmar que se enfrentan dos mentalidades y perfiles diferentes:

IC – Revista Científica de Información y Comunicación 20 (2023) • pp. 253-274 • E-ISSN: 2173-1071 • https://dx.doi.org/10.12795/IC.2023.i20.11

los usuarios de 20 años dispuestos a cualquier tipo de innovación en la forma de consumo, y el segmento de audiencia de más de 60 años, cuya única pretensión es la de visionar contenidos tranquilamente siguiendo el modelo convencional.

Esta circunstancia se proyecta también sobre la conversación que se genera alrededor de los contenidos. Antes el discurso era unitario, con parrillas de contenidos en los diferentes canales lineales bastante similares, por lo que los temas frecuentados por la opinión pública solían ser concretos y coincidentes. Ahora las conversaciones están cada vez más fragmentadas, por lo que las corporaciones deben navegar con esta condición y luchar contra el aislamiento. Según Eugenio Blanco, director Editorial y de Programación en el Sur de Europa de DAZN, deben trabajar en los mensajes lanzados, en disponer de una semántica social que mantenga ese hilo común entre las personas.

> (E.B/DAZN): «El consumo no lineal se acabará imponiendo, y cuando desaparezca el hilo común que genera la cultura lineal, debemos ser realmente relevantes, que sientas que estamos ahí y generamos un producto sencillo que te mejora la vida y no genera más estrés del que ya tienes con la sobrecarga de contenidos».

En el apartado de creación de contenidos, en DAZN establecen una diferenciación entre las acciones que influyen directamente sobre los equipos de producción, es decir, sobre cómo ellos cuentan el deporte; y, por otro lado, sobre cómo cambiará la forma de visualización y consumo de un evento desde la posición del espectador. Respecto a la primera de ellas, recurren a la realidad aumentada aplicada para llevar, por ejemplo, a un presentador al estadio y al futbolista a plató. Este es un avance significativo que quieren seguir mejorando, pero que ya está dando resultados satisfactorios.

En marzo de 2023 la compañía anunció las novedades vinculadas a su nuevo plató virtual para las retransmisiones de Moto GP, en el que incluyen tecnología puntera que, entre otras posibilidades, permite analizar los circuitos mediante las recreaciones de las pistas, y da la posibilidad de crear realidades aumentadas de motos y de cualquier otro objeto relacionado con la competición, así como ventanas virtuales para análisis de imágenes y conexiones con el circuito (Imagen 2).

Confían, además, en que la experiencia de usuario sea cada vez más inmersiva y cercana a los videojuegos, siendo posible que el espectador elija el punto de vista de la visualización. De este modo, el usuario podrá ver en primera línea una jugada en directo, o podría localizarse en la mirada del portero de un equipo de fútbol o en el propio banquillo. En esta línea, LaLiga ya está realizando importantes esfuerzos para poder dar nuevas perspectivas, como las anteriormente enumeradas: la vista 360ª cenital, o las cámaras mirrorless con aspecto cinematográfico en las celebraciones.

IC – Revista Científica de Información y Comunicación 20 (2023) • pp. 253-274 • E-ISSN: 2173-1071 • https://dx.doi.org/10.12795/IC.2023.i20.11

Imagen 2.

Plató virtual de DAZN para las retransmisiones de MotoGP

Fuente: TodoCircuito

En DAZN llevan tiempo barajando la introducción de competiciones de deportes electrónicos a su parrilla de contenidos. Sin embargo, la limitación principal que dificulta su integración reside en que, por el momento, los formatos están poco empaquetados y son trabajados de forma aislada. Eugenio Blanco explica que desde las compañías relacionadas con los esports se está trabajando para homogeneizar torneos y dinámicas, pero es necesario que se generen marcos más fuertes, productos más cerrados, y sistemas de ascensos y descensos, de forma que una plataforma como DAZN compre los derechos de un paquete de deportes electrónicos como lo haría de Champions League.

Otra de las dificultades localizadas en este sentido es el dudoso retorno por inversión, ya que en estos momentos se consume mucho contenido de esports vinculado a la popularidad y marca personal de streamers famosos y a la gratuidad de sus emisiones, pero existen dudas sobre si se mantendrían los números de audiencia si se repercute un coste asociado a la visualización.

3.2. Innovación técnica en la producción y distribución de contenidos en Movistar Plus+

En Movistar Plus+ se sitúan a la vanguardia en lo referente a técnicas de realización audiovisual en directo, recurriendo satisfactoriamente a la realización

IC – Revista Científica de Información y Comunicación 20 (2023) • pp. 253-274 • E-ISSN: 2173-1071 • https://dx.doi.org/10.12795/IC.2023.i20.11

remota, producciones con escenografía virtual, entrevistas virtuales, la integración del unreal engine (epic games), o la integración de modelos 3D en escenografía corpórea. Estos avances, implementados recientemente en el esquema de realización de Movistar Plus+, se detallan en la siguiente tabla 4:

Tabla 4.

Principales avances en la realización audiovisual de Movistar Plus+

Principales avances en la realización audiovisual de Movistar +
Realización remota. Utilización de las líneas de datos de alta capacidad para desplazar a las retransmisiones únicamente a un equipo reducido de operadores de cámara y sonido, el resto de personal permanece en el control de realización en sus instalaciones, abaratando costes de desplazamientos y minimizando la posibilidad de accidentes in itinere.
Producciones con escenografía virtual. El avance en materia de sensorización para las cámaras (posición espacial en el plató) y la mejora en términos de potencia de los engines gráficos les permiten hacer programas donde toda la escenografía es virtual (modelos CGI 3D). Esto facilita una mayor diversidad visual (cambio de escenografía) a un coste reducido, además de acortar sensiblemente los tiempos de montaje/desmontaje entre programas que se graban en un mismo plató.
Entrevistas virtuales. Entrevistas remotas virtuales, donde el entrevistado se encuentra en cualquier parte del mundo, pero se incorpora en el set del programa como un objeto de Realidad Aumentada.
Integración de Unreal Engine (Epic Games) en los entornos de producción broadcast: Consiguen añadir un plus de realismo a los modelos gráficos en tiempo real.
Integración de modelos 3D en escenografía corpórea. Gracias a la sensorización de las cámaras y la elevada potencia de los engines gráficos es posible la incorporación de modelos CGI 3D con acabados realistas en un decorado corpóreo convencional de forma creíble.

Fuente: elaboración propia

Respecto a las previsiones de futuro identificadas en la corporación, y a los sistemas que se desarrollarán en la próxima etapa de medios audiovisuales, Javier Riloba Prada, jefe de medios de producción de Movistar Plus+, considera que, a corto y medio plazo, tanto la captura de vídeo volumétrico, como la realización remota virtualizada en la nube, o la realización automatizada mediante inteligencia artificial, serán protagonistas. Las prestaciones de cada una de estas propuestas se especifican en la Tabla 5.

Tabla 5.

Claves del audiovisual del futuro previstas por Movistar +

Claves del audiovisual del futuro previstas por Movistar Plus +
Captura de vídeo volumétrico. «Captura en tiempo real de modelos 3D en movimiento, que sirvan para integrarlos remotamente en escenas de escenografía corpórea o virtual como objetos de Realidad Aumentada».
Realización remota virtualizada en el cloud. «Es la evolución de la actual realización remota, con la diferencia de que todo el equipamiento técnico del control de realización estaría corriendo en la nube en modelo SaaS, de manera que los costes de amortización se reducirían drásticamente, pasando de CAPEX a OPEX».
Realización automática mediante IA. «Partiendo de una imagen de la escena es muy alta resolución, una inteligencia artificial sería capaz de resolver de forma automática contenidos sencillos, especialmente deportivos».

Fuente: elaboración propia

La interacción e inmersión del espectador en el consumo de contenidos es crucial para su vinculación y permanencia en un canal o plataforma determinado. En el caso de Movistar Plus+, tienen en cuenta esta circunstancia y tratan de sacarle el máximo rendimiento manteniendo una conversación bidireccional activa en redes con los seguidores de sus diferentes programas. Aún así, no siguen las mismas pautas de actuación con todos los formatos de la marca, ya que tienen dos formas principales de mostrar los contenidos: el servicio bajo demanda y los canales lineales.

Juan Andrés García Ropero, director de entretenimiento de la marca, apunta que, en sus programas en directo como competiciones deportivas o galas de premios de cine y música, reciben una participación y comentarios constantes de los espectadores de forma simultánea al transcurso de los acontecimientos. Sin embargo, cuando se trata de piezas de producción original de entretenimiento, emitidas en diferido, esta situación es más difícil que se replique, para lo que trabajan y preparan conversaciones posteriores al consumo en sus canales sociales, para mantener así el interés de las audiencias y generar engagement.

Desde Movistar Plus+ consideran que los algoritmos son para ellos una herramienta imprescindible para localizar, entre un catálogo inmenso y con una amplia diversidad de temáticas (cine, series, entretenimiento, deportes o documentales, entre otros), los contenidos que más se ajustan a los patrones de consumo de cada cliente. Esto lo enriquecen, además, con contenidos adicionales que se obtienen del análisis del consumo de otros usuarios con características similares (filtrado colaborativo).

IC – Revista Científica de Información y Comunicación 20 (2023) • pp. 253-274 • E-ISSN: 2173-1071 • https://dx.doi.org/10.12795/IC.2023.i20.11

IC – Revista Científica de Información y Comunicación 20 (2023) • pp. 253-274 • E-ISSN: 2173-1071 • https://dx.doi.org/10.12795/IC.2023.i20.11

La mezcla entre esa recomendación basada en el contenido, y la colectiva entre diferentes usuarios, permite, según José Manuel Úbeda-Portugués Santos, gerente de Data & Insights TV de Movistar Plus+, que generen modelos con alta probabilidad de éxito en la recomendación, lo que no excluye la participación del factor humano, clave en el proceso de personalización de la cadena.

> (JU/Movistar Plus+): «La algoritmia brinda muy buenos resultados, pero adicionalmente a ella, y de cara a optimizar nuestra recomendación en el aspecto de descubrimiento, en Movistar Plus+ consideramos relevante el factor humano; incorporamos nuestras líneas de recomendación «curadas» por nuestros especialistas en cada una de las temáticas».

Todos los algoritmos y modelos relacionados con el mundo de la televisión de Movistar Plus+ están diseñados y desarrollados plenamente de forma interna desde su área de Innovación y Big Data. Según la corporación, esto se debe a que existen pocos proveedores de entretenimiento audiovisual que en el mercado manejen una variedad tan amplia de temáticas y de contenidos, ya que ellos no solo trabajan ficción ni deporte, sino que su parrilla es un producto mucho más amplio y complejo que debe ser trabajado de forma individualizada y exclusiva.

Otro aspecto fundamental que los llevó a tomar la decisión del desarrollo interno fue que no solo diseñan algoritmos para la recomendación, ya que la gestión de los soportes publicitarios de la plataforma Movistar Plus+ «dispone de unas capacidades de data a la vanguardia de la industria de la televisión en España». En relación al objetivo principal de su algoritmo de recomendación, Úbeda-Portugués Santos concreta que todas sus actuaciones giran alrededor de la optimización de la experiencia de usuario.

> (JU/Movistar Plus+): «En general cualquier sistema de recomendación de contenido audiovisual tiene como objetivo facilitar al cliente, en este caso espectador, la mejor experiencia de entretenimiento posible. Se busca que cada vez que un cliente accede a nuestra plataforma, de manera fácil y rápida tenga a su disposición los contenidos que mejor pueden encajar en ese preciso momento de consumo. En este sentido, consideramos también importante incorporar el factor de descubrimiento dentro de los sistemas de recomendación».

4. Análisis comparativo de los casos de estudio

La propuesta innovadora de Movistar Plus+ en la realización audiovisual de eventos y contenidos deportivos tiene su base en la actualización, experimentación

IC – Revista Científica de Información y Comunicación 20 (2023) • pp. 253-274 • E-ISSN: 2173-1071 • https://dx.doi.org/10.12795/IC.2023.i20.11

e integración de nuevas tecnologías en las técnicas de producción en directo; mientras que DAZN dirige su línea de actuación hacia la implementación de nuevas modalidades de visualización y la interrelación conversacional con los usuarios a partir del consumo. A pesar de que ambas corporaciones coinciden en su propósito central de optimizar la experiencia de sus espectadores, en Movistar priorizan el trabajo sobre la capa primaria de la cadena de producción, en tanto que DAZN focaliza sus iniciativas hacia la distribución y posterior interacción con las reacciones y respuestas generadas por las audiencias. Las prioridades de innovación de ambas marcas se concretan en la siguiente Tabla 6.

Tabla 6.

Prioridades de innovación de DAZN y Movistar Plus+

Prioridades de innovación	
DAZN	Afinar la relación de los usuarios con el interior de su propuesta mediante una navegación sencilla y directa.
	Generar un mayor nivel de engagement positivo a través de recomendaciones útiles y relevantes para los espectadores
	Influenciar sobre la forma de consumir deporte: cada vez en más soportes, con contenidos adaptados a cada dispositivo y situación de consumo y con tendencia al visionado colectivo remoto.
	Construcción de comunidad; conversación bidireccional constante e interacción.
Movistar Plus+	Innovación tecnológica y creativa sobre la realización audiovisual (realización remota, escenografía virtual, entrevistas virtuales, unreal engine, modelos 3D).
	Potenciación de su catálogo y parrilla de contenidos.
	Optimización de su sistema de recomendación teniendo en cuenta el filtrado colaborativo, la personalización basada en el contenido y el corte y acción editorial.
	Búsqueda de una mayor interacción y participación de los espectadores, tanto en plató como a través de las RRSS.

Fuente: elaboración propia.

IC – Revista Científica de Información y Comunicación 20 (2023) • pp. 253-274 • E-ISSN: 2173-1071 • https://dx.doi.org/10.12795/IC.2023.i20.11

5. Conclusiones

Esta investigación cumple el objetivo principal de identificar las tendencias y previsiones de innovación en la realización audiovisual, así como analizar la retransmisión y la experiencia de usuario en el consumo de eventos deportivos. Se trata de un estudio pionero en el panorama nacional, con apenas referencias en la bibliografía científica, que ha permitido analizar dos casos de estudio: DAZN y Movistar Plus+.

Los eventos deportivos continúan siendo un espacio referente para la experimentación de técnicas de realización audiovisual y retransmisión en directo, a lo que se une la optimización de la experiencia de usuario en la fase de distribución, visualización e interacción con las propuestas de contenidos. La transformación sustancial sufrida por las retransmisiones deportivas en las últimas décadas en los apartados narrativo, expresivo y tecnológico, sentaron las bases de modelos y estructuras que fueron probadas por primera vez en eventos deportivos y que se han establecido progresivamente en el resto de las temáticas y formatos (Roger, 2015).

En la próxima etapa de medios, las tecnologías como la inteligencia artificial y las realidades mixtas (virtual y aumentada) seguirán teniendo un papel protagonista para empaquetar y renovar las principales propuestas audiovisuales deportivas y la interacción de los espectadores con éstas, generando una inmersión que tratará de simular, cada vez con mayor éxito, experiencias reales en los propios eventos, y donde los usuarios consolidarán su posición de sujetos activos decidiendo el rumbo y punto de vista de las retransmisiones (**Q1**).

En el caso de DAZN, sus prioridades de innovación se concretan en optimizar la experiencia de sus usuarios en el interior de su plataforma; en mejorar su sistema de recomendación de contenidos para generar un engagement positivo y útil para las audiencias; en la creación de una comunidad estable alrededor de los contenidos; y en influenciar en la forma de consumir deporte, ofreciendo productos adaptables a diferentes dispositivos y ajustados a cada condición de consumo, lo que complementan con conversaciones bidireccionales activas que propician la interacción (**Q3**).

Será fundamental en los próximos años la consolidación de las aplicaciones y herramientas de consumo colectivo entre usuarios remotos, una práctica frecuente hoy en día que ofrecen en DAZN mediante su función WatchParty, y que se prevé que aumentará sus prestaciones con la integración de la realidad virtual y del uso del Metaverso, para lo que desde esta corporación ya han estrenado un nuevo plató virtual para las emisiones de MotoGP en marzo de 2023 (**Q2**).

Los retos de futuro que vislumbran desde DAZN para el porvenir del sector están relacionados con mitigar el impacto de la brecha generacional

existente entre los usuarios jóvenes que reclaman disrupción e innovación constante, prácticamente a la par de los videojuegos, y los espectadores tradicionales que quieren mantener sin alteraciones sus pautas habituales de consumo; y con la fragmentación de las conversaciones entre usuarios, ahora con diálogos distantes, individualizados e independientes del resto de grupos de la población, lo que rompe con las conversaciones provenientes de la televisión tradicional, donde los temas recurrentes eran altamente coincidentes (**Q3**).

En lo referido a técnicas de realización audiovisual en directo, en Movistar Plus+ se sitúan a la vanguardia, potenciando innovaciones como la realización remota, las producciones con escenografía virtual, la realización de entrevistas virtuales, la integración del unreal engine o del uso de modelos 3D (**Q1**). Los sistemas que creen desde esta corporación que guiarán las actuaciones de los próximos años están relacionadas con la captura de vídeo volumétrico, la realización remota virtualizada en la nube, o la realización automatizada mediante inteligencia artificial (**Q3**), pero su integración progresiva dependerá del interés que susciten estos sistemas para los espectadores en cada momento y del retorno por inversión que estimen desde la empresa.

La recomendación de contenidos es otro aspecto prioritario para Movistar Plus+ para simplificar y hacer accesible y navegable su diverso catálogo de contenidos, para lo que trabajan sobre un filtrado que combina la recomendación colaborativa; la basada en el contenido, y la aportación editorial de sus trabajadores. Todo este desarrollo lo ejecutan internamente desde sus equipos de tecnología, ya que tanto las particularidades técnicas de su propuesta, como el uso comercial que otorgan a sus algoritmos publicitarios, requiere de un trabajo específico, personalizado e individualizado, por lo que no sería suficiente con las aportaciones de un desarrollador externo (**Q1**).

Sin embargo, y a pesar de responder a las tres preguntas de investigación, este estudio ha trabajado sobre una muestra reducida que ha impedido establecer conclusiones generalizables a la totalidad del mercado. Por eso, la cuestión estudiada no se agota con esta investigación, sino que reafirma que las tendencias de innovación en la realización audiovisual y retransmisión de eventos deportivos plantean un debate abierto y en constante evolución. Este trabajo pionero en el ámbito periodístico deja abiertas posibilidades para futuros estudios. La ampliación del análisis hacia otras iniciativas permitirá comprobar si las tendencias detectadas son generales. De igual modo, sería enriquecedora una mirada comparativa que permitiera conocer el uso que hacen los medios públicos y privados de la realización automatizada mediante inteligencia artificial.

IC – Revista Científica de Información y Comunicación 20 (2023) • pp. 253-274 • E-ISSN: 2173-1071 • https://dx.doi.org/10.12795/IC.2023.i20.11

IC – Revista Científica de Información y Comunicación 20 (2023) • pp. 253-274 • E-ISSN: 2173-1071 • https://dx.doi.org/10.12795/IC.2023.i20.11

Financiación

Este artículo forma parte de las actividades del proyecto «Medios audiovisuales públicos ante el ecosistema de las plataformas: modelos de gestión y evaluación del valor público de referencia para España» (PID2021-1223860B-I00), financiado por el Ministerio de Ciencia e Innovación (España), AEI y Feder, UE. Además de integrarse en las actividades de la 'Cátedra RTVE-USC sobre Medios de Servicio Público en Europa' y del proyecto de investigación «Inteligencia artificial y Periodismo: contenidos, audiencias, retos y desarrollo curricular (2023-GRIN-34286)», financiado dentro del Plan Propio de Investigación, cofinanciado en un 85% por el Fondo Europeo de Desarrollo Regional (FEDER). El autor César Fieiras Ceide tiene un contrato FPI del Ministerio de Ciencia e Innovación de España con la referencia (PRE2022-103954).

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IC – Revista Científica de Información y Comunicación 20 (2023) • pp. 253-274 • E-ISSN: 2173-1071 • https://dx.doi.org/10.12795/IC.2023.i20.11

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Tripodos, number 55 | 2024| OnlineFirst
ISSN: 1138-3305

Received: 30/11/23
Accepted: 16/02/24
OnlineFirst: 12/04/24
Publicación final:

AI Implementation Strategies in the Spanish Press Media: Organizational Dynamics, Application Flows, Uses and Future Trends

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This research analyses the artificial intelligence application strategies adopted by the Spanish press media at the height of the generative AI boom, extending previous studies on integrating AI technology into journalistic routines. We studied the dynamics of implementation of AI solutions in the main newspapers in Spain, determining the departments or professionals involved, the current uses, and how AI affects their organization chart and professional profiles, as well as providing insights into the future trends of this technology in the sector. For this purpose, a qualitative methodology was employed, based on interviews with a purposive sample of executives from the 10 newspapers with the largest circulation in Spain: El País, La Vanguardia, Marca, La Voz de Galicia, As, ABC, El Mundo, El Correo, El Diario Vasco *and* Mundo Deportivo. *The results reveal that AI is conceived in the Spanish press media as an assistant aimed at optimizing all kinds of mechanical processes and existing products, not at amplifying coverage or generating final pieces that reduce the standard of quality essential to their subscription model. Groups such as Prisa, Vocento or Unidad Editorial centralize their AI strategy, while Grupo Godó delegates this management to its headers. These newspapers consider that AI will boost the renewal of job profiles in their structures, despite the fact that they do not currently have strictly specialized professionals.*

Keywords: *journalism, automation, artificial intelligence, ChatGPT, news.*

USC UNIVERSIDADE DE SANTIAGO DE COMPOSTELA

Doi.org/10.51698/tripodos.2024.55.01

THE IMPACT OF AI ON JOURNALISM

AI in journalism began by addressing basic automation tasks, later evolving into sophisticated applications capable of reporting and data analysis. This progression reflects broader technology trends, where advances in AI have progressively enhanced its applicability in other fields, including communication. The development of AI technologies from simple data sorting algorithms to advanced natural language generation tools illustrates a significant shift in the capabilities and potential of AI in news generation (Gondwe, 2023).

As Charlie Beckett, professor at the London School of Economics (LSE), and director of the Journalism AI Project, points out, newsrooms around the world are looking to incorporate AI into their workflows, aspiring to capitalize on AI's potential to increase productivity and impact, especially in times of declining funding and revenue streams for news (Euronews, 2023). In this context, the Reuters Institute for the Study of Journalism highlights 2023 as a watershed year for AI in journalism, underlining its growing relevance in the sector (Reuters Institute, 2023).

In particular, generative AI tools such as ChatGPT and Midjourney have become increasingly relevant in news production contexts, offering opportunities for greater production efficiency and the creation of new types of semi-automated content. Some internationally recognized media, such as The Guardian in the UK, has declared its intention to use generative AI to improve the quality of journalistic work, for example, by helping journalists interrogate (through *prompts*) large data sets and create ideas for new marketing campaigns (Euronews, 2023).

However, the speed with which these technological developments emerge complicates the confrontation and reflection of the ethical implications linked to them (González Arencibia and Martínez Cardero, 2020). In the case of AI, the advance of prototypes progresses faster than the capacity of institutions or organizations to offer legal and deontological responses (Pedrero-Esteban and Pérez-Escoda, 2021), which highlights the need to assume the ethical implications of the new digital media context in which algorithms learn from human routines for the purpose of personalizing the content offered.

These algorithmic recommendation engines decipher each individual's preferences based on browsing time and their digital trail, recognizing their tastes and selectively filtering consumption proposals (Lee, 2018), which positively assists in situations of infodemia, a concept popularized by the WHO (2020) during the Covid-19 pandemic and defined as an overabundance of information on a topic, either "rigorous and truthful or false and confusing that makes it difficult for people to find trusted sources".

In the field of news and media, there has always been a constant concern about the potential reduction of diversity that algorithmic recommender systems could cause (Napoli, 2011). This debate has evolved towards the notion of "filter bubbles" (Pariser, 2011), which are generated from collaborative filtering that tends to leave out specific content of interest in favour of that which is more popular (Bozdag and Hoven, 2015). However, recent research has revealed that

USC UNIVERSIDADE DE SANTIAGO DE COMPOSTELA

algorithms have the ability to provide diversity on par with human editors (Möller *et al*., 2018), and suggests that the uncertainty around filter bubbles may have been exaggerated (Zuiderveen-Borgesius *et al*., 2016).

In modern journalism, AI is increasingly being incorporated to improve the efficiency, accuracy and depth of reporting. Today, media outlets around the world are integrating AI into all phases of newsmaking, from routine information production to complex investigative journalism. The areas where AI is most popular so far are in automating news generation, analysing large data sets to uncover trends and stories, and even in improving audience engagement through personalized content (Diakopoulos, 2019).

The AI application that has most permeated socially and has generated the most controversy is the one focused on content production. This generative AI is based on neural networks that are trained through machine learning processes, including deep learning (Campesato, 2020). Its use has implications in different spheres such as labour, economics or education, which has led to the emergence of initiatives that promote ethical and responsible use, such as the OdiseIA observatory, Google's AI for Social Good program, or the OpenAI project (Franganillo, 2023).

Journalism or automated content entails ethical, legal and social risks and challenges (Davenport and Mittal, 2022) related to veracity, authorship, transparency, accountability or influence on public opinion, from which derives a complex panorama with multiple possibilities, but also with obstacles or threats that need to be monitored (Franganillo, 2023). For this reason, technological developers must ensure the transparency and accountability of their proposals, for which the European Parliament has laid the foundations of the Artificial Intelligence Act to regulate the use of the data that feed generative models and to protect the privacy of citizens against possible infringements of rights or malicious uses (Ayuso and Pascual, 2023).

Since the irruption of generative artificial intelligence in society, led by the universal and massive access to open solutions such as ChatGPT or Google Bard, no research prior to this study has been identified that analyses the strategies of the Spanish press media with respect to AI, so this paper collects the results of the initial studies by Hansen *et al*. (2017) and Gutiérrez-Caneda *et al*. (2023) on the use of AI in newsrooms, of Bullard (2023) on the impact of AI in journalism, including chatbots and image generators, and of Gilbert (2021) that highlights the role of AI in improving the news experience. It also updates the study of the impact of AI in journalism already addressed, among others, by Túñez-López *et al*. (2021) on AI in journalistic enterprises; Ufarte-Ruíz *et al*. (2023), on synthetic media; Toural-Bran and Vizoso (2022), on automated journalistic training; Santos (2023), on misinformation; and Hireche *et al*. (2023), on robo-reporters.

This paper provides a current vision and a future projection on the application of AI in journalistic companies, taking as an object of study the newspapers that OJD (Spanish Office of Justification of Diffusion) identifies with the largest circulation. For this purpose, it examines the organizational dynamics, the application implementation flows followed, the impact on professional profiles, the current uses and the forecasts of future trends in the incorporation of AI.

USC UNIVERSIDADE DE SANTIAGO DE COMPOSTELA

Generative AI Concepts and Models

If we talk about generative artificial intelligence in journalism or information production, we must mention the model that has popularized Generative Pretrained Transformer (GPT) technologies, specifically ChatGPT. In June 2023, ChatGPT, based on GPT-3, had more than 100 million users and 1.6 billion monthly visits, data that speak of the popularization of this technology, among whose possibilities it has appeared as a new way of production for some journalistic media, and are the origin of discussions on intellectual property or the ethics of generative AI, among others. The high capacity of this tool to handle a wide range of *queries* and its reasoning and text generation abilities reflect its versatility, and it is understood that it can be especially useful in journalism to generate news and diverse content, as other scholars such as Wang *et al*. (2023) have already begun to explore.

Authors such as Gondwe (2023), who have addressed the conceptualization and application of Generative AI in journalism, propose to divide this technology into several key areas:

- Computer Vision (CV): Allows computers to extract meaningful information from digital images, with applications such as facial recognition and image interpretation used in journalism.
- Speech recognition: Focuses on converting human speech into text data, often used in applications that follow voice commands or respond to spoken questions.
- Natural Language Processing (NLP): Computational processing of human language allows computers to manipulate text and spoken words in a manner similar to humans. PLN is used to understand and respond to text or speech data, extract meaning from sentences, and generate readable text.

At the same time, the author concludes that, for the time being, generative AI is applied in journalism in two main ways:

- Content generation: AI algorithms are used to automatically create news articles, reports, summaries and other journalistic content. This allows AI systems to generate coherent and contextually relevant text, mimicking human-like writing styles.
- Data analysis and insights: Artificial intelligence algorithms are used to analyse large data sets, identify patterns and draw meaningful conclusions for journalistic purposes. This includes automated data processing, visualization and interpretation.

Despite these efforts to generate definitions of the technology, more longitudinal studies are still needed to fully describe the status of generative AI in the media as a whole, with the understanding that the adoption of AI in journalism varies internationally, and is influenced by factors such as technological capabilities, media policies and cultural contexts. Countries that have been adopting AI in

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journalism have done so at different rates and to different degrees, reflecting the diversity of technological advances and media landscapes, but also making it clear that for the moment it is a tool that requires high media literacy, and therefore also has significant barriers to its use (Gilbert, 2021).

In Spain, in recent years there has been a growing openness to the use of AI in the press media, especially in the collection and distribution of information. However, there is still some reluctance regarding its application in content production, mainly due to disbelief and lack of knowledge about the automated options offered by artificial intelligence (Fieiras *et al*., 2022a; Sánchez-García *et al*., 2023).

The potential of AI in news verification is relevant, but represents a complex challenge due to the structural nature of fake news (Fieiras *et al*., 2022b). Current research is in early stages in order to identify biases in news through AI (Rodrigo-Ginés *et al*., 2023). Thus, the relationship between AI and content verification in journalism is moving towards the resolution of ethical issues related to transparency and data protection of users (Santos, 2023).

It has been shown that as AI advances, the possibilities of deception also increase, since the development of sophisticated systems that generate artificial content with a high degree of verisimilitude can confuse society if an appropriate code of conduct is not established. This is why it is essential to raise public awareness about the ethical and responsible use of this technology, because although generative AI can increase productivity, it can also cause conflicts in terms of democracy, employment, economics or culture (Franganillo, 2023).

Although AI is rapidly reaching all audiences through accessibility to the tools, as long as there is no generalized training and understanding of how these systems work, it will not be possible to speak of real democratization. Although it is irrefutable that artificial intelligence is democratizing in certain aspects, it is also necessary to recognize that there are private interests that restrict or condition this process (Franganillo, 2023).

In the particular field of public media, the implementation of technology, and particularly AI, must be aligned with the public values that define its nature, prioritizing ethical aspects over market demands and priorities (Sørensen *et al*., 2021). Therefore, there is questioning whether the use of artificial intelligences and algorithms, which entail digital personalization, could harm the universality and privacy of users (Bulck and Moe, 2018).

The incorporation of AI in public service media allows forms of differentiation with respect to those of commercial media, through the incipient development of public service algorithms that avoid the formation of bubble filters and echo chambers, while protecting user data (Fieiras *et al*., 2023), which invites reflection on whether the operational line followed by private proposals overly infringes on the privacy of audiences and limits access to plural, universal and diverse content.

OBJECTIVES

The aim of this research is to know the strategic position of the 10 printed newspapers with the largest daily circulation in Spain with respect to artificial

USC UNIVERSIDADE DE SANTIAGO DE COMPOSTELA

intelligence and to identify the current organizational and production dynamics, the flows of implementation of automated tools, the departments and professionals involved, the current uses and their impact on the current and demanded professional profiles, as well as the trends that are expected for the immediate future in order to anticipate the evolution of the integration of AI in journalistic routines. To this end, they set as objectives:

- To know the point of implementation of AI in the reference press media in Spain, its interest in this technology and its strategic approach.
- Identify which departments are in charge of AI in the press media and the internal implementation flows that follow.
- To specify the impact of AI integration on professional routines and profiles.
- To determine the AI solutions applied by the press media in the newsmaking, content verification and recommendation phases, and the expected future trends.

METHODOLOGY

This research is exploratory, descriptive and, therefore, hypothesis-blind. We chose to use qualitative methods, and resorted to in-depth personal interviews with a semi-structured questionnaire, conducted as a Delphi and in two rounds, to professionals with management positions and strategic vision of the 10 newspapers with the largest circulation in Spain.

A purposive sample is used based on data from the Association of News Media (AMI), with data from the September 2023 report, provided by the companies themselves, prepared by KPMG and collated by OJD. Print media are chosen instead of digital native newspapers with a single web edition in order to work with corporations with more longitudinal trajectories whose workers, routines and structures have progressively experienced the digitizing process of change from a traditional model to the current one.

The sample includes *El País*, *La Vanguardia*, *Marca*, *La Voz de Galicia*, *As*, *ABC*, *El Mundo*, *El Correo*, *El Diario Vasco* and *Mundo Deportivo*, whose aggregate relative weight of daily circulation (average daily circulation plus individual subscriptions) represents 57.24% of the total market (374,353 units out of 653,954), which makes it possible to make the convenience sample representative, since it also includes titles belonging to the five most important newspaper publishing groups in Spain: Grupo Prisa, Grupo Godó, Unidad Editorial, Corporación Voz de Galicia and Vocento.

USC UNIVERSIDADE DE SANTIAGO DE COMPOSTELA

Table 1. List of the 10 print newspapers with the highest daily circulation in Spain

Outlet	Daily average copy sales per issue + individual subscriptions (September 2023)	Relative weight daily diffusion
El País	52.923	8,09%
La Vanguardia	49.213	7,53%
Marca	44.294	6,77%
La Voz de Galicia	38.292	5,86%
As	37.293	5,70%
ABC	35.768	5,47%
El Mundo	33.633	5,14%
El Correo	33.137	5,07%
El Diario Vasco	29.236	4,47%
Mundo Deportivo	20.564	3,14%
Total	374.353	57,24%
Aggregation of copies per day	653.954	100%

Source: Own elaboration based on September 2023 AMI data.

Table 2. Purposive convenience sample

Abbreviation	Name	Corporation	Cargo	Publishing group
(MP/EP)	Mari Luz Peinado	*El País*	Digital Strategy Director	Prisa Group
(JA/V)	Joel Albarrán	*La Vanguardia*	Deputy Director	Godó Group
(EC/Marca)	Emilio Contreras	*Marca*	Deputy Director and Head of Digital	Editorial Unit
(XV/LV)	Xosé Luis Vilela	*La Voz de Galicia*	Director	Voz de Galicia Corporation
(TC/As)	Tomás de Cos Relaño	*As*	Deputy Director	Prisa Group
(CC/ABC)	Carlos Caneiro	*ABC*	Deputy Director	Vocento
(VC/EM)	Vicente Ruiz	*El Mundo*	Deputy Director	Editorial Unit
(AA/EC)	Aitor Alonso	*El Correo*	Director of Digital Strategy, New Narratives and Publishing Marketing	Vocento
(EU/DV)	Eli Ugalde	*El Diario Vasco*	Marketing Director	Vocento
(CD/MD)	Carlos Duart	*Mundo Deportivo*	Product Manager	Godó Group

Source: Own elaboration.

USC UNIVERSIDADE DE SANTIAGO DE COMPOSTELA

The research is developed through interviews with senior management professionals from the 10 media in the sample (Table 2) via video call by Microsoft Teams, Skype or Google Meet between October 2 and November 20, 2023, with an average duration of 40 minutes. The questionnaire includes specific content depending on the corporation interviewed, the central blocks being the strategic approaches to AI, the implementation flows of this technology, the organizational dynamics adopted around AI, the perceptions of workers with respect to it, current uses and applications, and forecasts of progress and impact.

The methodological triangulation is achieved by complementing the in-depth interviews with a bibliographic sweep of the scientific literature on AI in the media or technological innovation and the analysis of the main contents of these media and the operation of their platforms to detect possible uses of automated techniques in their proposals.

RESULTS

Strategic Position of the Spanish Press Media with Respect to Artificial Intelligence

The main print newspapers in Spain are in an initial phase of interpreting value and seeking the usefulness of artificial intelligence, with simple approaches to the automation of daily tasks. Except in specific cases, the use of generative AI is rejected for the moment. The common declared intention is to take advantage of the possibilities of AI with caution to optimize their core products or services and thus achieve qualitative differentiation, but not to use it to generate an amplification of coverage that, they believe, would end up with an endless race between media that would alter the essence of their subscription model based on the differentiation of authored content.

These newspapers pay special attention to the regulation of technology and artificial ethics, being one of the concerns most frequently mentioned by their executives. The forecast is that AI will be incorporated for the automation of routine tasks in which there is no real journalistic contribution, for which it is proposed as an assistant that cuts execution times of simple tasks, not as an aggressive agent that motivates the reduction of human capital. AI is conceived by newspapers as an opportunity to vindicate the importance of journalism and information professionals, who in their opinion should always supervise the activity of algorithms, without giving them autonomy or responsibility.

In the vision of the reference press media, there is agreement that human value, narrative quality, contrast and credibility will be the distinctive features of their brands. They identify as the main limitation of generative AI the production of flat pieces without differential contribution, offering an amplification of coverage that currently does not interest most of these newspapers.

On the organizational side, it is common for the different editorial groups to establish a joint line of action for the different titles, analysing the technology market through their transversal technology, strategy or product departments.

USC UNIVERSIDADE DE SANTIAGO DE COMPOSTELA

Subsequently, the ideas or tools identified as relevant are proposed to these same sections within the media and it is the latter who analyse their real interest before landing them in the appropriate newsrooms or departments.

Based on the analysis of the strategic lines of application of AI in these headers, and the specific uses they make of it (detailed in section 4.4 of this project), this research proposes a four-level scale of implementation of this technology, reflecting the point of development in which each corporation is: the lowest point, or 'null' status, represents those media that have not yet introduced any AI tool in their routines and show no interest in the concept; the 'initiation' point refers to those media with timid approaches to this technology, but without a firm strategy; the 'intermediate' status includes those headers with more sophisticated uses or with longer trajectories of implementation; while the 'advanced' level would reflect those media with a strong proposal or transversal AI strategy and with a variety of tools that permeate all phases of newsmaking, circumstances that have not yet manifested themselves in the 10 titles studied, with most of them at the initiation level, with the exception of *El País*, *Mundo Deportivo* and *ABC*, with a longer trajectory in the integration of AI in their routines or with more advanced application proposals.

Table 3 below presents the levels of the proposed implementation scale, while Table 4 specifies the strategic position of each medium with respect to the IA.

Table 3. Proposed IA implementation scale

AI implementation level	Description
Null	No AI tools or applications
	No clear interest in the concept
Initiatory	First approaches to AI tools for solving simple tasks
	Lack of AI implementation strategy
Intermediate	AI prototypes and tools with longer implementation track record or more sophisticated developments.
	Possibility of creating or publishing generative AI content and outlining strategic plans
Advanced	Strong cross-cutting AI proposal
	AI tools implemented in all phases of news creation and task solving

Source: Own elaboration.

USC UNIVERSIDADE DE SANTIAGO DE COMPOSTELA

Table 4. Strategic position of Spain's main print newspapers in relation to AI

Outlet	Implementation point	Strategic position in relation to AI
El País	Intermediate	They have been using algorithms and introducing automated tools to transform and optimize processes for years.
		They closely follow the progress of AI through a specialized work team, analysing how to integrate it into new tasks.
		They do not employ generative AI and do not plan to do so, even for the most basic products, as they believe it would alter the essence of their subscription model.
		They claim that they constantly receive offers for AI products and services.
La Vanguardia	Initiatory	In the AI interpretation phase. Very attentive, but cautious. They do not want to be on the sidelines, but neither do they want to delegate responsibilities to the AI.
		The human factor, credibility and contrast will be the hallmarks of the brand. AI, always with supervision.
		The main limitation they detect is that it does not provide a differential value, but rather an amplification of coverage that currently does not interest them. When they identify how it can help them, they will incorporate it into their systems.
Marca	Initiatory	In the initial implementation phase, caution. They received offers from tools producing more than 8,000 single parts per day, which they rejected.
		Intention to use AI to optimize core products and add value, not to amplify coverage.
		They have an AI Transversal Commission in Unidad Editorial with weekly meetings to update and search for tools.
La Voz de Galicia	Initiatory	Prediction that AI will totally transform journalistic routines. Fundamental to artificial ethics and human control over technology.
		They develop prototypes and ideas in their lab, but without publishing anything for the moment.
		Foreseeing new uses of structured data and documentary information to optimize process efficiency.
		They conceive of AI as assisting essential human labor, not as cost savings.

USC UNIVERSIDADE DE SANTIAGO DE COMPOSTELA

Outlet	Implementation point	Strategic position in relation to AI
As	Initiatory	Operational strategy 100% focused on the digital version.
		Predictive analytics use in predictive analysis of results or other parameters that nurture the parts, they do not value the use of AI to generate final products.
		While waiting to study the real benefit of implementing AI to amplify the current coverage, and always with human supervision.
ABC	Intermediate	Growing interest on the part of management and journalists in learning how to use AI to optimize and simplify processes.
		Transversal testing of Grupo Vocento to create useful content with AI to assist journalists, not to create final products.
		Intention to implement training on specific AI tools.
El Mundo	Initiatory	They see AI as an opportunity to improve product and profitability.
		They have an AI Transversal Commission in Unidad Editorial with weekly meetings to update and search for tools.
		They have provided ChatGPT training to their editors, plan to use generative AI to amplify coverage and improve their current offering.
El Correo	Initiatory	Caution and expectation. Occasional uses for experimentation and basic professional application.
		They don't think of AI to generate more content, but to improve and streamline processes.
		They believe that the media will be dedicated to creating unique, quality, exclusive content focused on their sphere of influence.
El Diario Vasco	Initiatory	The first tests were carried out in the marketing and promotion department, with no experience in copywriting at the moment.
		Watch out for new developments and possible applications for the automation of simple tasks.
		Forecast of use in the management and automated handling of social networks and digital platforms.

USC UNIVERSIDADE DE SANTIAGO DE COMPOSTELA

Outlet	Implementation point	Strategic position in relation to AI
Mundo Deportivo	Intermediate	Early 2023 focused on solution tracking and testing in AI prototypes. High interest in generative AI.
		Use of generative AI to create content that was not previously covered with the intention of generating engagement and capturing users.
		They envisage a progressive introduction of simple solutions that optimize specific routine processes.
		The sector is expected to move towards personalization.

Source: Own elaboration.

Organizational Dynamics for Managing AI Applications and Resources

The implementation flows of artificial intelligence applications and organizational dynamics vary according to each media and editorial group, without identifying for the moment any department specialized in AI in the newspapers studied. Only Unidad Editorial has a committee dedicated exclusively to AI. It was recently created and is made up of its technology team, an editor from each newspaper and the digital director (CDO) of each of its media, who hold weekly meetings to review new tools and automation possibilities.

The Prisa and Vocento groups also articulate joint transversal strategies for all their newspapers, which then decide, through their internal teams, which applications to integrate in their respective newsrooms. The newspapers belonging to Grupo Godó manage their lines of action independently, although they sometimes propose joint initiatives from time to time. *La Voz de Galicia* and *El País* are the only media that would consider the creation of a specific internal department for AI innovation in case this technology reaches a significant relative weight, while the rest of the newspapers think of keeping the teams or commissions currently responsible for it in charge. Table 5 shows the dynamics of AI resource management and the departments related to its implementation in each newspaper.

Table 5. Organization of AI resources in Spain's main print newspapers

Outlet	Organization of artificial intelligence resources
El País	Management is part of the Prisa Group's transversal strategy.
	They created a specific task force to track and analyse the progress of AI in the sector and new related tools.
	The product department would then move the tools to the newsroom together with this AI team.
La Vanguardia	IA managed by the New Projects department, in charge of innovation-related matters.

USC UNIVERSIDADE DE SANTIAGO DE COMPOSTELA

Outlet	Organization of artificial intelligence resources
Marca	Unidad Editorial has a recently created AI Transversal Commission to provide solutions to all its titles.
	At *Marca*, AI would be managed by the technology team together with the product team, which is the link between technology and the newsroom.
	In the case of incorporating new solutions, they would opt for outsourcing rather than creating a specialized in-house department.
La Voz de Galicia	The New Audiences department would manage the tools. Once analysed, it would test and implement them in the newsroom.
	Should AI become more important, the creation of an innovation and development department would be possible.
As	Management is part of the Prisa Group's transversal strategy.
	The *AS* product team would land the initiative at the head end together with the department involved in the initiative.
	They do not foresee the creation of a new IA department; the product team would continue to be the intermediary between Grupo Prisa and the newsroom.
ABC	Centralized management in Vocento's Strategy and Analytics Department in Madrid, in combination with the Group's technology team.
	At *ABC*, it is the technology and product teams that land the concepts in a small editorial team that also participates.
El Mundo	Unidad Editorial has a recently created AI Transversal Commission to provide solutions to all its titles.
	At *El Mundo* it would be the digital and technology managers who would transfer the tools to the newsroom .
El Correo	Centralized management by Vocento, which acquires the licenses on a group basis and sets up the systems.
	At *El Correo*, the digital strategy team would land the concepts in the corresponding department.
El Diario Vasco	Centralized management at Vocento.
	When a prototype is implemented, a specific internal work team would be created at the head office with professionals linked to the tool to land the concept in the corporation.
Mundo Deportivo	The head-end product team manages AI solutions.
	Joint cross-cutting solutions for the entire Godó Group are also being assessed.

Source: Own elaboration.

USC UNIVERSIDADE DE SANTIAGO DE COMPOSTELA

Impact of AI Integration on Newspaper Workforces and Recruitment Supply

The Spanish press media still does not identify professionals strictly specialized in artificial intelligence, nor does it include training as a requirement of interest in its hiring offer. In all these newspapers they have professionals on staff who are in a position to understand and keep track of the AI prototypes that are trending and beginning to settle in the sector, despite their self-taught training derived from other technological needs such as data analytics or code engineering.

All agree that as AI is progressively introduced into their structures, they will need specialized personnel to optimize solutions and extract maximum performance, which is not decisive in the current context where they value more the profile of a multitasking communicator who is capable of producing content in different formats. These newspapers advocate the gradual training of their own employees rather than drastically renewing their workforces with specialized professionals, and believe that AI will stimulate an important reconversion of profiles as happened with the digitizing process that their business models underwent.

Table 6. Professional profiles and AI-related hiring in Spain's leading print newspapers

Outlet	Professional profiles and AI-related recruitment
El País	Its technology journalists have an in-depth knowledge of AI although they are not solely specialized in it.
	They have offered small joint trainings to their employees on current trends and possible uses.
	Through their AI team, they analyse what training may be necessary for their journalists, graphic designers, photographers and other newspaper professionals.
	They believe that they will take AI training into account in the future as SEO or RRSS skills were once incorporated.
La Vanguardia	No specialized profiles or demanded so far.
	In the New Projects team, the professionals are able to understand and assimilate these automated prototypes.
	Data and code analyst profiles, hired 7/8 years ago, are the professionals who can understand them today.
Marca	They have a journalist in the process of specialization following the current events and useful tools available.
	As AI becomes more established in your newsroom, specialized profiles will be in demand in parallel.
La Voz de Galicia	No strictly specialized profiles or recruitment claims. They are trying to progressively train their team of new audiences.

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Outlet	Professional profiles and AI-related recruitment
AS	Without specialized professionals.
	The product team members are the most knowledgeable about the different technologies.
ABC	No specialized professionals, and no intention of including the AI profile in its recruitment offer until this technology becomes more pervasive in its structure.
	Intention to train on specific tools to optimize their use and exploitation.
El Mundo	They have provided specific training in ChatGPT to extract the full potential of this tool, which they integrate in many of their daily tasks.
	They plan to provide AI refresher training every 2/3 months to optimize the tools they already use and discover new ones.
El Correo	Expectant and with superficial self-taught training in the case of some workers to get to know the tools, try them out and see the possibilities.
	No specialists and no current intention to hire.
El Diario Vasco	No specialized professionals.
	They are looking for multitasking journalists rather than AI specialists.
Mundo Deportivo	They do not have specialized professionals nor are they demanding it in the hiring process. They foresee that they will incorporate it as they have more AI features and need to optimize their operation.
	They advocate training their own workers rather than hiring specialists.

Source: Own elaboration.

Specific Uses of Artificial Intelligence in Newsrooms

The current uses of AI and the foreseen incorporation of automated solutions in the Spanish press media are aimed at optimizing the existing offer created by its journalists and cutting the time spent on routine tasks in order to reserve those efforts for more specialized or creative work. Although most newspapers have already carried out internal tests for the production of texts with AI, only *Mundo Deportivo* has managed to publish artificial news pieces supervised by its editors and on simple topics that they did not cover before, such as lottery results, weather forecasts or chronicles of non-professional categories.

The rest of the newspapers consider that, for the moment, they are not interested in expanding their coverage with simple pieces that deviate from their quality standards, and value their future incorporation only to capture specific niches of users so that they are redirected to their core content, as *Mundo Deportivo* does at present. The exception is *El Mundo*, which values the use of generative AI to generate simple texts on specific topics such as election results in small cities.

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At Unidad Editorial they work with generative AI in an application that they have integrated into their CMS, aimed at creating promotional texts in news format about different Amazon products that they recommend from their headers. This is not related to news production, but is a tool linked to the business line through which they generate pieces that are subsequently supervised by their editors and published in their 'Bazaar' section. Likewise, in the specific case of *El Mundo*, they use ChatGPT on a daily basis for different functions such as translating information, adjusting the length of the pieces they transfer from the online version to the printed version, checking typos, for documentation and even for preparing interviews, asking the system for a battery of questions that they then filter.

AI is also being used in print journalism in Spain in business lines and marketing departments for the generation of advertising copy and creation of customized ads, translation to foreign versions, content planning in social networks, verification, audience analytics, generation of images and illustrations, and grammatical and SEO improvement of pieces through content analysis.

The Marfeel Compass application, used by most of these newspapers, performs a complete review of the texts to optimize their writing and grammar, and offers different headline proposals with an appropriate web positioning according to Google parameters. Tests are also being carried out in these newspapers for the transition from text to voice and the incorporation of the news narration option in the digital platforms, and in the video departments for the optimization of the editing and post-production processes.

The most imminent foreseeable incorporation of AI solutions in these media is related to the personalized recommendation of content; to the creation of simple texts derived from the pieces already created by their editors, such as summaries as a content preview; to the verification of facts and information; to the management and handling of social networks, and to the analysis of user behaviour to improve their experience in the digital proposals.

Diario *As* has already experimented successfully with the predictive analysis of results with a technology company using biomedical data, such as the kilometers travelled by a team, ambient temperature or injury history to provide an estimate of the probability of victory, which they believe could be interesting in the medium term to feed their articles. The current specific uses of artificial intelligence in the main printed newspapers in Spain are detailed in Table 7 below.

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Table 7. Specific uses of AI in the main Spanish print newspapers

Outlet	Specific application of AI
El País	They have been working for years on optimizing routine and mechanical daily tasks with automated tools and algorithms.
	They use AI in the generic planning of content in social media, determining the best times to publish or scheduling the publication. Also to evaluate which photographs work best on the front page.
	Content analysis and evaluation (Marfeel Compass).
	They foresee the incorporation in the short term of personalized content recommendation or verification of fake news or AI-generated content.
	They do not believe they will resort to generative AI in the future.
La Vanguardia	Content analysis and evaluation (Marfeel Compass).
	Usage forecasts: content recommendation; creation of summary-style content on the pieces already created to optimize distribution and expand the formats derived from the pieces generated by your editors.
	They value the use of AI in content verification.
Marca	Use of generative AI for the generation of texts linked to the line of business (Bazaar).
	Use of AI in translation tests to foreign versions.
	Work on audience analysis.
	Content analysis and evaluation (Marfeel Compass).
La Voz de Galicia	They inform readers about the possibilities and limitations of AI through news reports.
	First approaches to optimize distribution.
	First tests with generative AI for the generation of texts with different points of view.
	Usage forecasting for the generation of parts based on structured data (TV listings, stock market, economy, weather or movie listings) and the processing of documentary information to optimize process efficiency.
AS	Trials with the company Narrative in 2019 for the generation of simple soccer chronicles.
	Testing with a technology company for predictive analytics of outcomes from biomedical data.
	Personalized recommendation, verification and evaluation of content is expected to be relevant in the medium term to optimize product and distribution.

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Outlet	Specific application of AI
ABC	Tests with illustrations and AI-generated images.
	Internal testing to generate useful content such as weather forecasts or documentation to assist journalists.
	Prototype under development at Group level for text-to-speech to implement the news narration option.
	Freelance testing in the video department for the integration of AI applications in editing and post-production, and on the IT side.
El Mundo	Use of generative AI for the generation of texts linked to the line of business (Bazaar).
	Use of ChatGPT for translation, proofreading, text length adaptation, and documentation work.
	The incorporation of an automatic text production system is foreseen, with the intention of applying it to the electoral results.
El Correo	Use AI to improve and streamline processes, not to generate more content.
	Content analysis and evaluation (Marfeel Compass).
	Foreseeable use in simple mechanical tasks, such as some layout functions, optimization of graphic resources and photographs.
El Diario Vasco	Simple applications in the marketing department (copy ads).
	Ideas for the line of business in the planning phase (user behaviour analysis).
	Forecast of possible use in social media management.
Mundo Deportivo	Generation of simple texts with the intention of attraction (primitive results, weather forecast, chronicles of non-professional categories).

Source: Own elaboration.

CONCLUSIONS

The incorporation of Artificial Intelligence (AI) in journalism is a significant change that is integrated into all aspects of the development of the profession, although with variations in pace depending on the adaptability and acceptance of digital ecosystems in the newsrooms of different countries. However, progress towards journalism based on artificial intelligence and automated technology, or synthetic media, still presents challenges, as they do not arouse interest or economic sustainability in the professional sector (Ufarte-Ruiz *et al*. 2023), in addition to the ethical, legal and social risks and challenges arising from the implementation of generative AI, and leading to conflicts linked to veracity, authorship, transparency, accountability or influence on public opinion (Franganillo, 2023).

In the case of the Spanish press media, the main written newspapers are already considering the incorporation of algorithms and AI in all phases of

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journalistic creation to automate mechanical tasks without human or creative input, in order to optimize their main routines and products. However, most of these newspapers discard in the short and medium term any generative use of final text creation as they consider them flat, simple and without sufficient differentiation, which would be detrimental to the quality standards that nurture their subscription model (Objective 1). Likewise, the development of automated solutions is advancing faster than the establishment of the necessary regulatory standards to avoid negative effects that could result in a violation of the privacy rights of individuals (Pedrero-Esteban and Pérez-Escoda, 2021), so that artificial ethics and the promotion of education about this technology seem to be key requirements to continue its establishment in society.

Within the scale of AI implementation, most newspapers occupy the second or 'initiation' level, with timid approaches to simple tools but without a defined strategy or sophisticated uses, while *El País*, *Mundo Deportivo* and *ABC* are at the next 'intermediate' point, as they show a greater progress in the integration of AI in their routines, or by resorting to more advanced application proposals.

In organizational terms, it is the technology, product or strategy departments that manage the AI resources and tools in the newspapers, although in the case of Grupo Prisa and Vocento, these applications pass through a first filter centralized in the strategy teams of the groups, while in Unidad Editorial they work with a specific AI Commission that reviews the needs of each business unit, and in Grupo Godó this responsibility falls directly on their own newspapers, which does not prevent joint solutions from being projected on an ad hoc basis (Objective 2).

At present, no professional profiles specialized in artificial intelligence are identified in the corporations, despite the fact that all of them have workers with the capacity to interpret and understand the new trends related to AI. In this line, they foresee a gradual and progressive training of their personnel as this technology is introduced more deeply into their structures (Objective 3).

The most frequent uses of AI in the Spanish press media are related to the business and marketing line, translation to foreign versions, planning in RRSS, content review, verification, analytics, and SEO positioning, while its use for personalized recommendations, predictive analysis, creation of simple texts on finished pieces as a summary, automated management and handling of content, and greater analysis of user behaviour and verification of facts and information are already valued and planned (Objective 4).

It will be interesting to monitor over the next few years to see if these media finally decide to produce artificial news with algorithms to amplify their coverage and capture specific niches, and to quantify the time it will take to consolidate in the newsrooms the new functions specialized in automation, as well as possible departments specifically dedicated to this technology.

USC UNIVERSIDADE DE SANTIAGO DE COMPOSTELA

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Funding: This article is part of the activities of the project "Public audiovisual media in the face of the platform ecosystem: Management models and evaluation of the public value of reference for Spain" (PID2021-122386OB-I00), funded by the Ministry of Science and Innovation (Micin, Spain), State Research Agency (AEI, Spain), and European Regional Development Fund (ERDF, EU). In addition to being integrated in the activities of the RTVE USC Chair on Public Service Media in Europe.

The author César Fieiras Ceide has an FPI contract from the Spanish Ministry of Science and Innovation under reference (PRE2022-103954).

USC UNIVERSIDADE DE SANTIAGO DE COMPOSTELA

RED
MARKA
Revista de Marketing Aplicado
Vol. 26, núm. 1 (2022), 36-51
ISSN: 1852-2300
DOI: https://doi.org/10.17979/redma.2022.26.1.8932

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Recibido el 20 de enero de 2022
Aceptado el 10 de junio de 2022

Verificación automatizada de contenidos en las radiotelevisiones públicas europeas: primeras aproximaciones al uso de la inteligencia artificial

Automated content verification in European public broadcast media: initial analysis of the use of artificial intelligence

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Resumen: La proliferación de noticias falsas en el renovado contexto digital se erige como uno de los problemas centrales a los que se enfrentan los medios de comunicación. Se ha comprobado que, para atajar la desinformación, no basta con la aplicación de soluciones tecnológicas, ya que se trata de una cuestión estructural que debe ser contenida desde la raíz: la alfabetización mediática desde la juventud para el

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Forma de citar este artículo: Fieiras Ceide, C., Vaz Álvarez, M., y Túñez López, M. (2022). Verificación automatizada de contenidos en las radiotelevisiones públicas europeas: primeras aproximaciones al uso de la inteligencia artificial, *Redmarka. Revista de Marketing Aplicado*, vol 26, núm. 1, 36-51. https://doi.org/10.17979/redma.2022.26.1.8932

desarrollo de un pensamiento crítico. Con todo, el uso de herramientas basadas en la automatización o la inteligencia artificial (IA) simplifica la tarea de verificación de contenidos y de rastreo de falsedades, permitiendo un análisis inmediato de grandes volúmenes de información. En el caso concreto de las radiotelevisiones públicas europeas, las 8 entrevistas en profundidad realizadas para el presente estudio a responsables de innovación e inteligencia artificial en radiotelevisiones públicas revelan que ya han comenzado a implementar estas soluciones en sus procesos de producción, lo que supone un paso adelante hacia una mitigación efectiva de la desinformación.

Palabras clave: noticias falsas, verificación, inteligencia artificial, automatización, periodismo, comunicación, internet, radiotelevisiones públicas.

Abstract: The proliferation of fake news in the new digital era is one of the main problems facing the media. Technological solutions alone are not enough to tackle misinformation, as the problem is a structural one requiring root cause solutions, such as the promotion of media literacy from a young age to develop critical thinking. The use of tools based on automation or artificial intelligence (AI) simplifies the task of verifying content and tracing false information, and allows large volumes of information to be analysed quickly. The eight in-depth interviews conducted for this study with heads of innovation and artificial intelligence at European public broadcasters reveal that these solutions have already begun to be implemented as part of their production processes. This represents a step in the right direction towards mitigating the problem of misinformation in the future.

Keywords: fake news, verification, artificial intelligence, automation, journalism, communication, internet, public broadcast media.

1. INTRODUCCIÓN. LAS FAKE NEWS EN EL ECOSISTEMA DE MEDIOS

El registro de la primera noticia falsa en la historia contemporánea data de 1835, fue publicada por The Sun y relataba la existencia de seres vivos en la Luna (Abad, 2019). El impacto en el país norteamericano fue enorme, y se acentuó por la irrupción de tres factores fundamentales que facilitaron el acceso a la información y la propagación de ésta: la creación de grandes empresas dedicadas a la prensa, la bajada en el precio de los periódicos y la llegada de nuevos transportes como los barcos y los trenes.

La desinformación ha estado presente desde los orígenes de los medios de comunicación, agravándose en momentos de crisis o conflictos bélicos (Bloch, 1999). Para combatirla se han desarrollado prácticas como el fact-checking, una técnica periodística basada en la comprobación y verificación de informaciones publicadas en los medios (Mantzarlis, 2018). Su propósito, según Gueham (2017), es paliar el impacto

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de la distribución de fake news, que es cada vez más masiva e incontrolable debido a la expansión de los entornos digitales y plataformas sociales (Lopez-Borrull; Vives-Gràcia; Badell, 2018).

Vázquez-Herrero, Vizoso y López García (2019) analizan la figura del fact-checker, un periodista concentrado en la comprobación y verificación de datos y discursos, con el objetivo de localizar incoherencias o inexactitudes (Graves, 2016, p. 77). Para ello, recurren a diferentes aplicaciones tecnológicas que analizan grandes volúmenes de información y de bases documentales (Brandtzaeg et al., 2018). Mantzarlis (2018) establece 3 fases diferenciadas en el proceso de verificación: la búsqueda de declaraciones verificables; el rastreo de los propios hechos originales mediante la consulta de la fuente de información que los apoye; y la corrección y matización del contenido presentando las evidencias pertinentes.

Con respecto al término posverdad, Fernández-García (2017) lo define como una "falsedad" que sigue siendo aceptada por parte de la sociedad a pesar de saberse que es un hecho falso. Las redes sociales son las nuevas líderes de información en internet, un espacio donde existen filtros como los recomendadores de contenido que impiden que lleguen a nosotros puntos de vista que difieran de los nuestros, lo que acaba por crear la burbuja informativa que puede derivar en una grave falta de sentido crítico (Pariser, 2017, p.11).

La consolidación del uso de redes sociales deriva en un aumento de la proliferación de las fake news, lo que dificulta la confianza en determinadas informaciones. La carrera electoral entre Donald Trump y Hillary Clinton marcó un antes y un después en la trayectoria de las noticias falsas en internet, ya que a partir de ahí no solo fueron normalizadas, sino que se convirtieron en un nuevo y demoledor instrumento político de propaganda (Journell, 2017). Según Mcnair (2018), este fenómeno tiene su base en el "auge de los populismos y los nacionalismos y el desprestigio de las élites y los medios de comunicación".

2. MARCO TEÓRICO. EL PAPEL DE LA INTELIGENCIA ARTIFICIAL EN EL PERIODISMO ACTUAL

Silverman (2013) apunta que la inteligencia artificial (IA) mejora "la calidad y precisión del periodismo" al permitir una verificación en directo y una identificación de errores más efectiva, así como la detección del plagio o la manipulación. Este "periodismo artificial" (Tuñez, Toural y Valdiviezo, 2019) o "automated journalism" (Carlson, 2015; Graefe, 2016), "algorithm journalism" (Diakopoulos, 2014; Dörr, 2016), o "robot journalism" (Oremus, 2015), reemplaza determinadas funciones de los profesionales de la información con algoritmos, pero no debe entenderse como rival, sino como un nuevo aliado para mejorar la creación de la historia.

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La aplicación de la IA no solo se limita a la prensa escrita o a las noticias automatizadas, sino que se ha extendido a todos los apartados del newsmaking (Túñez, Toural y Frazão,

2020). Se emplea en la mayoría de procesos de la cadena de producción periodística, tanto en la generación de alertas, notificaciones y recomendaciones como en la asistencia a los informadores en la verificación, comercialización, y, principalmente, en la automatización inteligente del flujo de trabajo para la creación de historias y cobertura en directo de acontecimientos (Rojas-Torrijos, 2018).

En la próxima década impactará sobre el sector de la comunicación una nueva ola tecnológica, la que tendrá como protagonistas a la inteligencia artificial, el big data y a las nuevas interfaces visuales y basada en voz (Newman, 2020). Este uso a gran escala de datos e IA supone la cuarta etapa en la digitalización del periodismo tras los medios online, móviles y sociales (EBU, 2017). "La transcripción, la traducción automatizada y los servicios de texto a voz serán algunas de las primeras tecnologías impulsadas por la IA que alcanzarán una adopción masiva este año, abriendo nuevas fronteras y oportunidades para los editores" (Newman, 2020).

En el desarrollo de soluciones inteligentes se han identificado dos tipos de tendencias en los medios de comunicación: los que han creado su propio software o los que han acudido a empresas proveedoras (Rojas-Torrijos, 2018). The Washington Post ha sido una de las cabeceras que desarrolló su propio sistema basado en IA, llamado Heliograf. Este proyecto consiste en una plantilla creada por periodistas que es rellenada por la tecnología basada en inteligencia artificial con los útlimos datos disponibles sobre la materia objeto de trabajo. Posteriormente, esos textos se convierten en artículos ya preparados para ser distribuidos (Universidad Fasta, 2020). Con Heliograf se generan automáticamente titulares y breves que proyectan a través de Twitter y Messenger de Facebook, entre otros canales.

En el caso concreto de los medios de servicio público (Public Service Media -PSM- en inglés), la IA brinda nuevas oportunidades en todas sus facetas. En la BBC se ha testado la traducción automática de idiomas y la tecnología de voz sintetizada en la puesta en marcha de su servicio de vídeo japonés. También emplearon un software inteligente para publicar 689 historias locales en escasas horas durante la noche de las elecciones de diciembre de 2019 (Newman, 2020). Tanto la BBC como Deutsche Welle y SRG-SSR en Suiza son algunas de las emisoras públicas que trabajan intensamente con tecnologías lingüísticas, de hecho, BBC World Service ya opera en más de 40 idiomas (EBU, 2019).

En la producción de contenido, la inteligencia artificial puede contribuir con la misión de los PSM al analizar la toma de decisiones algorítmicas con el objetivo de detectar sesgos y manipulación, ofreciendo nuevas técnicas de verificación que refuerzan la confianza en el periodismo (EBU, 2019). La European Broadcasting Union (2019) prevé oportunidades interesantes para los medios de servicio público a partir del avance de tecnologías del lenguaje, como son la traducción automática, el reconocimiento de voz y la generación de voz y texto.

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Tabla 1. Beneficios de la aplicación de IA en los medios. (Fuente: elaboración propia a partir de European Broadcasting Union, 2019)

Detectar tendencias en redes sociales
Obtener consejos para romper tendencias
Obtener ángulos de la historia, imágenes y personas sugeridas a través de una búsqueda en línea
Verificación de hechos
Verificación de fotos y vídeos falsos
Comprobación de falsificaciones profundas
Encontrar direcciones de correo electrónico conectadas a sitios web
Descubrir bots en redes sociales
Transcripción de audio
Creación de historias a partir de datos estructurados
Traducción automática de textos
Corrección automática de textos
Asistencia de la IA en la edición de vídeo
Edición automática de audio
Automatización de los flujos de trabajos
Análisis predictivos para generar ingresos y aumentar la satisfacción de los clientes
Creación de un chatbot
Limpieza y filtración de los datos

Para garantizar la protección de la información personal y de la privacidad las corporaciones deben cumplir con las regulaciones nacionales y las de la UE. En concreto, la General Data Protection Regulation (GDPR), en vigor desde el 25 de mayo de 2018, es la normativa europea que se encarga de este apartado y "prevé la ampliación de los derechos de los usuarios a proteger la información personal, incluido el derecho a ser informados sobre el tratamiento de sus datos y el derecho al olvido" (Sørensen y Van den Bulck, 2020).

Tortoise Media (2021) elaboró un índice global de inteligencia artificial que estudia cómo 62 países aplican y se adaptan al desarrollo de esta nueva corriente tecnológica. Lo hacen a través de tres pilares: inversión, innovación e implementación. Reino Unido, primera nación europea y número tres mundial después de los EEUU y China, es la tercera mejor valorada en cuanto a talento, solo por detrás de los propios EEUU y la India. Países Bajos y Alemania cierran el podio Europeo, mientras que España no entra en la lista de las 10 regiones más avanzadas, localizándose en undécima posición. Aún así, la estrategia de gobierno española es la cuarta mejor valorada por el índice.

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Tabla 2. Ranking europeo de IA, posiciones globales. (Fuente: elaboración propia a partir de Tortoise Media, 2021)

País	Talento	Infraestructura	Entorno Operativo	Investigación	Desarrollo	Estrategia de gobierno	Comercial	Ranking global
1. Reino Unido	3	23	24	5	11	11	4	3
2. Países Bajos	6	9	10	15	8	33	18	8
3. Alemania	11	13	30	6	12	10	8	9
4. Francia	9	14	17	16	15	5	10	10
5. Irlanda	8	5	31	28	7	25	25	12
6. Finlandia	16	22	18	17	20	8	21	13
7. Dinamarca	13	18	11	13	32	18	26	14
8. Luxemburgo	18	3	33	23	17	30	20	15
9. Suiza	14	11	54	3	13	58	9	18
10. Suecia	10	17	34	11	22	47	22	19
11. España	21	19	23	26	29	4	28	21

3. METODOLOGÍA

Esta investigación se plantea a modo exploratorio descriptivo con hipótesis ciega. Se opta por emplear métodos cualitativos y se recurre a la realización de entrevistas personales en profundidad a los directores de innovación, estrategia e inteligencia artificial de las de las televisiones públicas de Alemania (ARD) Austria (ORF), Bélgica (VRT), España (RTVE), Gran Bretaña (BBC), Italia (RAI), Suiza (RTS), así como a miembros de la EBU; a modo de Delphi y en dos vueltas.

Se selecciona una muestra intencional de conveniencia que se amplía en modo bola de nieve a partir de las aportaciones de los entrevistados y se realiza una segunda consulta para matizar detalles de la información recolectada. Se trabaja con cuestionario semiestructurado que nunca superó las 12 preguntas y en el que se incluyeron cuestiones específicas en función de la corporación entrevistada. Aún así, los bloques principales en todas ellas fueron: aplicación de la inteligencia artificial en la verificación de contenidos; sistemas de detección y rastreo de noticias falsas; avance y desarrollo de las estrategias de innovación de las radiotelevisiones; y previsión y retos de futuro con respecto a las fake news.

Se realizaron 25 contactos y se validó finalmente una muestra de conveniencia en la que estuvieran representados PSM de los tres modelos mediáticos descritos por Hallin y Mancini (2004). El panel final de 8 entrevistados quedó integrado por:

Tabla 3. Relación de entrevistados, corporación y cargo. (Fuente: Elaboración propia)

ABREVIATURA	NOMBRE	CORPORACIÓN	CARGO

USC UNIVERSIDADE DE SANTIAGO DE COMPOSTELA

(AM/RAI)	Alberto Messina	RAI	*Director del área de I+D*
(AJ/EBU)	Atte Jääskeläinen	EBU	*Professor en LUT University y asesor en la EBU*
(DC/RTVE)	David Corral	RTVE	*Responsable de innovación en contenidos*
(JA/BBC)	Jatin Aythora	BBC	*Arquitecto jefe, responsable de IA*
(KP/ORF)	Karl Petermichl	ORF	*Responsable de gobernanza, estrategia e innovación*
(LB/RTS/EBU)	Léonard Bouchet	RTS/EBU	*Líder de datos y archivos en RTS; Codirector de IA en EBU*
(MM/ VRT)	Mike Matton	VRT	*Responsable de colaboraciones internacionales de innovación*
(RA/ZDF)	Robert Amlung	ZDF	*Director de estrategia digital*

De esta forma, por modelos, quedan representados el modelo pluralista polarizado con RTVE y Rai; por el modelo corporativista-democrático la ORF, VRT, RTS y ZDF; y por último el modelo liberal con la BBC.

Tabla 4. Relación de corporaciones participantes en el estudio con el modelo definido por Hallin y Mancini (2004). (Fuente: Elaboración propia)

PLURALISTA POLARIZADO	CORPORATIVISTA DEMOCRÁTICO	LIBERAL	OTROS
RAI (Italia) RTVE (España)	ARD (Alemania) ORF (Austria) RTS (Suiza) VRT (Bélgica) ZDF (Alemania)	BBC (Gran Bretaña)	*European Broadcasting Union* (EBU)

Las entrevistas se realizaron entre el 17 de abril de 2020 y el 3 de marzo de 2021 a través de las plataformas Skype, Zoom y Meetings de Google, con una duración situada entre los 30 y los 40 minutos. El 1 de abril de 2020 comenzó la primera ronda de contacto a los correos corporativos de las radiotelevisiones, para posteriormente afinar y conseguir el contacto personal de cada uno de los profesionales de interés. La transcripción y traducción del material se realizó paralelamente a su recogida, mientras que el análisis de los resultados comenzó una vez se cerró este periodo.

La triangulación metodológica se consigue a través de un barrido bibliográfico de la literatura científica sobre la aplicación de la IA en los medios de comunicación y la problemática de las noticias falsas en el contexto global de comunicación, además de

USC UNIVERSIDADE DE SANTIAGO DE COMPOSTELA

una revisión de los sitios y plataformas web de las corporaciones contactadas, con el objetivo de contextualizar las preguntas y verificar las respuestas de los entrevistados.

4. RESULTADOS

4.1. Inteligencia artificial vs noticias falsas en las radiotelevisiones públicas europeas

La desinformación ocasionada por la proliferación de las fake news es uno de los problemas angulares a los que se enfrentan los medios de servicio público (Public Service Media, -PSM- en inglés) a la hora de defender y cumplir con su misión. En ello coinciden el conjunto de entrevistados para el presente estudio, que alegan que parte de las soluciones que están implementando y desarrollando tienen como base la automatización y la inteligencia artificial.

El nuevo contexto digital ha multiplicado los canales a través de los que el contenido llega a la audiencia, por lo que es prácticamente imposible controlar todas las vías de distribución y 'prohibir' que se difundan mentiras. Es por ello que las soluciones automatizadas resuelven o agilizan parte del trabajo rutinario llevado a cabo por los verificadores, bien sean estos periodistas, o figuras asociadas a la labor comunicativa. En esta línea, la inteligencia artificial permite rastrear palabras claves, contrastar información y analizar grandes volúmenes de datos en tiempo récord.

Esta decisión permite a los profesionales de la información centrarse en tareas específicas de testeo, monitorización o logística, con un componente humano que desde las corporaciones entienden como insustituible, referenciando a la coherencia y pensamiento crítico como valores principales. Aun así, la combinación de recursos humanos y tecnológicos es crucial a la hora de concretar una estrategia eficaz que se adecúe a las características específicas de la realidad identificada.

Atte Jääskeläinen, asesor de la EBU, apunta que el principal problema reside en la mente humana, mentirosa, y a la que le gusta creerse las noticias falsas. No considera que la desinformación sea un "rompecabezas" con una fecha de caducidad concreta, sino que lo entiende como una condición que se perpetuará en el tiempo. Es por ello que no se muestra optimista en relación a las nuevas herramientas digitales que están irrumpiendo en el contexto de los medios de comunicación, a pesar de que las valora positivamente y las cataloga como necesarias para afrontar la situación desencadenada.

(AJ/EBU) "Hay una carrera interminable contra las fake news si se intenta hacer de la manera en que se hace ahora. El verdadero problema no es que alguien esté creando noticias falsas, y la resolución no es una especie de prohibición de noticias falsas y mentiras, siempre estarán ahí. El verdadero problema es que al cerebro humano le gusta mentir y le gusta creer en las mentiras".

USC UNIVERSIDADE DE SANTIAGO DE COMPOSTELA

En la ZDF alemana refuerzan esta idea y van más allá. Aseguran que las fake news son "propaganda" y que para detectarlas es necesario entender el propósito final del actor

que las proyecta. Robert Amlung, director de estrategia digital de la corporación, piensa que se debe "humanizar" la solución que se aplique, ya que en este caso concreto un razonamiento coherente y crítico puede ser más resolutivo que un algoritmo o un software determinado.

(RA/ZDF) "Creo que el tema de las noticias falsas es muy complejo, porque al final lo que son noticias falsas, es propaganda. Hay un propósito detrás de ellas y si realmente quieres detectarlas tienes que saber el propósito, eso te lleva a los actores. Al final en muchos casos lo más humano es lo que te lleva a descubrir todo esto".

La solución que proponen desde la RTS de Suiza es ofrecer contenido de calidad y relevante desde las radiotelevisiones públicas para contrarrestar así el efecto de los bulos y de las burbujas de filtro. Apela Léonard Bouchet, líder de datos y archivos en RTS y codirector de IA en EBU, al poder e infraestructura de los medios de comunicación para fortalecer la relevancia de sus informaciones. El planteamiento de Bouchet se basa en una reacción del PSM fundamentada en la calidad de los contenidos ofrecidos a los usuarios.

(LB/RTS) "Creo que la parte más importante es producir un contenido relevante, bien documentado y difundido en los medios, esto es muy poderoso. Creo que concentrarse en lo que hacemos mejor es nuestra oportunidad para luchar contra las noticias falsas, las burbujas de filtro, etcétera".

Los PSM asumen que la cuestión de las noticias falsas no desaparecerá de un día para otro, sino que será un problema duradero para el que todavía no tienen muchas soluciones y que afectará de forma desigual a los diferentes sectores de la población. Las radiotelevisiones públicas europeas no están avanzadas en la protección y lucha contra la desinformación, y consideran que la labor que se hace en las escuelas y desde el propio gobierno con los discursos políticos deberían reforzar esta coyuntura.

El desarrollar herramientas útiles es costoso, por lo que corporaciones como RTVE crearon un departamento de verificación en el que emplean tecnologías de terceras plataformas como las de Google o Facebook y contrastan con el material de su archivo. Otras optan por construir alternativas propias, eso sí, mediante colaboraciones con más entidades. La escasez de recursos y de tiempo para implementar las soluciones dificulta en muchos casos su puesta en marcha, por lo que los medios optan por aplicaciones sencillas y generalistas, en vez de concretar sistemas precisos adaptados a sus estructuras.

(DC/RTVE) "Todas las corporaciones estamos peleando contra la desinformación. Nosotros tenemos un departamento de verificación en el que contrastamos con las herramientas que ofrecen Google, Facebook, o con recursos propios, contrastando con nuestro archivo. De momento no hemos desarrollado una herramienta propia anti fake news".

USC UNIVERSIDADE DE SANTIAGO DE COMPOSTELA

La vulnerabilidad de sectores concretos de la población a las informaciones falsas, o la desigualdad latente en el impacto que tienen sobre segmentos de audiencia diferentes, es otra de las preocupaciones identificadas entre los profesionales consultados. A juicio de Alberto Messina, director de innovación de la Radiotelevisione Italiana, las mentiras han existido siempre, pero actualmente los medios se enfrentan a una situación inédita de la que solo se encuentran en una primera fase exploratoria. Nunca antes habían sido tan variados los recursos ni fuentes digitales disponibles, lo que complica el control, la competencia leal entre actores involucrados y, como no, la verificación.

(AM/RAI) "No estamos avanzados en la lucha contra las noticias falsas. Estamos empezando a entender qué tecnologías se pueden utilizar. Esto también está relacionado con la confianza, hay ciertas categorías de población que están más sujetas a ser acopladas por la desinformación".

Las tipologías de fake news son tan variadas como las clases de herramientas que se están desarrollando para combatirlas. De la misma forma que la inteligencia artificial avanza y nutre nuevos sistemas, se desarrollan nuevas 'trampas' y 'distribuidoras de mentiras' igual de eficaces e innovadoras. Es por ello que la formación a los jóvenes para que estimulen su conciencia crítica y pongan en duda los discursos que reciben es una de las tareas a completar por parte de la sociedad.

En lo relativo a la dificultad para producir soluciones generales que sean efectivas en entornos específicos, desde la ORF exponen que no han descubierto ningún algoritmo que actúe y dé resultado en todos los contextos. Es por ello por lo que cada corporación está trabajando en adaptar los sistemas a sus estructuras, a pesar de que sea más costoso, complejo y lento.

Karl Petermichl, responsable de gobernanza, estrategia e innovación de la radiotelevisión pública de Austria, asegura que en repetidas situaciones ellos no disponen del tiempo necesario para desarrollar herramientas basadas en inteligencia artificial que respondan y cubran sus necesidades, ya que estas requieren de una fase de aprendizaje bastante larga que supera con creces el margen de reacción del que disponen.

(KP/ORF) "El video falso para los expertos tiene un significado muy amplio y no he encontrado un algoritmo que funcione en todos los contextos. Por ejemplo, este es un tipo de video falso porque tal vez este animal no debería estar en este lugar, como pingüinos en Madrid. No he encontrado un algoritmo que pudiera detectarlo, y en caso de haberlo, no sería el mismo que podría identificar un vídeo de declaraciones falsas de Trump".

En el caso de la VRT, Mike Matton, responsable de colaboraciones internacionales de innovación, explica que desde su corporación apuestan por búsquedas inversas y aplicaciones sencillas con el objetivo de hacerlas accesibles y prácticas para los periodistas, y que así estos sean capaces de emplearlas de forma dinámica en su día a día. Consideran desde la VRT que con herramientas más complejas no serían capaces

USC UNIVERSIDADE DE SANTIAGO DE COMPOSTELA

de ejecutar esta labor de forma permanente, ya que demoraría en sobremanera los procesos.

(MM/VRT) "Nuestros periodistas hacen búsquedas inversas para comprobar el contenido. Estamos tratando de reunir nuestras tecnologías en una plataforma más fácil de acceder para que no sólo los periodistas especializados puedan utilizarla".

El uso del blockchain para completar un registro seguro y una distribución cifrada de las informaciones es otra de las técnicas a las que apuntan los medios. En concreto, Jatin Aythora, arquitecto jefe responsable de la IA en la BBC, asegura que desde la corporación británica pretenden realizar un rastreo de la hoja de ruta que toman sus informaciones para asegurarse de que han sido empleadas de forma adecuada, sin modificaciones ni sabotajes. Mientras que otras corporaciones recurren a listados para detectar noticias falsas en vídeos, imágenes y textos.

(JA/BBC) "Nuestra intención es utilizar blockchain y el aprendizaje automático para detectar automáticamente el contenido de la BBC que haya sido usado incorrectamente en otro medio. Adobe también proporciona herramientas para la verificación de noticias".

4.2. Proyectos y herramientas contra noticias falsas en España

En el caso español, en los últimos años se han desarrollado múltiples soluciones digitales para ayudar a la población a detectar información falsa. Estas herramientas proceden de iniciativas tanto públicas como privadas, y abarcan todos los escenarios posibles: redes sociales, internet o incluso bulos que se difundan mediante el boca a boca en las relaciones interpersonales tradicionales. La especialización temática de estos proyectos también es diversa, y vaga entre propuestas más generalistas hasta otras centradas en temas políticos, sociales o sanitarios.

Tabla 5. Proyectos contra fake news en el ámbito español. (Fuente: elaboración propia)

PROYECTO	DESCRIPCIÓN
Maldita.es	Reúne las noticias falsas más difundidas por las redes sociales o los principales medios. Ofrece la posibilidad de contacto vía WhatsApp para verificar bulos distribuidos a través de esta propia aplicación de mensajería.
Newtral	Analizan y desmienten bulos o informaciones sobre distintos temas de actualidad. Tienen un servicio en Twitter a través del que confirman o desmienten rumores a quien lo solicite.

USC UNIVERSIDADE DE SANTIAGO DE COMPOSTELA

Facterbot	Bot que envía las últimas novedades en materia de noticias falsas que circulan por Facebook a través del Messenger de esta red social.
Oficina de seguridad del internauta	Fuente donde se cuelgan avisos y desmentidos de bulos de todas las temáticas, también trabajan sobre amenazas y consejos de ciberseguridad.
Salud sin bulos	Iniciativa de la Asociación de investigadores en eSalud (AIES) y COM SALUD que trata de frenar bulos y ofrecer información fiable y veraz sobre salud.
Poletika	Proyecto que supervisa las noticias y declaraciones de políticos sobre todos los temas: educación, cambio climático, infancia, etc.
Tragabulos	Sección del suplemento 'Verne' del diario 'El País' destinada a desmentir bulos e identificar noticias falsas e informaciones que se convierten en virales a través de Internet y de las redes sociales.

5. CONCLUSIONES

Los medios de comunicación en el contexto global encaran una etapa de cambios constantes sin precedentes. Transformaciones que afectan a las rutinas productivas, a los canales de comunicación y plataformas, o a la relación con sus públicos y a las herramientas que emplean. El componente digital de sus estructuras es cada vez mayor, al igual que la necesidad de innovar para mantener la ventaja competitiva con el resto de los agentes involucrados. En este escenario, tecnologías basadas en la automatización o la inteligencia artificial cotizan al alza, consolidándose como una de las respuestas más efectivas y con mayor posibilidad de prolongarse en el futuro.

En esta línea de crecimiento constante de los entornos digitales, las fuentes de información son cada vez más diversas y abundantes, lo que imposibilita un control efectivo sobre ellas y complica el consumo de información veraz por parte de los usuarios. La sobreinformación a la que se exponen los públicos emana de esta oportunidad que se abre para nuevos operadores y plataformas de crear contenido y distribuir información sin ningún tipo de vigilancia.

La proliferación permanente y en escala de fake news es uno de los principales problemas a los que se enfrentan los medios de servicio público en esta nueva realidad. En el contexto europeo, las corporaciones ya han comenzado a implementar soluciones, las que se componen de recursos tanto humanos como tecnológicos, a pesar de que una de las conclusiones coincidentes entre estas operadoras es que no

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todas las herramientas son efectivas en cualquier entorno, sino que es necesario adaptarlas a las características concretas de cada medio de comunicación, lo que conlleva un largo tiempo de testeo y abundantes recursos económicos.

El principal contratiempo que destaca el conjunto de profesionales entrevistados a la hora de atajar las noticias falsas es la voluntariedad de la mente humana en crear y creerse las mentiras. Explican que este ha sido un dilema presente desde el nacimiento de los medios de comunicación, pero que ahora se ve potenciado exponencialmente con las nuevas tecnologías. Para luchar contra ello, consideran fundamental el trabajo con los más jóvenes desde las escuelas, para incidir en la etapa de formación en el desarrollo de un pensamiento crítico que ponga en duda los discursos recibidos.

Sin embargo, sin el aprovechamiento de las soluciones tecnológicas más innovadoras, en su mayoría basadas en sistemas de inteligencia artificial y en el machine learning, cualquier tarea de verificación, rastreo o monitorización de las informaciones se convierte en un imposible. La unión de estos recursos con la coherencia que se presupone del pensamiento humano esboza una solución más efectiva, ya que, mientras que las herramientas digitales liberan el grueso de trabajo y de volumen de información, los profesionales de la comunicación o verificadores implicados se pueden centrar en tareas en las que aporten un mayor valor añadido y en una toma de decisiones con resultados más eficaces.

Las herramientas empleadas por el PSM europeo parten de diferente origen, vagando entre soluciones personalizadas, de elaboración propia o subcontratadas, y herramientas generalistas de terceros o de código abierto. El impacto desigual sobre la población y la vulnerabilidad de algunos sectores de las audiencias preocupan a los profesionales entrevistados, que aseguran que las campañas gubernamentales de información y formación son necesarias para paliar el efecto de esta ola de mentiras.

Otra de las inquietudes de los medios participantes en el presente estudio reside en la accesibilidad de las aplicaciones implementadas, ya que se considera fundamental que estas sean fácilmente comprensibles por los periodistas para que estos sean capaces de emplearlas en el día a día y de exprimir todo su potencial. En su defecto, las corporaciones no dispondrán de profesionales con formación tecnológica suficiente para defender el uso dinámico y eficaz de estas herramientas, lo que sería inservible.

La solución a esta infección en el sistema de medios y en la sociedad no tiene aún una soluciíon definitiva. Más aún, los expertos aseguran que es necesario aprender a convivir con ella, pero son optimistas con respecto a las medidas que se pueden tomar para paliar su efecto, y se muestran firmes en su idea de que la mejor alternativa consiste en atacar el problema en su origen: la alfabetización de la ciudadanía.

Entidades de Apoyo. "Este artículo forma parte de las actividades del proyecto "Medios audiovisuales públicos ante el ecosistema de las plataformas: modelos de gestión y evaluación del valor público de referencia para España" (PID2021-122386OB-I00), financiado por el MCIN, AEI y FEDER, UE."

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Capítulo 9

SISTEMAS ADAPTATIVOS BASADOS EN INTELIGENCIA ARTIFICIAL COMO NUEVAS SOLUCIONES PERSONALIZADAS DE TECNOLOGÍA EDUCATIVA

*César Fieiras Ceide**
*Miguel Túñez López***

Resumen

El avance y proliferación de soluciones tecnológicas ha permeado en el sistema educativo global para ofrecer nuevos recursos, herramientas y procesos que permiten la consolida-

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ción de una práctica docente cada vez más individualizada, especializada y precisa. La inteligencia artificial (IA) asienta las bases de estos sistemas adaptativos, los que permiten la automatización de determinados procedimientos y optimización de métodos, con lo que se alcanzan resultados cada vez más específicos amoldados a la situación de cada alumno. En este capítulo se analiza el funcionamiento, beneficios y desventajas de estas soluciones personalizadas a través de una revisión de la bibliografía científica y documentación normativa existente sobre la materia, con la intención de identificar las vías de aplicación de la inteligencia artificial sobre el ecosistema educativo.

Palabras clave: Educación; tecnología educativa; inteligencia artificial; sistemas adaptativos; algoritmos

Introducción

La tecnología educativa se puede entender como el "conjunto de recursos, procesos y herramientas de información y comunicación aplicadas a la estructura y a las actividades del sistema educativo en sus diversos ámbitos y niveles"[1]. Desde las primeras aplicaciones de estas soluciones al sector educativo, y en paralelo al avance digital y desarrollo de internet, se han instaurado diferentes sistemas basados en inteligencia artificial que permiten acelerar la consecución de los objetivos globales

[1] Caro Cruz, "La tecnología en la educación". *La tecnología en la educación*, 20 de mayo de 2020 https://latecnologiaenlaeducacionccl.blogspot.com/

de educación. Esto se logra a través de la automatización de procesos de gestión y de la optimización de métodos, lo que genera resultados cada vez más específicos y adaptados a la situación de cada alumno[2].

En este capítulo se identifican sistemas adaptativos basados en inteligencia artificial que operan como soluciones personalizadas de tecnología educativa a través de una revisión de la bibliografía científica y de documentación normativa sobre el tema que permitan identificar las vías de aplicación de la inteligencia artificial sobre la educación. También se analizan los beneficios que puede reportar su uso si se completan buenas prácticas en las escuelas, universidades y demás centros educativos y las posibles desventajas de la implementación de la IA, así como el impacto que ésta está teniendo y puede alcanzar en la administración vinculada al ámbito docente.

Según Moreno, los enfoques reseñables de la inteligencia artificial (IA) en la educación son tres[3]: los *chatbots* que pueden operar como docentes o tutores en espacios digitales de formación; las plataformas online para realizar estudios desde cualquier lugar y a cualquier hora; y la robótica educativa, consistente en un nuevo mundo de aprendizaje en el que se fomenta la creatividad e imaginación de los alumnos.

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2 Yovanna Macías, "La tecnología y la Inteligencia Artificial en el sistema educativo" (Trabajo de Final de Grado) http://repositori.uji.es/xmlui/handle/10234/195263

3 Raúl Darío Moreno, "La llegada de la inteligencia artificial a la educación". *Revista de Investigación en Tecnologías de la Información: RITI*, 7 (14) (2019): 260-270.

Aun así, para el pleno asentamiento de la IA en la educación todavía queda un largo camino por recorrer. A la creencia de que esta pueda dar forma a las transformaciones educativas esperadas, se contrapone la resistencia al cambio tecnológico presente en las escuelas, lo que deriva en una baja tasa de implementación todavía vigente en relación con estas herramientas[4].

Sistemas de enseñanza adaptativos basados en inteligencia artificial

Uno de los principales ámbitos en los que la inteligencia artificial contribuye a la educación es el de los sistemas de enseñanza adaptativos. Estos consisten en plataformas y herramientas de tutoría inteligente que brindan "trayectorias personalizadas de aprendizaje" fundamentadas en los "perfiles, respuestas e interacciones de los estudiantes"[5]. Con esto se logra concretar y adaptar el "tipo, dificultad, secuencia y ritmo" de los materiales de aprendizaje a las necesidades específicas de cada individuo, con costos mucho más asequibles que los requeridos por las técnicas tradicionales.

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4 Organization for Cooperation and Economic Development (OCDE), *AI: Intelligent Machines, Smart Policies Conference Summary*. OECD Digital Economy Papers (2018): 270. https://www.oecd-ilibrary.org/science-and-technology/ai-intelligent-machines-smart-policies_f1a650d9-en

5 Rose Luckin, Wayne Holmes, Mark Griffiths y Laurie Forcier, *Intelligence Unleashed: An argument for AI in Education*. (Londres: Pearson Education, 2016)

Estas aplicaciones están siendo dinamizadas principalmente en países desarrollados, como la plataforma China 'Liulishou', con capacidad para atender en línea a 600.000 estudiantes; pero también tienen presencia en el resto del mundo, como es el caso de la aplicación M-Shule en Kenia, que está siendo empleada para impartir lecciones adaptables a las habilidades de los estudiantes vía SMS, y que también proporciona informes de la evolución del aprendizaje a los tutores del alumno[6].

La integración en estos sistemas de algoritmos capacitados para el reconocimiento de voz e imagen y la gestión de ingentes cantidades de datos está facilitando la personalización de las trayectorias de aprendizaje, nutriéndolas con aspectos concretos de su personalidad, gustos e intereses e incluso estados de ánimo[7]. Con estas nuevas funcionalidades es posible detectar las fortalezas y debilidades de cada usuario con el objetivo de reorientar las prácticas docentes y optimizar así los resultados de cada alumno[8].

Otro aporte de la IA al proceso pedagógico está vinculado a la asistencia que esta brinda para el trabajo colaborativo

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6 UNESCO, *Artificial Intelligence in Education: Challenges and Opportunities for Sustainable Development*. Working Papers on Education Policy, 7 (2019). https://unesdoc.unesco.org/ark:/48223/pf0000366994

7 Fabiano Dorca, "Implementation and use of simulated students for test and validation of new adaptive educational systems: A practical insight". *International Journal of Artificial Intelligence in Education*, 25 (2015): 319-345.

8 Emmanuel Blanchard, "Socio-cultural Imbalances in AIED Research: Investigations, Implications and Opportunities". *International Journal of Artificial Intelligence in Education*, 25 (2015): 204-228.

entre estudiantes, como sucede en los espacios de discusión asíncronos en los que los alumnos comparten sus inquietudes y realizan tareas conjuntas[9]. En esta línea, se está trabajando sobre diferentes sistemas que ofrecen retroalimentación a los estudiantes de su actividad y que avisan a los docentes de aquellos casos que requieren de una mayor atención[10].

Asimismo, la incorporación de la inteligencia artificial a plataformas de juego empleadas como mecanismos de aprendizaje es otro ámbito en el que se espera una contribución significativa de la IA. El reconocimiento de emociones faciales en tiempo real, la adaptación de la dificultad en función de las habilidades de cada usuario, o el procesamiento de lenguaje natural y evaluación de la entonación del hablante aproximan informaciones relevantes que permiten potenciar en el alumno "competencias sociales, comunicativas, de trabajo en equipo, y creatividad, persistencia y capacidades para la resolución de problemas"[11].

El papel de la IA en la administración educativa

En relación con el impacto de la inteligencia artificial en la administración de instituciones escolares, se diferencian dos

9 Claire O'Malley, *Computer Supported Collaborative Learning* (UK: Springer Science & Business Media, 2012).

10 Bruce McLaren, Oliver Scheuer, Jan Mikšátko, "Supporting Collaborative Learning and E-discussions Using Artificial Intelligence Techniques". *International Journal of Artificial Intelligence in Education*, 20(1) (2010): 1-46.

11 Margarida Romero, Mireia Usart, Michela Ott, "Can Serious Games Contribute to Developing and Sustaining 21st Century Skills?" *Games and Culture*, 10(2) (2014): 148-177.

líneas de actuación: la que se vincula a la automatización de las tareas rutinarias del profesorado, como la corrección de pruebas de selección múltiple o la generación de preguntas aleatorias; y el análisis de grandes bloques de información, como la extracción de conclusiones a partir de resultados o la verificación de la asistencia de los estudiantes[12].

La aplicación de estas soluciones deriva en una disminución del tiempo destinado a desarrollar tareas administrativas por parte de los docentes para que estos se centren en labores pedagógicas como la planificación de los programas o el apoyo al alumnado[13]. Otra funcionalidad interesante es la que brindan los chats, a través de los que el estudiantado entabla conversaciones en las que, en la mayoría de las ocasiones, encuentran respuesta a consultas relacionadas con un amplio abanico de temas, lo que libera nuevamente el tiempo de los docentes y personal administrativo[14].

Martens (2018)[15], apunta que la lectura de grandes cantidades de datos educativos acumulados en cada país puede

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12 Ignacio Jara, Juan Manuel Ochoa, "Usos y efectos de la inteligencia artificial en educación". *Sector Social división educación*. (2020) doi: http://dx.doi. org/10.18235/000238 0

13 UNESCO, *Artificial Intelligence in Education: Challenges and Opportunities for Sustainable Development*.

14 Mark Dogson, David Gann, "Artificial Intelligence will Transform Universities. Here's How". *World Economic Forum* (2017). https://www.weforum.org/agenda/2017/08/artificial-intelligence-will-transform-universities-here-s-how/

15 Jens Martens, "Redefinir las políticas para el desarrollo sostenible". *Global Policy Watch*, (2018). https://www.2030spotlight.org/sites/default/files/spot2018/esp/Spotlight_Innenteil_2018_ES_redifinir_las_poli%CC%81ticas_para_el_desarrollo_sostenible.pdf

ayudar a enfocar las decisiones de política nacional y orientar las actuaciones de las escuelas y del profesorado. Por ello reitera la necesidad de incorporar estos algoritmos de IA capaces de interpretar estas informaciones y de identificar patrones que permitan anticipar escenarios desfavorables.

Para ello, la analítica de aprendizaje o *learning analytics* es un campo especialmente potenciado por los nuevos algoritmos predictivos basados en inteligencia artificial. Estas herramientas analizan las interacciones del alumnado en las plataformas digitales de aprendizaje para detectar tendencias que faciliten una asistencia personalizada a cada uno de ellos, teniendo en cuenta variables educativas de interés como el rendimiento o la deserción[16].

En los sistemas de admisión escolar, la implementación de inteligencia artificial hace más "transparente, equitativa y eficiente" la asignación de las plazas en los colegios, ya que trabaja a partir de parámetros conocidos y asigna las puntuaciones mediante criterios matemáticos que se aplican automáticamente, sin interpretaciones que puedan atentar contra la objetividad de la evaluación[17]. Lo que pone de manifiesto que la asistencia de estas tecnologías no solo se limita al apoyo al cuerpo docente.

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16 Pablo Rojas, "Learning Analytics: una revisión de la literatura". Educación y educadores, 20(1) (2017): 106-128. https://doi.org/10.5294/edu.2017.20.1.6

17 Ignacio Jara, Juan Manuel Ochoa, "Usos y efectos de la inteligencia artificial en educación".

En el contexto europeo, el 'Libro Blanco de IA' de la Comisión Europea (2020)[18], asegura que un plan de acción sobre la educación digital que se vaya actualizando conforme al avance de las tecnologías contribuirá a hacer un mejor uso del análisis del aprendizaje y del análisis predictivo, "con el objetivo de mejorar los sistemas educativos y formativos y adaptarlos a la era digital". En este sentido, el informe también recalca que es necesario desarrollar conjuntamente entre los Estados miembros las habilidades técnicas para operar en el ámbito de la inteligencia artificial, así como matizar las directrices éticas que guíen su uso.

En el caso español, la Estrategia Nacional en Inteligencia Artificial del Gobierno de España[19] también realza el valor de esta tecnología y su importancia futura en el sistema educativo del país, ya que, gracias a ella, será posible mejorar el aprendizaje, tanto en su proceso como en los resultados, además de tener la capacidad de modernizar las dinámicas de formación para enfrentarse a los nuevos desafíos educativos que surgirán en la era digital.

El documento reconoce que la IA tiene un alto potencial de aplicación en distintas ramas, entre las que se incluye a la educación y se señala que permitiría la adaptación del

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18 Comisión Europea, "Libro Blanco sobre la inteligencia artificial–un enfoque europeo orientado a la excelencia y la confianza". *Comisión Europea* (2020). https://ec.europa.eu/info/sites/default/files/commission-white-paper-artificial-intelligence-feb2020_es.pdf

19 Gobierno de España. "Estrategia Nacional de Inteligencia Artificial". *Gobierno de España* (2020) https://portal.mineco.gob.es/RecursosArticulo/mineco/ministerio/ficheros/201202_ENIA_V1_0.pdf

aprendizaje a las necesidades de cada persona[20]. Se incide, además en el impacto en la creación de empleo cualificado favoreciendo la formación y educación, motivando el talento nacional y atrayendo el talento de otras partes del mundo[21].

La estrategia del Gobierno español identifica como primer eje el impuso de sinergias entre la investigación en IA y la investigación en áreas estratégica entre las que se cita expresamente a la educación[22], aunque dedica casi todo el contenido del eje estratégico 2 a temas de formación como forma para promover el desarrollo de las capacidades digitales y atraer talento, para lo que a aboga por "la necesaria educación y la formación en competencias digitales de toda la población a lo largo de toda su vida"[23].

El documento señala textualmente que[24]:

> De manera específica, y para el éxito de la presente Estrategia Nacional de IA, es imprescindible asegurar la preparación y capacitación en IA del alumnado, profesorado, personal del empleo público, mercado laboral y sociedad, con una perspectiva ética, humanista y de género. Esto implica la necesidad de crear una ciudadanía capacitada, que pueda entender las opciones y decisiones de los sistemas inteligentes.

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20 Gobierno de España. "Estrategia Nacional de Inteligencia Artificial", 7.
21 Gobierno de España. "Estrategia Nacional de Inteligencia Artificial", 16.
22 Gobierno de España. "Estrategia Nacional de Inteligencia Artificial", 23.
23 Gobierno de España. "Estrategia Nacional de Inteligencia Artificial", 31.
24 Gobierno de España. "Estrategia Nacional de Inteligencia Artificial", 31.

La propuesta estratégica es que la formación en Inteligencia Artificial se aborde impulsando la formación profesional, actualizando la oferta de la enseñanza superior y en los ciclos profesionales y cuidando el proceso desde la educación infantil. Las propuestas del documento gubernamental se resumen en la tabla siguiente.

Tabla 1. ***Propuestas del Gobierno del Gobierno de España en relación a la IA***

Formación	Plan estratégico
Potenciar y atraer talento (Pág. 31)	"La IA tiene un alto potencial para mejorar el aprendizaje tanto en su proceso como en sus resultados, pudiendo utilizarse como método transversal de aprendizaje en diferentes materias de perfil científico, humanista, social, etc., además de tener la capacidad de modernizar los sistemas educativos y formativos en nuestro país, planteándose como una nueva oportunidad para resolver viejos retos y nuevos desafíos en Educación, impulsando el aprendizaje personalizado".
	"Todos estos niveles deben estar enriquecidos por objetivos transversales, como la aproximación multidisciplinar, relacionando la formación técnica con los aspectos humanísticos, legales y sociales implicados, el uso de las nuevas tecnologías inteligentes para modernizar la propia educación, o la lucha contra la brecha de género, de enorme sensibilidad, en esta materia".
Educación infantil, primaria, secundaria (Pág. 33)	"Es preciso reforzar la orientación hacia las tecnologías TIC y la IA (matemáticas y lógica) desde las etapas tempranas del ciclo educativo, así como en la formación del personal docente (…)"
	"La SCIE y CODDII han elaborado un manifiesto sobre la necesidad de incluir en el sistema educativo español la materia" Informática" de carácter obligatorio desde Educación Primaria hasta Bachillerato. Asimismo, la SCIE y la Real Sociedad de Matemáticas de España han elaborado un documento conjunto, titulado "Hacia una nueva educación en matemáticas e informática en la Educación Secundaria".
Formación profesional (Pág. 34)	Numerosos estudios apuntan hacia la necesidad de reforzar el contenido tecnológico de la FP a todos los niveles, en especial en el impulso de "habilidades medias" en tecnología, y adecuarlo a la realidad de los sectores productivos, mejorando las capacidades y competencias profesionales.(…) El objetivo es fomentar la creación de más perfiles como personal analista, de desarrollo de aplicaciones y especialistas en computación, principalmente por la importancia que tienen estas ocupaciones en el desarrollo de actividades relacionadas con la IA.

Estudios superiores y universidades (Pág. 35)	"La escasez de titulados y perfiles TIC, que desde el mundo empresarial e industrial se advierte, exige una adaptación de los estudios de carácter no informático a estas tecnologías 45 y medidas de coordinación entre los sistemas formativos superiores y el mundo laboral, que permita identificar los trabajos en transición y ofrecer, desde las universidades, mecanismos de recualificación de los trabajadores durante su vida laboral, como se viene haciendo en algunas titulaciones que ya combinan la IA con otras ciencias, negocios o humanidades"
	"Con la misma intención de apoyar la diversidad formativa, es relevante que la educación universitaria introduzca los desafíos alrededor de la IA en sus estudios de carácter social y humanístico, pues estas miradas deben estar presentes en los procesos de supervisión de diseño y en la orientación de sus desarrollos, co-definiendo métodos de análisis y de intervención metodológica que incorporen nuevas perspectivas a los aspectos técnicos"
Ámbito laboral (Pág. 38)	"Más allá del sistema educativo, es fundamental impulsar la formación en el ámbito laboral para acompañar las transiciones tecnológicas"
	"Teniendo en cuenta la digitalización que se anticipa, y con mecanismos adecuados de capacitación técnica en tecnologías de IA, la formación en esta materia puede suponer una solución laboral para abordar la brecha tecnológica y mejorar la empleabilidad de nuestro país".

Fuente: elaboración propia a partir de la Estrategia Nacional de IA -ENIA- (GdE, 2020)

Ventajas e inconvenientes de la tecnología educativa

En 2019 la directora general de la UNESCO, Audrey Azoulay, aseveró que la inteligencia artificial transformará profundamente la educación en la próxima década, apuntando a que todos los métodos de enseñanza, las formas de aprender y de acceder al conocimiento sufrirán su particular proceso de renovación. El objetivo central de estos sistemas reside, entonces, en desarrollar estrategias puntuales de obtención de conocimiento por parte del alumno y que permitan a la IA

generar métodos para impartir lecciones eficazmente basados en análisis predictivos y evacuativos[25].

En síntesis, el uso de la tecnología en educación, y en concreto de la inteligencia artificial, brinda una serie de ventajas e inconvenientes que es preciso analizar para encaminar su uso de la forma más eficaz. El beneficio más evidente consiste en la facilidad y rapidez de localizar información sobre cualquier tema. También, el fomento de la ayuda entre compañeros y el trabajo colaborativo; la asistencia del aprendizaje a distancia; la adaptabilidad y personalización a cada caso específico para prevenir el fracaso escolar; la mejora de las habilidades técnicas del alumnado con respecto a la tecnología; el mayor aprovechamiento del tiempo; o la reducción de las tareas rutinarias del docente[26].

Sin embargo, los inconvenientes de la aplicación de estas tecnologías también existen, y versan sobre los posibles problemas técnicos que pueden originarse en cualquier instante; los elevados costes de la implementación de estos sistemas y la desigualdad latente en los presupuestos de las escuelas; el cansancio visual o problemas físicos derivados de un mal uso de estas herramientas; o el estancamiento en el aprendizaje que se puede ocasionar si no se hace un uso responsable de la tecnología[27].

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25 Raúl Darío Moreno, "La llegada de la inteligencia artificial a la educación", 260-270.

26 Yovanna Macías, "La tecnología y la Inteligencia Artificial en el sistema educativo".

27 Yovanna Macías, "La tecnología y la Inteligencia Artificial en el sistema educativo".

Todo lo anterior, unido a la necesidad de tener un enrome poder computacional para poder procesar los datos y calibrar los parámetros que ajustan los algoritmos mantuvo a estos métodos alejados de sus posibles aplicaciones prácticas hasta hace una década[28]. A partir de 2010, el avance de la tecnología brindó la posibilidad de entrenar a los algoritmos de aprendizaje automático a precios asequibles, lo que inició el desarrollo y comercialización de una nueva generación de sistemas que completaban tareas mucho más complejas de lo que se ejecutaba hasta ese momento[29].

La mayoría de los países en el ámbito global son conscientes de que las permutas económicas y sociales desencadenadas por estas nuevas aplicaciones presentan una serie de oportunidades y desafíos importantes[30], por ello que cotizan al alza las inversiones encaminadas a liderar la innovación en inteligencia artificial, al tiempo que se trabaja en una concienciación progresiva de la ciudadanía para prepararla para vivir en un mundo con un componente digital cada vez mayor.

China, por ejemplo, promovió en 2016 una estrategia para convertirse en el polo principal de desarrollo de IA, mediante

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28 Ilkka Tuomi, "The Impact of Artificial Intelligence on Learning, Teaching, and Education". *European Union Joint Research Centre for Policy Report* (2018). https://scholar.google.es/scholar?hl=es&as_sdt=0%2C5&as_vis=1&q=Tuomi%2C+I.+2018.+The+Impact+of+Artificial+Intelligence+on+Learning%2C+&btnG=

29 Ignacio Jara, Juan Manuel Ochoa, "Usos y efectos de la inteligencia artificial en educación".

30 Ignacio Jara, Juan Manuel Ochoa, "Usos y efectos de la inteligencia artificial en educación".

lo que ordenó a las agencias responsables de la educación en el país a invertir un 8 % de su presupuesto en la digitalización de las escuelas[31]. Una situación similar se está dando en otros países desarrollados, en los que la inteligencia artificial ha adquirido con el paso del tiempo un peso cada vez mayor en "las agendas de investigación, innovación empresarial y desarrollo educativo"[32].

Será progresiva en los próximos años la introducción de asignaturas específicas de inteligencia artificial y automatización en las escuelas y en los grados universitarios no tecnológicos. Aun así, por el momento en España éstas son escasas y no se identifican frecuentemente en los planes de estudio de las universidades, como bien apuntan Ufarte, Túñez y Fieiras con respecto a los grados de Periodismo y Comunicación[33].

En relación con la educación social sobre inteligencia artificial, ésta se antoja fundamental en el corto plazo, ya que la ciudadanía debe estar al tanto de las posibles consecuencias que pueden derivar de un mal uso colectivo de esta tecnología.

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31 UNESCO, *Artificial Intelligence in Education: Challenges and Opportunities for Sustainable Development*.

32 Ali Zaidi, Shane Beadle, Arthur Hannah, "Review of the Online Learning and Artificial Intelligence Education market". *British Department of Education* (2018). https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/919364/Review_of_the_online_learning_and_artificial_intelligence_education_market_for_upload.pdf

33 María-José Ufarte-Ruíz, César Fieiras-Ceide, José-Miguel Túñez-López, "La enseñanza-aprendizaje del periodismo automatizado en instituciones públicas: estudios, propuestas de viabilidad y perspectivas de impacto de la IA". *Anàlisi: Quaderns de Comunicació i Cultura*, 62 (2020). 131-146. doi: <https://doi.org/10.5565/rev/analisi.3289>

Asimismo, la proliferación de bulos y falsas informaciones proyectadas por bots y algoritmos manipulados es una de las amenazas que acechan a una sociedad en vías de desarrollo tecnológico, lo que tiene como única solución el fomento de un pensamiento crítico forjado desde los primeros pasos educativos[34]. La inteligencia artificial ha desembarcado en nuestro día a día, y ha llegado para quedarse, ahora es nuestra responsabilidad el aprovechar su potencial y desviar sus limitaciones o posibles contaminaciones.

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Cocreación en el universo e-sport: estrategia de la RTP para captar a público joven

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Resumen:

La captación de público joven se antoja como uno de los mayores desafíos para los medios de servicio público en el nuevo ecosistema digital. En esta línea, la irrupción de realidades como los deportes electrónicos abren nuevas posibilidades de ganar y mantener la atención de este segmento de la población, acercándoles contenidos que reflejan el avance de sus gustos e intereses y con los que se sienten reconocidos. En el caso de la Rádio e Televisão de Portugal, la creación de su plataforma de deportes electrónicos, RTP Arena, les permitió volver a ser relevantes entre el público portugués de 16 a 34 años, siguiendo una estrategia basada en la cocreación de contenidos con los usuarios y los propios deportistas. Daniel Rodrigues, gestor de este producto, apunta que el carácter 360º de su proyecto desemboca en una interacción continua en redes sociales sobre las partidas en directo disputadas entre seguidores y profesionales, así como programas de entrevistas, sesiones formativas de tácticas, entrevistas, e incluso espacios en sus emisiones lineales. Esto ha llevado al canal de Twitch de la marca a ser el más seguido en el país en los últimos 3 años, lo que derivó en una migración inédita de los usuarios jóvenes a sus propios sitios web y canales tradicionales.

SUMARIO: 1. INTRODUCCIÓN.2. CONTEXTO. 2.1. La innovación como valor esencial de los medios de comunicación. 2.2. Fundamentos de las prácticas de cocreación. 2.3. Universo de los deportes electrónicos. 3. RESULTADOS. 3.1. Nacimiento, desarrollo y consolidación de RTP ARENA. 3.2. Cocreación de contenidos en el marco e-sport: captación de audiencias jóvenes. 3.3. Impacto de la Covid-19 sobre RTP Arena. 4. CONCLUSIONES.

1. INTRODUCCIÓN

Los servicios de radiotelevisión pública, además de pioneros, han sido dominantes durante décadas en el continente europeo. Sin embargo, desde los años 70 u 80 han perdido "presencia, audiencia, penetración y financiación" frente a los operadores privados y las nuevas plataformas digitales que han irrumpido en el contexto global (López-Golán, Rodríguez-Castro y Campos-Freire, 2019).

En este renovado ecosistema de medios, caracterizado por un consumo inmediato, híper fragmentado y con la intervención creciente de los GAFAN (Google, Apple, Facebook, Amazon, Netflix), el mantenimiento y captación de público joven se antoja cada vez más complejo para las corporaciones públicas.

Es por ello que la búsqueda de nuevos mercados, formatos y posibilidades narrativas es fundamental en su hoja de ruta presente y futura, con el objetivo de volver a ser relevantes para un segmento de la población que parece encontrar en las plataformas digitales el contenido y modalidad de consumo que mejor se adapta a sus necesidades.

El progresivo avance tecnológico y la conectividad digital que brinda Internet ha impulsado en los últimos años el crecimiento y proliferación de los deportes electrónicos, un universo en el que se compite en determinados videojuegos y que representa una realidad social, económica, laboral y de entretenimiento que experimenta una expansión a nivel global (DEV, 2016; Hamari y Sjöblom, 2017; Stanton, 2015).

El origen de esta modalidad deportiva surge de la actividad reglada, con competencia y profesional de determinados videojuegos que, en un primer momento, solo eran jugados por ocio y recreación (Hamari y Sjöblom, 2017; Taylor, 2012). Con el paso de los años se han ido construyendo y asentando diferentes competiciones tanto nacionales como internacionales promovidas por diferentes organismos, y que cada vez se asemejan más a las dinámicas de los deportes tradicionales.

Corporaciones como la Rádio e Televisão de Portugal han identificado en esta práctica deportiva una oportunidad de acercarse al

público joven y de cubrir un espacio que, hasta el momento, no contaba con agentes relevantes en su país. Un escenario en el que la innovación es más accesible que nunca, ya que se trata de un entorno sin un marco delimitado, donde toda praxis es posible, y todo crece y cambia a un ritmo frenético.

En esta línea, la cocreación de contenidos es la principal modalidad de producción que han implementado en su proyecto de deportes electrónicos, RTP Arena, donde escuchan a sus seguidores, analizan sus peticiones para aplicarlas en los formatos y ceden parte del protagonismo a los usuarios y deportistas, para generar así una sensación completa de inmersión y de comunicación y entretenimiento horizontal.

El análisis de esta plataforma 360º de la RTP permite extraer unas primeras nociones de la efectividad que pueden tener determinadas propuestas digitales basadas en fórmulas de creación que, a priori, se escaparían del modelo tradicional de los medios de servicio público. Para su estudio se realizó un seguimiento de la evolución del proyecto y se llevó a cabo una entrevista con su director, quien clarificó el fundamento y origen de la iniciativa, además de arrojar pistas sobre su funcionamiento y objetivos futuros.

Los *e-sports* son una realidad que va más allá del mero entretenimiento, son una de las primeras representaciones de prácticas físicas en el entorno virtual, lo que va aparejado de las ventajas de este escenario: la conectividad, la interactividad, la cercanía en la distancia y la sensación de que las acciones de los usuarios dejan de tener presencia y consecuencia en el mundo real para desarrollarse en un nuevo universo.

2. CONTEXTO

2.1. La innovación como valor esencial de los medios de comunicación

El concepto de innovación en el sector de la comunicación, y en concreto en periodismo, ha sido objetivo de diversos estudios con

perspectivas variadas. Se ha examinado su implementación en la gestión de las corporaciones (Dal-Zotto y Van-Kranenburg, 2008), los nexos que se establecen con las audiencias (Bruns, 2014), e incluso los modelos de negocio emergentes (Carvajal, García-Avilés y González; 2012).

Las investigaciones de García-Avilés, Carvajal y Comín (2016) apuntan que "innovar consiste en detectar un problema o necesidad, encontrar una solución original y desarrollarla de forma exitosa". En este sentido, destacan la importancia de la propia iniciativa individual de los agentes implicados, de la eficacia del liderazgo y la correcta puesta en marcha de equipos de trabajo interdisciplinares que se retroalimenten.

Bajo esta teoría, se concluye que el proceso de innovación debe ser transversal e implicar "más trabajo que genialidad, ya que requiere de conocimiento, esfuerzo, determinación y pasión". Es por ello que la innovación no solo puede derivar en un nuevo producto, sino que también puede estar fundamentada en la combinación de ideas o recursos ya existentes (Storsul y Krumsvik, 2013).

La realidad de los medios de comunicación ha cambiado en los últimos años por la confluencia de tres procesos globales como son el asentamiento del consumo de información en dispositivos conectados a Internet; la irrupción de las redes sociales; y la atomización del mercado publicitario, determinada por la bajada constante en la inversión en medios tradicionales que comenzó en 2008 (Carvajal *et al*; 2015).

En este renovado contexto digital, los medios se están viendo obligados, más que nunca si cabe, a mejorar, tanto en su producción como en las vías de comercialización y sus modelos de organización. Todo este desarrollo debe estar fundamentado en una estrategia previa que permita delimitar prioridades y asignar recursos de forma eficiente (Küng, 2015, p. 107).

En el caso de las redacciones, actualmente funcionan como "comunidades de aprendizaje" en las que se pueden testar herramientas y nuevos conceptos de innovación (Porcu, 2017). Es por ello que

cada vez es más necesario el trabajo conjunto entre periodistas y desarrolladores web para alcanzar así una perspectiva "integral, interconectada y con una nueva experiencia interpretativa" (Peñafiel, 2016, p. 176). Esta estructuración de equipos mixtos, la organización horizontal de dinámicas de trabajo y la comunicación fluida hacen que la innovación sea más sencilla en las redacciones (García Santamaría, *et al*., 2013).

De esta forma, han surgido nuevas ofertas educativas que pretenden fomentar la innovación en el periodismo (Carvajal *et al*; 2015). En el año 2011, la Universidad de Columbia estrenó la primera doble titulación de Periodismo e Informática, una propuesta que tomaron como referencia las universidades de Goldsmiths y Cardiff en el Reino Unido. Al mismo tiempo, Columbia abrió el Tow Center for Digital Journalism para estudiar los cambios originados por la tecnología sobre el periodismo, sus prácticas y consumo.

Si se analiza la situación en España, "la automatización de la información no es un contenido que se identifique en los planes de estudio de los grados en Periodismo y Comunicación de las universidades españolas". Sin embargo, la oferta curricular existente sobre automatización, bots y algoritmos en la redacción de noticias comienza a tener presencia en los másteres sobre innovación y periodismo de datos (Ufarte, Fieiras y Túñez, 2020).

La innovación en los medios tradicionales se ha limitado con frecuencia a la simple difusión de tecnologías, y pocas veces ha transcendido a un cambio real de modelo o a una modificación profunda en sus dinámicas de trabajo (Mitchelstein y Boczkowski, 2009; Ostertag y Tuchman, 2012). Schumpeter (1975) fue el primer estudioso en interesarse por el concepto de innovación como factor fundamental de la empresa. Por su parte, Fageberg (2003) agrega que la innovación afecta tanto "a la tecnología como a la organización de los procesos de producción", por lo que considera que se puede experimentar tanto en el producto como en su elaboración.

En la literatura científica reciente se han analizado los retos y oportunidades a los que se enfrentan los medios de servicio público

en el nuevo contexto de la digitalización y la convergencia (Franquet, 2014). Se identifican, por ejemplo, los estudios de Flew (2011) sobre las corporaciones públicas en Australia, de Moe (2008) en Noruega, de Palmeri y Rowland (2011) sobre los EE.UU. y Francia, y los de Moragas y Prado (2000) en España.

Según la European Broadcasting Union (2000), el principal reto que afrontan los PSM es la construcción de estrategias que les permitan siendo agentes relevantes dentro del escenario tecnológico. Para lograrlo, una solución puede ser innovar en cuanto a géneros y formatos adaptados a "las nuevas formas de consumo de los medios" (Bardoel, 2007; Lowe y Bardoel, 2007). También el ampliar los recursos de participación e integración de la audiencia (Franquet, Villa y Bergillos, 2013), el público como coproductor (Franquet, 2014).

Las conclusiones del estudio de Franquet (2014) consolidan la teoría de que la aparición de nuevas plataformas de distribución derivó en cambios importantes en la creación de contenidos. Las transformaciones son, por ejemplo, "la multiplicación de los contenidos y servicios audiovisuales, el uso de nuevos medios en Internet como YouTube y los medios sociales como Facebook y Twitter, y la búsqueda de estructuras organizativas que fomenten el fortalecimiento de los vínculos entre las diferentes áreas funcionales y grupos humanos que participan en la producción".

2.2. Fundamentos de las prácticas de cocreación

La relación existente entre las corporaciones de radiotelevisión y sus públicos está experimentando en plena revolución digital un cambio constante en el que los usuarios gozan cada vez de un mayor protagonismo. Estas organizaciones comenzaron hace años a valorar la inclusión de sus seguidores en las distintas fases del proceso de producción de contenidos, una práctica impulsada principalmente por el desarrollo de Internet y sus plataformas de creación (Vaz-Álvarez, Túñez-López y Frazão-Nogueira, 2020).

La multiplicación de estas experiencias cocreadoras tiene su explicación en el uso de Internet como una herramienta democratizadora que potencia las capacidades de conexión e interacción entre los usuarios (Hoff, 2010), los que ahora adoptan una posición de productores o "produsuarios" (Bruns, 2008).

Este proceso ha llamado la atención del PSM (Public Service Media), que concibe esta nueva capacidad de producción de sus seguidores como una oportunidad para generar valor añadido en sus formatos y cumplir con el valor de la participación que se engloba dentro de su misión de servicio público (Vaz-Álvarez, Túñez-López y Frazão-Nogueira, 2020).

El término concreto de UGC (*User Generated Content*), o contenido generado por el usuario, fue definido por la OCDE en 2007 cuando estableció las características fundamentales que deben poseer estos contenidos:

- La publicación: una condición esencial es que el contenido sea publicado, es decir, que se haya "procesado, consumado e implementado".
- Esfuerzo creativo: cuando hablamos de UGC hacemos referencia al valor añadido. No se relaciona con una reproducción ni adaptación de contenidos existentes, sino que requiere de un nuevo esfuerzo creativo para renovar su valor.
- Creación fuera de la esfera profesional: con este requisito, la OCDE se refiere a la intencionalidad de la aportación, que debe ser, en el caso del usuario, sin una pretensión económica.

Es por esto que la idea de cocreación en los medios de comunicación podría considerarse como una nueva formulación de la relación creativa existente entre las distintas organizaciones y otros agentes externos, principalmente seguidores, abandonando algunos aspectos restrictivos que se mantenían en las prácticas de creación de contenidos por parte de los usuarios.

Debemos remontarnos a 2004 para encontrar la primera definición de cocreación. Esta fue esbozada por el profesor Prahalad y lo

describió como un proceso de creación en colaboración mediante el que "dos agentes desarrollan una puesta en común creativa de la que extraen un valor recíproco" (Prahalad y Ramaswamy, 2004).

Investigaciones más recientes sobre esta cuestión como la de Vaz, Fieiras y Túñez (2020) apuntan a que una de las debilidades principales en las experiencias de cocreación es la voluntad de participación de los usuarios. En su estudio sobre estas prácticas en los medios públicos europeos concluyen que "la mayor parte de la audiencia no quiere necesariamente generar contenido", sino consumirlo, por lo que la escasa actitud de implicación de los públicos dificulta en ocasiones la puesta en marcha de muchas de estas iniciativas.

En este momento todavía no es posible recibir una definición unánime sobre lo que es la cocreación para el PSM, ya que cada una de las corporaciones la concibe de una manera diferente, lo que está estrechamente vinculado a su filosofía y estrategia. En el contexto europeo, las televisiones se aproximan conceptualmente, pero no todas están de acuerdo "en lo que representa ni en los formatos en los que se expresa o es factible" (Vaz, Fieiras, Túñez, 2020).

2.3. Universo de los deportes electrónicos

Diversos autores han estudiado la relación entre el concepto de e-Sport y deporte tradicional, analizando sus aspectos más relevantes para confirmar o desmentir que ambos parten de un mismo punto. ONTIER (2018) indica que son seis las razones que unen ambas modalidades: (i) existe un rendimiento principalmente mental y también físico; (ii) la participación es organizada; (iii) las competiciones son regladas; (iv) existen entrenamientos; (v) están sujetos a normas y (vi) tienen un carácter competitivo.

Con el paso del tiempo y el avance de esta disciplina se ha comprobado que, desde una perspectiva de rendimiento, son un tipo de deporte en el que las personas desarrollan y potencian capacidades cognitivas como el tiempo de reacción y la toma de decisiones; habilidades mentales como la motivación y la autoconfianza; capacidades

físicas como la fortaleza ante la fatiga; y los valores tradicionales vinculados a estas prácticas como son el esfuerzo y la superación (García-Naveira, Toribio, Teruel y Suárez, 2018).

Jugar con regularidad a estos videojuegos "mejora la percepción, atención y la cognición espacial" según el estudio psicológico de Bediou *et al.*, que en 2018 realizaron un meta-análisis de la influencia de los videojuegos sobre la capacidad cognitiva de las personas. Siguiendo este modelo, Sala, Tatlidil y Gobet (2018) estructuraron un estudio sobre la relación entre videojuego y capacidad cognitiva de la extraen que la práctica regular de estos formatos mejora "el procesamiento visual, la atención, la capacidad de movilidad y el control cognitivo".

En lo relativo a las motivaciones que llevan a los usuarios a introducirse en el ecosistema de los *e-sports*, Fuster, Carbonell, Chamarro y Oberst (2013) concretaron que los perfiles habituales correspondían a personas curiosas, con ganas de explorar y de establecer nuevas relaciones sociales, ya que los videojuegos acercan al jugador a un espacio de experimentación donde tiene la posibilidad de pertenecer a un grupo donde se siente reconocido, donde obtiene apoyo social y entretenimiento, lo que se aleja de la concepción del jugador solitario.

A la hora de definir las estructuras bajo las que se engloban y compiten estos deportistas, la mayoría de ellos se integran en clubes profesionales con una organización y disposición similar a las organizaciones convencionales. Estos se constituyen legalmente con su equipo técnico, cúpula directiva, jugadores y puestos específicos que irrumpen de la mano de la profesionalización, como es el caso de los preparadores físicos, psicólogos del deporte, nutricionistas o responsables de marketing y publicidad. Todo ello con objetivos tanto deportivos, como de rendimiento económico y empresarial, lo que principalmente consiguen con la retransmisión de las competiciones.

Para poder clasificar los deportes electrónicos se analizan cuestiones como el papel que juega el esfuerzo físico en ellos, la condi-

ción del espectador, el precedente y contexto histórico o el grado de interacción. Bajo este modelo es frecuente que se establezcan nexos de unión entre los *e-sports* y el ajedrez, el póker y otros deportes tradicionales (Holt, 2016).

El desarrollo de estas disciplinas, tanto en espacios físicos como digitales, es posible gracias a los medios de comunicación y el flujo informativo, al mismo tiempo que Taylor (2012) añade que "los *e-sports* han codificado en su propia razón de ser y entorno una profunda relación, tanto en la tecnología como en los medios de comunicación".

Uno de los apartados que copan los intereses de los investigadores de los medios de comunicación en relación con los deportes electrónicos es el estudio de la creación de comunidad, de la retransmisión en directo y la propia interacción con los *streamers* (Reitman, Anderson-Coto, *et al*., 2020). El universo creado por la convergencia de los mundos virtuales y físicos se ha convertido en un foco de atención para los estudiosos del sector, que tratan de concretar las similitudes, distinciones y líneas de separación entre estas realidades. Autores como Burroughs y Rama (2015) discuten y se muestran críticos ante la falta de diferenciación entre lo que es virtual y real en marco del *streaming*.

La organización de los *e-sports* tiende a articularse en torno a géneros de juego específicos como es el caso de las arenas de combate multijugador en línea (*League of Legends*, *Dota 2*); los de disparos en primera persona (*Counter-Strike: Global Offensive*); la estrategia en tiempo real (*Starcraft 2*); juegos de cartas coleccionables (*Hearthstone* o *Ultimate Team*) o juegos deportivos (serie *FIFA*). Es por ello que se crean subestructuras, como acontece con los deportes tradicionales. Aun así, los *e-sports* no se conciben como versiones electrónicas de deportes convencionales como el fútbol, tenis o béisbol, que sí tienen representación en juegos con *FIFA* o la serie *NHL* (Hamari, Sjöblom, 2017).

Teniendo en cuenta los conceptos anteriormente expuestos, y siguiendo las investigaciones y análisis de los primeros teóricos que se han embarcado en el estudio de este nuevo contexto, es posible definir a los *e-sports* como una tipología deportiva en la que los aspectos principales "son facilitados por sistemas electrónicos y la entrada en

escena de los jugadores y los equipos están mediadas por interfaces humano-ordenador" (Hamari, Sjöblom, 2017). En relación a esta definición, el entramado vinculado a los *e-sports* puede considerarse, de forma superficial y en términos generales, como una actividad similar a la de cualquier deporte.

En lo tocante a las pautas de consumo de deportes electrónicos, la tendencia habitual es que se acceda a ellos a través de transmisiones en directo por Internet, en las que, además de visualizar los eventos, competiciones, formatos o torneos, los espectadores tienen la posibilidad de participar en la interacción social que sucede de forma constante. Al entrar en esta dinámica, los usuarios también entran en el juego de la mediación informática que rige a los *e-sports*, ya que dependen de los componentes tecnológicos para su intervención.

Los jugadores profesionales de deportes electrónicos suelen ser más accesibles que sus homólogos físicos, como es el caso de los futbolistas, por ejemplo (Hamari, Sjöblom, 2017). Esto se debe a que muchos de estos *gamers* son al mismo tiempo streamers activos, lo que abre un canal de comunicación constante y directo entre los espectadores y jugadores. De esta relación puede derivar una conexión mucho más profunda entre deportistas, clubes y seguidores.

En el caso concreto de los deportes tradicionales, históricamente se han mantenido dos "importantes motivaciones cognitivas para verlos", como son el aprender sobre los jugadores y equipos y la recopilación de información para compartirla posteriormente en entornos sociales (Wenner y Gantz, 1998). Whiting y Williams (2013) apuntan en su investigación sobre el uso y consumo de medios que la adquisición de conocimientos también es un factor relevante dentro de la retransmisión de videojuegos. En los *e-sports*, los métodos de trabajo, estrategias y tácticas se reproducen fácilmente ya que estas actividades "no requieren de tantos requisitos previos como los deportes tradicionales", por lo que este aprendizaje se asocia directamente a su consumo.

El componente social de los videojuegos es otro de los apartados que permea sobre los deportes electrónicos, en los que se ha demos-

trado que la relación estrecha con los compañeros es de gran importancia, al igual que sucede en las modalidades convencionales. Asimismo, los *e-sports* están conectados a un chat en directo que permite hacer comentarios y aportar juicios de valor sobre los acontecimientos del juego y animar a los equipos y jugadores. La naturaleza tecnológica de la mayoría de los servicios mediante los que se consumen los deportes electrónicos, es habitual que coexistan en un mismo entorno diferentes microcomunidades y actores sociales simultáneos, de los cuales pueden surgir pautas de comportamiento distintas (Woerman y Kirschener, 2015).

3. RESULTADOS

3.1. Nacimiento, desarrollo y consolidación de RTP ARENA

La dificultad para captar audiencias de 16 a 34 años y ser relevantes para ellas se convirtió en una "profunda preocupación" para la Rádio e Televisão de Portugal. Lo confirma Daniel Rodrigues, gestor de producto de RTP Arena, quien estuvo inmerso en el desarrollo de la plataforma desde el primer momento.

Explica Rodrigues que en la corporación portuguesa generan constantemente contenidos infantiles y dibujos animados, con los que logran satisfacer a un rango de edad hasta los 10-12 años. Sin embargo, presentan dificultades para mantener la relevancia en etapas posteriores, por lo que indagaron sobre nuevas realidades con las que pudieran atraer a estos jóvenes.

A excepción de los contenidos de fútbol que emiten regularmente en sus diferentes canales, la RTP no era capaz de captar a estas audiencias, por lo que en 2015 se decidieron a crear RTP Arena, "una nueva relación con la realidad incipiente de los *e-sports* que estaba comenzando a irrumpir y manifestarse". Con ella, Daniel Rodrigues asegura que han sido capaces de cumplir con su papel de PSM de ser interesantes para el conjunto de la ciudadanía, abarcando a un público cada vez más alejado de la televisión lineal.

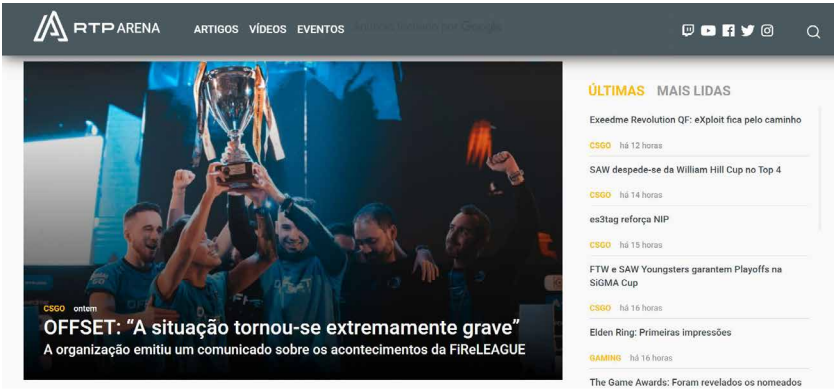

Imagen 1: Interfaz de la página de inicio de la web "RTP Arena".
Fuente: RTP

"En estos momentos la juventud recurre a la televisión para muchas cosas, pero no para ver los canales tradicionales, lo que es un aprendizaje para nosotros. No debemos tener los ojos cerrados ante esta situación, sino que debemos abrirlos y adaptarnos. RTP Arena nos pareció una solución efectiva para contactar y ser relevantes para ellos. Seis años después observamos que estábamos en lo cierto", asevera Rodrigues.

La plataforma fue presentada en 2015 como un proyecto de ficción, pero el análisis y seguimiento llevado a cabo por el equipo técnico concluía que las posibilidades y potencial de la herramienta eran mucho mayores al tratarse de una cuestión profunda que requería de un soporte más amplio y transversal.

Fue en ese momento cuando se construyó la estructura actual de RTP Arena, un "producto multimedia que permite representar y tener presencia en el nuevo ecosistema de deportes electrónicos, con un potente acompañamiento multimedia y digital" que se compone por su propia web y los perfiles en redes sociales, de entre los que sobresale su cuenta en Twitch.

En el año 2016 comenzaron las primeras transmisiones de la marca, las que presentaron un crecimiento progresivo y se fueron diversificando hasta abarcar diferentes formatos ajustados al universo e-sport. De entre estas prácticas iniciales sobresalen competiciones

en vivo de *League of Legends* y una cobertura noticiosa de los principales eventos nacionales e internacionales.

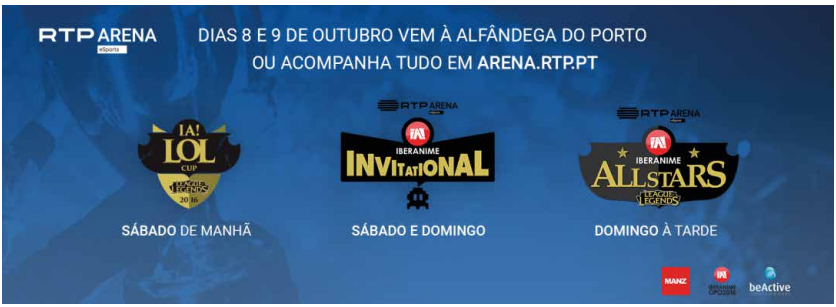

Imagen 2: Cartel de una de las primeras competiciones de LOL organizadas por el proyecto 'RTP Arena' (2016).
Fuente: RTP

Una vez analizados los primeros resultados, añade Daniel Rodrigues, en la Rádio e Televisão de Portugal consideraron que sería interesante la creación de un espacio semanal en sus canales tradicionales, por lo que introdujeron un formato de 25-30 minutos en horarios relevantes de su parrilla en el que le dan "visibilidad a las figuras del momento a través de entrevistas en directo".

Imagen 3: Programa semanal de entrevistas de 'RTP Arena' emitido en la televisión lineal.
Fuente: RTP

Este programa comenzó como un repaso de los asuntos más relevantes sobre deportes electrónicos que se desarrollaban cada semana, pero concluyeron que era "un enfoque poco representativo y superficial", por lo que optaron por transformarlo en un talk show. En él, un protagonista acude al plató por semana, habla de su carrera, metodologías de trabajo e incluso juega una partida en directo explicando sus trucos a los espectadores.

Las redes sociales son otro de los pilares fundamentales de RTP Arena para distribuir contenido y generar interacción. Tienen perfiles de publicación constante y de gran impacto en las principales plataformas, como es el caso de Facebook (26.000 seguidores), Instagram (18.000 seguidores) o Twitter (14.000 seguidores). Por el momento, TikTok es la única red a la que no le han "encontrado mucho sentido", y Twitch, el espacio dorado de su distribución, con 57.000 seguidores en su perfil principal y más de 170.000 en su canal dedicado al juego *Counter-Strike Global Offensive*, el juego más exitoso de la plataforma.

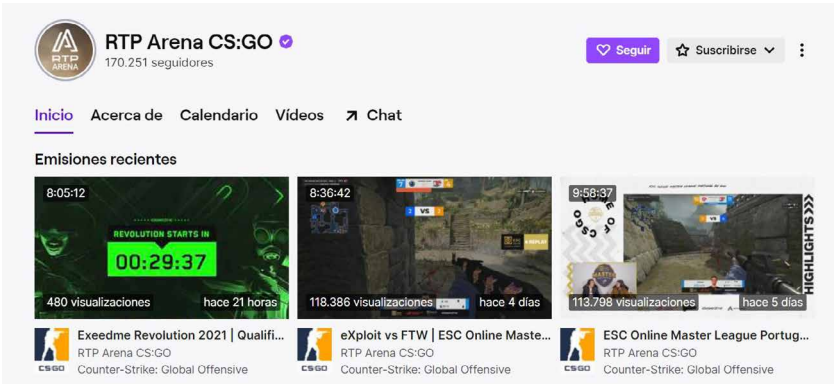

Imagen 4: Perfil de RTP Arena dedicado al CS-GO en Twitch.
Fuente: RTP

"En estos años hemos crecido mucho, sobre todo en Twitch. En los últimos 3 años fuimos el canal más seguido en Portugal en esta red, lo que sorprendió a mucha gente que pensaba que un medio de servicio público no podría ser líder en un espacio que, a priori, se

ajusta más a las características de corporaciones privadas o nuevas empresas con alto potencial tecnológico". Asimismo, Rodrigues asegura que consiguieron captar a ese público que los iba a ver a Twitch para que ahora los vaya a buscar directamente a sus propios espacios, por lo que consideran que el proyecto "ha sido un caso de éxito, tanto en lo cualitativo como en la parte cuantitativa".

En lo relativo a las secciones que componen el proyecto, en RTP Arena trabajan talk shows con figuras reconocidas del mundo de los *e-sports*, pero también reservan espacios para especialistas del sector en diferentes modalidades y apartados, para que expliquen las dinámicas de competición de los torneos que se celebrarán y se centren en otros aspectos más técnicos, así como la propia valoración de los campeonatos.

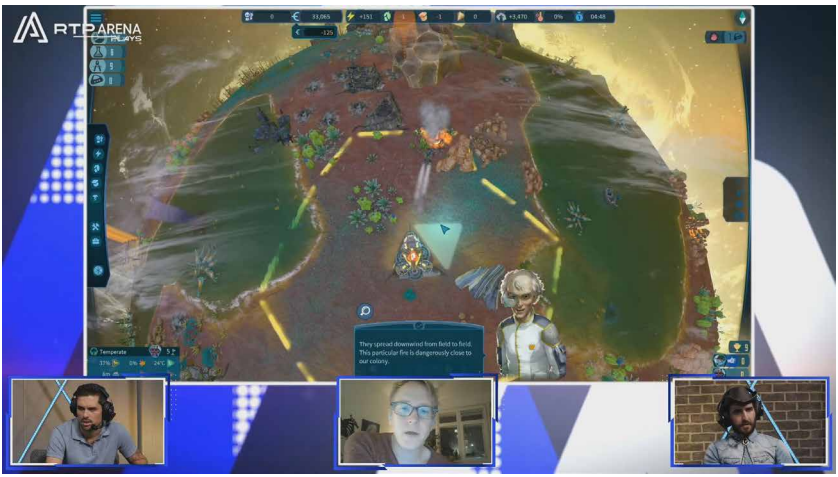

Imagen 5: Formato de cocreación en directo, RTP Arena Live-Plays.
Fuente: RTP

Otros de sus formatos presentan un carácter experimental, como es el caso de RTP Arena Live-Plays, en el que todas las semanas seleccionan junto a los usuarios un nuevo juego para probarlo. Además, trabajan con frecuencia los *live streams*, y a nivel internacional tratan de darle cobertura a las competiciones de mayor reconocimiento

e impacto. Con respecto a los juegos que incluyen en su carta de contenidos, abarcan todos aquellos que el equipo editorial considera valiosos y que le puede interesar a su público, como es el caso de "*Counter Strike*, *FIFA* o *League of Legends*, entre otros".

3.2. Cocreación de contenidos en el marco e-sport: captación de audiencias jóvenes

En la Rádio e Televisão de Portugal eran conocedores de que los principales mercados que existen para generar interés entre el público joven como son "la música, el deporte o los festivales", ya estaban siendo explotados, por lo que plantearon un estudio exploratorio para detectar tendencias emergentes entre este segmento de la población. De este modo identificaron que, en concreto, los deportes electrónicos estaban consolidándose como una realidad que irrumpió en el contexto global de la comunicación para quedarse, y que hasta el momento no estaban siendo cubiertos por el PSM de Portugal.

En este sentido, otra de las conclusiones clave que extrajeron en la corporación fue que la cocreación de contenidos junto a los usuarios elevaría la magnitud del proyecto al conseguir una mayor inmersión de este público en los distintos formatos, por lo que apuntaron a esta práctica como "uno de los focos principales en la puesta en marcha de RTP Arena".

"Nosotros ya teníamos algunas ideas para involucrar a la audiencia en la cadena de producción, en algunas de ellas el público no incidía directamente sobre el producto que generamos, pero en este caso de RTP Arena tiene un papel fundamental", apunta Daniel Rodrigues. Para hacer efectiva e interesante esta participación, en la RTP completan un análisis constante para saber qué es exactamente lo que el público necesita y le interesa, y sobre esta información se articulan las líneas de actuación y nuevas propuestas del proyecto.

En el caso concreto de su perfil de Twitter, tienen un apartado en el que los usuarios pueden marcar y concretar cuáles son las partes y formatos de RTP Arena que más les gustan, lo que les sirve de guía

para enfocar los nuevos contenidos. También tienen abierta una línea a través de la que el público les contacta y envía directamente sus preguntas a los especialistas que participan en sus *talk shows* para que posteriormente estas sean respondidas como parte de los programas, por lo que los usuarios participan en la creación de los guiones.

"Nos gusta tener en cuenta sus aportaciones a la hora de construir las propuestas y guiones porque hemos comprobado que el resultado mejora exponencialmente, conseguimos apuntar mucho más directo a lo que quieren. Mantenemos una conversación con nuestras audiencias constante en la que escuchamos, escuchan y todos hablamos en el mismo nivel", comenta Rodrigues.

Destacan en la RTP que la participación y la fidelidad también es premiada en sus diferentes canales. En el caso concreto de Twitch, sortean de forma regular pases para que los usuarios puedan vivir la experiencia en directo de las competiciones y del *behind the scenes* de sus emisiones, de esta forma se desplazan hasta sus instalaciones para conocer de primera mano cómo generan los contenidos.

Asimismo, concretan que todos los productos que se elaboran bajo la marca RTP Arena no solo se enfocan al público, sino que también están destinados a los propios jugadores que después participan en los formatos, por lo que se trata de una interesante puesta en común y retroalimentación constante, una "comunidad y conversación que no para de crecer".

Imagen 6: Chat RTP Arena en directo.
Fuente: RTP

A la hora de concretar las vías de participación más frecuentadas por los usuarios, desde la Rádio e Televisão de Portugal aseguran que es su chat 24 horas en Twitch el que recibe un mayor número de aportaciones. En varios de sus formatos en directo el presentador está constantemente leyendo, escuchando y proyectando lo que los usuarios quieren saber y decir, se les da voz continuamente y se trata de establecer una conversación ordenada con todos ellos.

Además, semanalmente recogen las principales inquietudes y dudas que identifican en los comentarios y encuestas para incluirlos posteriormente y tenerlos en cuenta en los guiones, escaletas y preguntas de las entrevistas, estas son las principales formas de interacción que destaca el gestor de producto de RTP Arena. Antes de la Covid-19, añade, "otra de las iniciativas que se hacían era enviar a periodistas a cubrir en directo los eventos para que sacaran a los espectadores que allí estaban a dar sus valoraciones en el propio directo y participar en las conversaciones".

3.3. Impacto de la Covid-19 sobre RTP Arena

Daniel Rodrigues destaca que es curioso el análisis que extrajeron del impacto del coronavirus sobre el proyecto. Cuando la pandemia impactó sobre el ecosistema de medios, la RTP estaba acostumbrada a una cadena de producción muy concreta, con equipos, personal y cámaras en los estudios. Los *e-sports* más potentes se jugaban en eventos físicos, pero las prácticas virtuales fueron poco a poco cobrando mayor relevancia. Al igual que en otros formatos de las emisiones lineales vinculadas a la información o entretenimiento, la normalización de la retransmisión de estos contenidos rodados con cámaras domésticas fue incrementando.

Estas prácticas les permitieron diversificar los contenidos y mantener la programación, lo que a su juicio fue sorprendente, ya que lograron alcanzar un enorme impacto y visualización con contenidos que en un primer momento consideraban que se escapaban de los estándares mínimos de calidad técnica para ser emitido en cualquiera de los canales de la corporación.

A tenor de estos aprendizajes que les brindó la Covid-19 sobre nuevas fórmulas para crear y transmitir contenidos, la RTP experimentó sorprendentes mejoras en términos cualitativos, que también derivaron en notables incrementos en el apartado cuantitativo: un crecimiento exponencial de la repercusión del proyecto, que llegó a duplicar el número de seguidores, horas de retransmisión y tasa de participación y consulta por parte de los usuarios. En estos momentos, ya de vuelta en los estudios, retornaron hacia producciones de mayor calidad, pero mantienen determinadas prácticas que resultaron ser exitosas y que no se encontraban en su hoja de ruta en un primer momento.

Con respecto a los objetivos que se marcan en la cúpula directiva de RTP Arena, su meta principal es que, "si los *e-sports* continúan cotizando al alza en esta nueva realidad y universo digital" quieren hacer cada vez más contenidos, de más calidad y crear una comunidad que esté viva y que crezca progresivamente. "Queremos ser una plataforma donde las competiciones quieran transmitirse, queremos cubrir los grandes eventos nacionales e internacionales", concluye Daniel Rodrigues, director de producto de RTP Arena.

4. CONCLUSIONES

La Rádio e Televisão de Portugal decidió en 2016 afrontar de manera directa la pérdida de público joven de 16-34 años que la corporación había experimentado en los últimos tiempos. Esta disminución de espectadores se vinculaba estrechamente a una incapacidad de innovar y sorprender con nuevos formatos que se concibieran como relevantes para los jóvenes y que vagaran en consonancia con sus nuevos gustos e intereses.

Una vez concluido un estudio exploratorio que pretendía examinar este déficit, la RTP concluyó que no era posible estructurar contenidos lo suficientemente llamativos sobre las temáticas que tradicionalmente atraían a este segmento de la población, por lo que identificaron una tendencia disruptiva en los *e-sports* sobre la que cimentaron un proyecto 360º: RTP Arena.

El carácter interactivo de las redes sociales y de los deportes electrónicos supuso que la cocreación de contenidos con los usuarios se convirtiese en uno de los pilares de esta herramienta. De este modo, tanto los deportistas que participan en los formatos, como el público que los sigue, forman parte del proceso de producción, con un intervencionismo que, en ocasiones, llega a ser esencial.

Los usuarios generan aportaciones de valor a través de los chats y los canales disponibles en las redes sociales. Un discurso que es escuchado por parte del equipo editorial de RTP Arena y posteriormente analizado, para extraer conclusiones que vertebran sus guiones o escaletas y que les dan la oportunidad de apuntar con certeza hacia nuevos espacios que sí interesan a este grupo.

Asimismo, los profesionales del sector acuden tanto a platós físicos como a programas virtuales para jugar en directo y explicar sus métodos de trabajo y tácticas, con lo que se puede observar una práctica de cocreación elevada a su máximo nivel. El éxito de estas prácticas llevó a que los seguidores que solo consumían los contenidos a través del perfil de Twitch de la plataforma migraran hacia los propios sitios web de RTP Arena. Esto convenció a los gestores del proyecto a ceder un espacio semanal de la parrilla de la televisión lineal a uno de los formatos de *e-sports*, con lo que los usuarios jóvenes volvieron a ver interés en las emisiones tradicionales y a acudir al servicio público de radiotelevisión con frecuencia, ya que encontraron en él un espacio que versa en consonancia con las nuevas tendencias digitales.

Desde la Rádio e Televisão de Portugal están seguros de que continuarán explorando y apostando por este nuevo universo e innovando alrededor de él. No pautan una hoja de ruta, ya que los cambios que se producen en los entornos digitales son altamente moldeables e imprevisibles, pero tienen claro que los deportes electrónicos fueron, son y serán una de las realidades que irrumpieron con mayor fuerza en el escenario de la comunicación, que han llegado para quedarse, cada vez con mayor protagonismo, y que las posibilidades de inmersión, asociación y creación colectiva que brindan son inéditas en el contexto global.

Espejo de Monografías
ISSN: 2660-4213 Número 21, año 2023. URL: espejodemonografias.comunicacionsocial.es

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COMUNICACIÓN SOCIAL
ediciones y publicaciones

ISBN 978-84-17600-96-9

Innovar en innovación televisiva

Análisis de casos de éxito en los medios públicos europeos (2023)

César Fieiras Ceide; José Miguel Túñez López;
Marta Rodríguez Castro (editores)

Separata

Capítulo 5

Título del Capítulo
«Cómo acelerar un periodismo de vanguardia: laboratorios de innovación en las noticias de BBC y VRT»

Autoría
César Fieiras Ceide;
Yolanda Martínez Solana

Cómo citar este Capítulo
Fieiras Ceide, C.; Martínez Solana, Y. (2023): «Cómo acelerar un periodismo de vanguardia: laboratorios de innovación en las noticias de BBC y VRT». En Fieiras Ceide, C.; Túñez López, J.M.; Rodríguez Castro, M. (eds.), *Innovar en innovación televisiva. Análisis de casos de éxito en los medios públicos europeos.* Salamanca: Comunicación Social Ediciones y Publicaciones. ISBN: 978-84-17600-96-9

D.O.I.:
https://doi.org/10.52495/c5.emcs.21.p107

El libro ***Innovar en innovación televisiva. Análisis de casos de éxito en los medios públicos europeos*** está integrado en la colección «Periodística» de Comunicación Social Ediciones y Publicaciones.

Los Medios de Servicio Público intentan ser relevantes para los ciudadanos, en medio de una tormenta perfecta contra ellos en la que se cuestionan su financiación, su independencia editorial, su papel en la sociedad y su existencia en sí misma.

Innovar en innovación televisiva aborda un rastreo sobre la actividad de las principales radiotelevisiones públicas de Europa para extraer un listado de casos de éxito de innovación en informativos que han sido posteriormente analizados por un amplio grupo de expertos académicos.

La construcción de una obra de estas características permite extraer una radiografía del estado actual de la innovación en los contenidos informativos, listando y analizando proyectos que renuevan tanto los procesos de producción de noticias, de distribución, como los formatos, equipos de trabajo, objetivos, y públicos destinatarios. Se analizan los canales empleados para alcanzar a las audiencias, el código comunicativo empleado, las narrativas establecidas, y los elementos que convergen en una comunicación fluida, multiplataforma, líquida y multisoporte.

29 autores de 14 centros universitarios e investigadores desgranan en este libro iniciativas de innovación desarrolladas por los Medios de Servicio Público europeos, con especial énfasis en el ámbito informativo; analizan a la vez que ponen tareas a los medios: colocar a los usuarios en el centro, adoptar una mentalidad digital de productos y servicios, implementar un liderazgo efectivo y transformacional y armar una estrategia basada en datos.

SC

Sumario

Prólogo. Inno¿vamos?: Tareas pendientes en la innovación existencial de los medios
por Urbano García Alonso **11**

Bloque I
La innovación en los medios de servicio público europeos

Introducción. Creatividad y experimentación como aceleradores del cambio
por César Fieiras Ceide; José Miguel Túñez López; Marta Rodríguez Castro **17**

1. Innovación tecnológica y metamorfosis del *newsmaking*
por José Miguel Túñez-López; Karina Valarezo González **21**
Introducción *21*
La IA en la producción de noticias: amplificación de la cobertura periodística y especialización de las informaciones *26*
Distribución automatizada, recomendación y personalización de contenidos *29*
Verificación automatizada de contenidos para contrarrestar las fake news *31*
Referencias bibliográficas *33*

2. Verificar para poder innovar: estudios de casos desde la hibridación y la transversalidad entre medios
por Santiago Tejedor; Laura Cervi; Belén Sancho **35**
Introducción *35*
Metodología de trabajo *37*
Resultados *39*
Los medios de comunicación: poniendo en valor la figura del periodista *39*

La información como servicio público: las agencias de noticias 42
Los fact-checkers y su modelo de negocio contra la desinformación 45
Conclusiones 49
Referencias bibliográficas 50

3. Tendencias de innovación en la producción de contenidos: los medios de comunicación públicos ante los desafíos de la cultura audiovisual hegemónica
por María Soler Campillo; Javier Marzal-Felici **53**
Introducción: la innovación, una forma de gestión esencial para los medios de comunicación públicos 53
Una aproximación al consumo de entretenimiento en España y en Europa 54
Una caracterización de la cultura audiovisual mainstream o hegemónica 58
Retos para la producción de contenidos de servicio público: el mandato de la diversidad audiovisual 60
Referencias bibliográficas 64

4. Innovación en contenidos y relación con las audiencias jóvenes
por Félix Ortega-Mohedano; María Marcos Ramos **67**
Introducción a la innovación en el audiovisual 67
Innovando en el contenido audiovisual 69
Las mil y una pantallas 73
La economía de la atención 75
La opinión de las audiencias jóvenes 77
Referencias bibliográficas 79

Bloque II
Análisis de caso. Innovación en los informativos de los Medios de Servicio Público europeos

5. Cómo acelerar un periodismo de vanguardia: laboratorios de innovación en las noticias de BBC y VRT
por César Fieiras Ceide; Yolanda Martínez Solana. **87**
VRT NWSlab: Laboratorio interno de innovación para las noticias de la radiotelevisión pública flamenca belga 90

BBC News Lab: innovación compartida desde la British Broadcasting Corporation 93
Ideas fundamentales 98
Referencias bibliográficas 100

6. La innovación infinita. Nuevos retos y dualidades en los Medios públicos europeos
por Juan Carlos Miguel de Bustos; Jessica Izquierdo Castillo Miguel Ángel Casado **101**
Introducción 101
Innovación en los medios públicos 102
Dilemas y dualidades 105
Innovación transparente-Innovación oscura 105
Innovación con valores-sin valores. Y la necesidad de regulación 107
Algoritmos sí-algoritmos no 108
Forma de organización. Jerárquica vs virtual 109
Conclusión 110
Referencias bibliográficas 111

7. Medios Basados en Objetos: ¿La personalización definitiva? Un análisis de las posibilidades y usos de esta herramienta para la ip-difusión contemporánea
por Martín Vaz Álvarez; Marius Dragomir **115**
Introducción 115
Entendiendo los Medios Basados en Objetos (OBM) 118
La tecnología detrás de los Medios Basados en Objetos 120
Ventajas clave de los OBM 121
Uso de Medios Basados en Objetos en la BBC 124
BBC Click 1000: el primer programa personalizado a través de medios basados en objetos 124
Proyecto Casualty Accessible and Enhanced (A&E) Audio 126
Las experiencias MotoGP at Home, Football at Home y Football Fanzone 128
BBC StoryKit y Cook-Along Kitchen Experience (CAKE) 129
Retos y consideraciones en su implantación 131
Conclusiones 132
Referencias bibliográficas 134

8. Innovaciones en periodismo móvil y nuevos códigos informativos
por Carmen Costa-Sánchez; María José Ufarte Ruiz **137**
El MoJo que lo cambiará todo *137*
Medios públicos e innovación móvil *139*
Casos de estudio *141*
Conclusiones *146*
Referencias bibliográficas *148*

9. La innovación al servicio de las noticias en la RTS suiza. El caso de los formatos informativos *Le Shorts*, *Le Rencard* y *Suisse Good*
por Mónica López-Golán; Olga Blasco-Blasco **151**
Introducción *151*
El caso de la RTS. La innovación al servicio de las noticias *154*
Le Short, un formato para móvil *156*
Le Rencard, la información en un feed de Instagram *158*
Suisse Good, periodismo constructivo *160*
Ideas fundamentales *161*
Referencias bibliográficas *163*

10. La automatización para acercarse a las audiencias. ARD *Tagesschau*, *Keys* de RTBF, *Voitto* de Yle y la SR de Suecia como casos de éxito
por Isaac Maroto González; Juan Manuel Prieto Arosa **165**
La automatización en los medios de comunicación *165*
Keys RTBF: el bot conversacional para la Generación Z *167*
ARD Tagesschau y su sistema de recomendación algorítmica *170*
Yle y su robot para comunicar *172*
SR y la automatización con control editorial *174*
La automatización como herramienta para acercarse al usuario *176*
Referencias bibliográficas *177*

11. Proyecto de personalización de noticias a partir de la neurocomunicación. ARD-BR *Data Driven Publishing*
por Almudena Barrientos-Báez; David Caldevilla-Domínguez Marc Pallarés **179**
Periodismo público para hoy *181*
La muerte de la objetividad *182*

El buen uso de la comunicación emocional *183*
Bayerischer Rundfunk y su experimentación con el Data Driven Publishing *185*
Referencias bibliográficas *192*

12. NOS.nl: Innovación y accesibilidad para definir el periodismo y la alfabetización
por Ana Gabriela Frazão-Nogueira; Patrícia Weber **193**
Alfabetización a través de la accesibilidad tecnológica *193*
Innovación, competencias y diferenciación *194*
El Nieuws van de Week y el Jeugdjournaal *195*
NOS Stories *196*
NOS-vídeos verticales en la app *197*
Conclusión *198*
Referencias bibliográficas *200*

13. Innovación y *fact-checking* en la lucha contra la desinformación en la red CIRCOM: el caso de la RTBF belga y el proyecto Faky
por José Rúas Araújo; Talía Rodríguez Martelo **205**
Introducción: la lucha contra la desinformación en la agenda de las televisiones regionales europeas *205*
Estudio de caso: Faky *209*
Conclusiones *214*
Referencias bibliográficas *216*

14. La construcción de una esfera pública europea a través de la colaboración y la innovación: *A European Perspective*, la redacción más grande de Europa
por Marta Rodríguez-Castro; Karen Arriaza-Ibarra **219**
Introducción *219*
Una mirada europea: la redacción más grande de Europa *222*
Innovación al servicio del interés público *225*
Una perspectiva compartida para atajar desafíos comunes *226*
Conclusión *229*
Referencias bibliográficas *230*

Conclusión. Innovar en innovación
por César Fieiras Ceide; José Miguel Túñez López; Marta Rodríguez Castro **233**

5.

Cómo acelerar un periodismo de vanguardia: laboratorios de innovación en las noticias de BBC y VRT

César Fieiras Ceide
Universidad de Santiago de Compostela
Yolanda Martínez Solana
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Resulta complejo predecir con exactitud cómo se desempeñará el periodismo en la próxima década. Más difícil se antoja precisar cuáles serán las tendencias o preferencias de consumo de los usuarios en un contexto extremadamente atomizado. Lo que es seguro es que ambos conceptos, productos periodísticos e intereses de la audiencia, irán aparejados, y la innovación, entendida ésta como una combinación novedosa de ideas, competencias y recursos existentes (Schumpeter, 1934), tendrá un papel protagonista a la hora de ensamblar las noticias y contenidos del futuro.

En esta transición y renovación incesante de rutinas y formatos, los laboratorios de innovación, también llamados *medialabs* o *labs*, se han consolidado desde 2010 como un fenómeno en expansión en los medios internacionales de referencia como *The New York Times*, *The Washington Post*, *The Boston Globe*, *BBC*, entre otros (Salaverría, 2015), suponiendo «una unidad interna de la empresa periodística, dotada de cierto grado de autonomía operativa y equipo humano propio, cuyo cometido es idear y promover innovaciones de carácter tecnológico, editorial y/o comercial, para la mejora competitiva de la organización» (Sádaba; Salaverría, 2016: 153).

El estudio de Salaverría (2015) apunta a que más de 30 medios a escala mundial han puesto en marcha estos departamentos, siendo más frecuentes en medios audiovisuales que en periódicos, con perfiles profesionales con una orientación

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hacia lo tecnológico, y entre los que diferencia cuatro modelos: uno centrado en el desarrollo de tecnología y aplicaciones; el orientado a la innovación en lenguajes, formatos, infografías y periodismo de datos; otro destinado a promover proyectos empresariales y comerciales; y un cuarto modelo dedicado a la formación periodística.

En el caso español, en 2016 diez medios ya habían incorporado a su estructura un laboratorio de innovación (RTVE, *Diario de Navarra*, *El Confidencial*, Vocento, *eldiario.es*, *Ideal*, *El Mundo*, *El Español*, *La Vanguardia* y la Sexta) (Donaire-Pitarch, 2016), con el objetivo central de encontrar productos innovadores y lenguajes con los que atraer a unas audiencias cada vez más insatisfechas, desarrollando herramientas y tecnologías vanguardistas que den un salto cualitativo a sus productos (López Hidalgo; Ufarte, 2016).

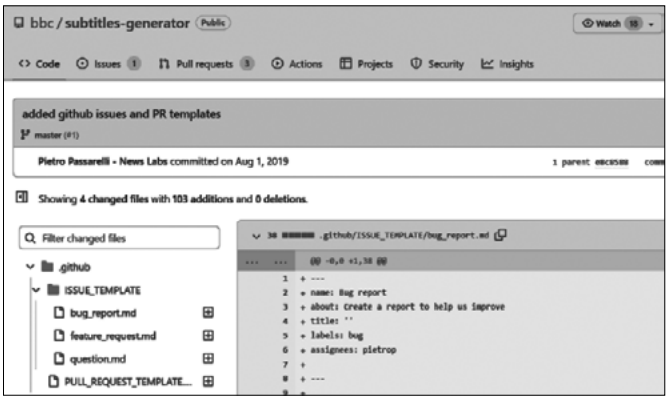
Las corporaciones de radiotelevisión pública de Europa también se han ido sumando a esta tendencia en los últimos años, siendo la innovación en su caso más una necesidad que una opción. La crisis de confianza por la que muchas de ellas atraviesan y la disruptiva propuesta tecnológica y digital de las operadoras privadas deja a los Public Service Media (PSM) con escaso margen de reacción.

La BBC fundó en 2012 una incubadora encargada de impulsar la innovación en sus contenidos informativos, llamada BBC News Lab. Este departamento reúne habilidades editoriales y técnicas para explorar y crear prototipos y nuevas líneas narrativas, un puente conector entre sus periodistas y su departamento de investigación y desarrollo. «Somos un equipo diverso con experiencia en periodismo digital y de transmisión, desarrollo de software, tecnología de transmisión, gestión de proyectos, diseño y experiencia de usuario», explican en su página web bbcnewslabs.co.uk.

El BBC News Lab tiene un enfoque de proyección externa. Desde su página web comparten gran parte de los proyectos que desarrollan con la comunidad de medios y usuarios, dejando el código de los prototipos en abierto para que el resto de actores se involucren y contribuyan. También actualizan en

https://doi.org/10.52495/c5.emcs.21.p107

Imagen 1. Código en abierto de la herramienta de generación de subtítulos del BBC News Lab.



Fuente: BBC.

su blog de noticias las últimas informaciones sobre sus experimentos, y organizan jornadas temáticas destinadas a encontrar respuesta a problemas de toda la industria.

A diferencia del laboratorio de la BBC, el otro caso de estudio que se analiza en este capítulo —el NWSlab de la VRT de Bélgica— tiene una orientación plenamente interna, destinado a mejorar el impacto de los proyectos de innovación en las noticias de la corporación. No transfieren en la radiotelevisión pública flamenca belga la actividad de su lab de cara al exterior, la única información en abierto disponible consiste en un vídeo corporativo subido a su biblioteca de medios en la que hacen repaso de las iniciativas desarrolladas y en la que mencionan esta nueva sección.

El lab fue creado en noviembre de 2021 para cerrar la brecha entre su departamento de innovación y el de noticias, donde era difícil involucrar a los profesionales de la información (periodistas y editores) en iniciativas innovadoras, ya que por lo general estos trabajadores están más interesados en indagar en los propios hechos informativos y en realizar su actividad como siempre lo han hecho, más que preocuparse por el envoltorio que rodea al contenido o la forma en la que lo distribuyen a la sociedad.

ISBN: 978-84-17600-96-9
Innovar en innovación televisiva. Análisis de casos de éxito en los medios públicos europeos
Colección: Periodística, 107

En este capítulo se analiza el origen, estructura, funcionamiento y actividad principal de dos laboratorios de innovación referentes en el contexto de las radiotelevisiones públicas de Europa: el BBC News Lab y el NWSlab de la VRT de Bélgica. Ambos fueron seleccionados teniendo en cuenta la fecha de creación y su actividad. El lab de la BBC es de los primeros en integrarse en un medio de comunicación en el ámbito global (2012), y el de la VRT (noviembre de 2021) de los últimos en iniciar su actividad. Ambos investigan, además, con enfoques diferentes: externo el de la BBC, e interno el de la VRT.

El análisis de la actividad y de los proyectos principales de ambos laboratorios permite concretar las causas que motivaron su creación; identificar disparidades en metodologías y en rutinas de trabajo; y conocer su estructura interna y los perfiles profesionales que componen los equipos de trabajo. Las entrevistas cualitativas en profundidad a Miranda Marcus, directora ejecutiva de productos del BBC News Lab, y a Chajá Libot, investigadora de usuarios en el NWSlab de la VRT, sirven de base para realizar ese análisis. En el caso de la BBC se completa un mapeo de la página web de su laboratorio de innovación para analizar pormenorizadamente su actividad y extraer un listado de todos los proyectos y eventos que han hecho públicos desde su creación. En la VRT se trabaja con cuestionario de reconsulta para matizar los datos que se consideran oportunos.

VRT NWSlab: Laboratorio interno de innovación para las noticias de la radiotelevisión pública flamenca belga

La VRT creó en noviembre de 2021 un laboratorio de innovación para aproximar a sus periodistas y editores a los procedimientos innovadores y a la actualización y modernización de procesos. Los profesionales que colaboran con este departamento provienen de diferentes secciones, a pesar de que el equipo interno principal está formado por 12 personas cuyo reparto de puestos se concreta en la siguiente Tabla 1.

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Tabla 1. Reparto de puestos en el VRT NWSlab.

Puesto	Función
Redactor jefe	Apoya la iniciativa. Es importante para que los periodistas implicados reciban el mandato y el tiempo necesario para trabajar en ella.
Coordinador de NWSlab VRT Innovation	Punto único de contacto para todas las iniciativas de noticias del departamento de innovación.
Jefe del departamento de DDT (datos, desinformación, tecnología)	Responsable de los desarrollos y procedimientos tecnológicos del laboratorio. Coordina a los periodistas del departamento DDT.
Periodistas Departamento DDT	Aplican los desarrollos y prototipos para probar su funcionamiento sobre los procesos informativos.
Investigación de usuarios VRT Innovation	Participa en proyectos de I+D relacionados con las noticias. Traduce las ideas de los usuarios del laboratorio de noticias en el proyecto y hace que los desarrollos dentro de estos proyectos sean tangibles para comunicarse con los periodistas y otras partes interesadas en VRT.
Desarrollo VRT Innovation	Crea prototipos para hacer tangibles los desarrollos dentro de estos proyectos con el fin de recoger opiniones y comunicar.

Fuente: elaboración propia.

El eje principal de la metodología de trabajo seguida en el VRT NWSlab consiste en reuniones semanales para discutir todos los proyectos en curso. El primero de los temas abordados tiene relación con las actualizaciones editoriales, a las que dan prioridad sobre el resto de cuestiones. De esta forma, los investigadores de usuarios pueden conocer mejor los flujos de trabajo actuales para tenerlos en cuenta en su actividad.

Acto seguido, en estos encuentros se ofrece información actualizada sobre los proyectos innovadores en curso, y se comparten consejos y trucos que han detectado a partir del análisis de resultados de la semana anterior, como por ejemplo nuevas herramientas, temáticas de interés o puntos débiles que se pueden reencaminar. Chajá Libot explica que también aprovechan estos momentos para compartir conocimientos entre secciones e invitar a ponentes externos que ofrezcan nuevos puntos de vista y asistencia a los profesionales de la corporación.

> (Chaja Libot, investigadora de usuarios en VRT): «Trabajamos juntos *ad hoc* en proyectos. Formamos un equipo de personas relevantes. A veces, los periodistas sólo son necesarios para dar su opinión. En algunos proyectos nos dividimos las tareas para crear algo juntos».

La lucha contra la desinformación copa la mayor parte de los esfuerzos de la VRT desde su condición de emisora pública, ya que entienden que deben actuar e investigar de forma permanente sobre posibles soluciones contra la intoxicación informativa y las mentiras. Un ejemplo de ello es su iniciativa 'Checkbox', una «caja de herramientas curada por expertos en desinformación», los *fact-checkers* de VRT, que pretende hacer accesibles y comprensibles las herramientas de comprobación de hechos para todos los periodistas de la redacción. Sus otros dos pilares se centran en los medios sintéticos basados en IA y en el desarrollo de nuevos formatos.

Están investigando en la corporación belga sobre cómo mejorar el flujo de trabajo de los periodistas con herramientas automatizadas asistidas por inteligencia artificial. Explica Chajá Libot que, para el sector de los medios de comunicación, la rápida evolución del entorno informativo digital es un auténtico reto, por lo que los periodistas se encuentran sometidos a una gran presión de tiempo y plazos de aprendizaje, actualización y ejecución, además de tener que «crear historias fiables en formatos cada vez más diferentes para poder responder a los hábitos del usuario de los medios».

En esta dirección crearon un prototipo llamado 'Video Butler', una herramienta que basándose en la historia narrada puede sugerir imágenes o vídeos de archivo para compilar automáticamente nuevos vídeos cortos, por lo que a partir del etiquetado del contenido mezcla una tarea de interpretación y de producción de nuevas piezas.

En definitiva, la colaboración que se originó en el NWSlab de la VRT es valorada por los integrantes del departamento como una iniciativa altamente positiva para optimizar la calidad de los contenidos informativos de la corporación, lo que además fructificó en la redacción de propuestas de proyectos

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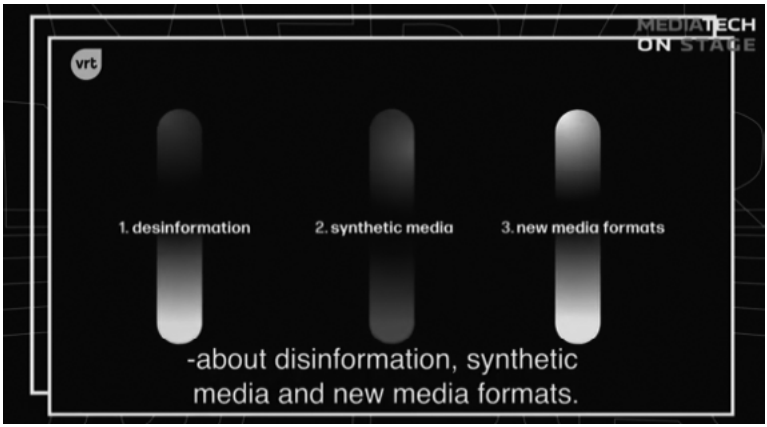
Imagen 2. Prioridades de trabajo en el NWSlab de VRT.



Fuente: VRT.

relevantes basadas en opiniones reales de los usuarios; en una comunicación clara y rápida entre investigadores y periodistas; en la utilización de los conocimientos técnicos del equipo de innovación para crear, por ejemplo, historias basadas en datos; y en un intercambio y puesta en común permanente de conocimientos.

Será de interés efectuar un seguimiento en los próximos años de la evolución de este departamento y concretar si se mantiene su estructura, si aumentan sus dimensiones, o si sus límites terminan por difuminarse, tomando los propios periodistas el control de las tareas innovadoras, de testeo de nuevas herramientas y de investigación de usuarios para cristalizar nuevas ideas y formatos.

BBC News Lab: innovación compartida desde la British Broadcasting Corporation

El laboratorio de innovación de la BBC es un departamento con más de 10 años de actividad en el seno de la corporación, con enfoque abierto, y que ya ha hecho públicos en su pági-

ISBN: 978-84-17600-96-9
Innovar en innovación televisiva. Análisis de casos de éxito en los medios públicos europeos
Colección: Periodística, 107

Imagen 3. Interfaz de la página de inicio del BBC News Lab.

Fuente: BBC

na web 80 proyectos de innovación de los que ha compartido además el código de desarrollo de alguno de ellos para su testeo y mejora por parte de actores externos a la organización.

La actividad del BBC News Lab en la red se puede resumir en tres puntos principales: los proyectos a través de los que exploran cómo las nuevas herramientas y formatos afectan a la forma en que se encuentran y se informan las noticias; la sección de noticias en la que comparten información sobre sus últimos proyectos y rutinas de trabajo; y su sección de 'involucración' de agentes externos, a través de la que anuncian y promocionan los eventos que realizan y promueven conexiones con la industria en general.

Éste empezó como un pequeño e informal experimento en 2012. La principal motivación del equipo era el razonamiento de que podrían innovar y aplicar la innovación más rápido si integraban este departamento interfuncional, en el que trabajan tanto periodistas como ingenieros, lo que significa que pueden actuar directamente sobre las rutinas de trabajo de las redacciones y ser capaces de ser más precisos y prácticos sobre qué crean y cómo lo crean.

Son 17 los profesionales vinculados en exclusiva al laboratorio, ente los que destacan tanto perfiles periodísticos, enfocados a entornos digitales, como expertos en ingeniería informática. En este sentido, tienen diferentes responsables que se encargan de supervisar la línea editorial o el apartado de desarrollos e ingeniería. En la página web del lab, en el directorio de equipo

https://doi.org/10.52495/c5.emcs.21.p107

de trabajo, es posible contabilizar los siguientes puestos, representados en la Tabla 2:

Tabla 2. Distribución de puestos de trabajo en el BBC News Lab.

Distribución de puestos de trabajo en el BBC News Lab	1 director ejecutivo de producto
	5 ingenieros de programación superior
	2 productoras sénior de investigación y desarrollo
	1 ingeniero superior de sistemas
	4 Ingenieros de software
	1 ingeniero de software graduado
	1 ingeniero de software júnior
	1 editor de noticias
	1 periodista

Fuente: elaboración propia.

Trabajan en este lab con un círculo de creación de proyectos a partir del que los miembros de los equipos proponen ideas que provienen de diferentes orígenes. Algunas de ellas parten de los propios responsables del laboratorio, cuando identifican determinadas necesidades o posibilidades, las que detectan de diferentes formas, cuando buscan un *engagement* estratégico, por ejemplo, o cuando hacen *engagement* con las comunidades tecnológicas.

Los objetivos del laboratorio de la BBC están alineados con sus objetivos estratégicos centrales, siendo el principal de ellos el acelerar la innovación en las redacciones y el aplicar la tecnología en sus espacios PSM. Añade Marcus que lo que realmente les gusta en el lab es desarrollar la innovación relacionada con el impacto sobre la audiencia y el impacto sobre el periodismo, ejecutar investigaciones sobre el comportamiento de los usuarios y pensar y reflexionar sobre los requisitos periodísticos. De esta forma valoran simultáneamente las necesidades periodísticas y las de la audiencia, para crear así productos que tengan en cuenta ambas vertientes.

La enorme dimensión de la BBC hace que sus desarrollos innovadores no sólo se centren en un soporte o tecnología determinada, ya que son un medio «con presencia en todos los espacios, radio, tele y online, y con estaciones en muchos países», en los que hablan de sociedad, economía, deportes y muchas otras temáticas en 42 lenguas, por lo que no sólo piensan en recomendaciones o automatización, sino en cómo la aplicación de la innovación estratégica o tecnológica puede marcar realmente una diferencia significativa. Intentan entender desde el lab en todo momento el contexto de la BBC «para evolucionar, ser más inclusivos, permitir la participación de la audiencia, ser más dinámicos y experimentar con nuevos y llamativos formatos».

Como resultados generales, sintetizan desde la corporación que es complejo implementar las ideas, tanto en los procesos de innovación interna como externa, ya que lleva mucho tiempo completar los procedimientos, y cada vez disponen de un margen menor para obtener avances. Miranda Marcus relata dos valoraciones, una que proviene de una perspectiva tecnológica, de no desarrollar prototipos aislados, sino proyectos que realmente interactúen con la producción, testeo y distribución a las audiencias, de manera que no sean iniciativas aisladas, sino que se interconecten y sean capaces de entender el impacto sobre los usuarios.

La otra idea es que trabajen y desarrollen prototipos relacionados con el ecosistema que les rodea, crear herramientas para los periodistas que realmente estén relacionadas con su día a día y que sean necesarias para ellos. Desde el BBC News Lab han hecho públicos hasta diciembre de 2022 un total de 80 proyectos que clasifican en 6 diferentes categorías. Algunos de ellos se enmarcan en más de una tipología por la coincidencia de sus características con más de un clasificador. Asimismo, etiquetan cada iniciativa en función de su estado de desarrollo, donde distinguen entre proyectos 'activos', todavía en desarrollo; proyectos 'terminados'; y proyectos 'en uso' que ya han incorporado a sus rutinas y estructuras. Las tipologías de proyectos trabajados en este laboratorio de innovación se enumeran y describen en la siguiente Tabla 3:

https://doi.org/10.52495/c5.emcs.21.p107

Tabla 3. Tipologías de proyectos del BBC News LAB.

Tipología	Nº	Descripción
Periodismo conversacional	3	Exploración sobre cómo entregar noticias a través de conversaciones en chat y voz.
Mejora de flujos de trabajo	37	Aplicaciones destinadas a simplificar y a acompañar a los periodistas en su día a día.
Plurilingüe	13	Asistencia a las personas que elaboran o consumen noticias en más de un idioma.
Nuevas experiencias de audiencia	23	Nuevas formas de encontrar y experimentar las noticias.
Dictado a texto	7	Transcripción asistida por máquina y todos los beneficios que se derivan de eso.
Periodismo estructurado	16	Uso de contenido modular y metadatos para ofrecer un mejor periodismo.

Fuente: elaboración propia.

Como organización financiada con fondos públicos, es una prioridad para la BBC la participación de agentes externos con su laboratorio de innovación, para lo que involucran a personas ajenas a su estructura siempre que es posible, abriendo parte del código de los proyectos y organizando eventos y *hacks* destinados a encontrar respuestas a los problemas generales de la industria. La British Broadcasting Corporation ha hecho públicos cuatro eventos desde 2019, cuya temática es dispar, siendo éstas 'periodismo modular', 'storytelling con voz', 'herramientas para salas de redacción multilingües', o 'herramientas para el periodismo de investigación'. La descripción de estos encuentros se detalla en la siguiente Tabla 4:

ISBN: 978-84-17600-96-9
Innovar en innovación televisiva. Análisis de casos de éxito en los medios públicos europeos
Colección: Periodística, 107

Tabla 4. Eventos desarrollados por el BBC News Lab.

Nombre del evento	Fecha	Temática y descripción
#newsHACK: periodismo modular	24/03/20	«Contenido modular, periodismo estructurado, noticias atomizadas, medios basados en objetos: tiene muchos nombres. Se trata de usar 'módulos' de contenido de noticias para permitir la reconstrucción dinámica de experiencias de noticias, personalizadas para diferentes audiencias en diferentes circunstancias».
#newsHACK: Storytelling con voz	14/11/19	«Nueve equipos se reunieron en Level39 en Canary Wharf de Londres para un NewsHack de dos días sobre el tema de la narración con voz. Exploraron nuevas ideas que podrían ser habilitadas por las últimas innovaciones en este espacio».
#newsHACK: herramientas para salas de redacción multilingües	11/06/19	«En todo el mundo hay docenas de salas de redacción que funcionan en varios idiomas. ¿Cómo pueden las máquinas liberar a los periodistas para que se concentren en el periodismo en sí?».
#newsHACK: Herramientas para el Periodismo de Investigación	26/03/19	«En marzo de 2019, BBC News Labs y Connected Studio reunieron a más de 60 profesionales de los campos del desarrollo tecnológico y el periodismo para este #newsHACK sobre herramientas para ayudar a los periodistas de investigación. Para inspirar e informar a los asistentes el primer día comenzó con una serie de charlas de expertos en periodismo de investigación».

Fuente: elaboración propia.

Ideas fundamentales

Los laboratorios de innovación integrados en las estructuras de la BBC y VRT parten de enfoques y planteamientos radicalmente diferentes. Mientras que el lab de la British Broadcasting Corporation se orienta a desarrollos más sofisticados tecnológicamente y con la intención de asentarse como un repositorio de herramientas y conocimiento compartido para el conjunto de la industria, este departamento en la VRT tiene como propósito el aproximar internamente a sus periodistas a una filosofía y práctica innovadora, así como formar a estos profesionales en materias incipientes relacionadas con su actividad diaria.

https://doi.org/10.52495/c5.emcs.21.p107

La dimensión de los departamentos es similar, con 17 profesionales 100% vinculados en el caso de la BBC, y 12 en el de la VRT, a lo que se suma la colaboración de compañeros de otras secciones en ambas estructuras. Aun así, los perfiles profesionales que integran el BBC News Lab tienen una mayor inclinación hacia el desarrollo de software, lo que se contrapone al componente investigador y periodístico del personal del VRT NWSlab.

En relación con la tipología de proyectos llevados a cabo por ambos laboratorios, en la BBC establecen una clasificación de seis categorías para los 80 proyectos publicados desde su nacimiento en 2012: periodismo conversacional, mejoras de flujos de trabajo, plurilingüe, nuevas experiencias de audiencia, dictado a texto y periodismo estructurado. Por parte de la VRT, explican que desde el inicio de su actividad en noviembre de 2021 se han centrado principalmente en la lucha contra la desinformación, en el desarrollo de nuevos formatos y de soluciones asistidas por inteligencia artificial para optimizar los flujos de trabajo internos.

Las rutinas de trabajo identificadas en ambos departamentos son similares, con la puesta en marcha de ideas que provienen tanto de trabajadores como de directivos una vez localizan necesidades u oportunidades en la industria de medios, con jornadas internas de puesta en común y debate, y con la principal diferencia de que la incidencia del lab de la VRT se limita a la estructura de la corporación, mientras que el trabajo del BBC News Lab inicia una segunda fase fundamental de difusión y transferencia una vez concluyen con el prototipado de una idea.

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Colección: Periodística, 107

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CAPÍTULO 10:
ANEXOS

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Desde el Servicio de Publicaciones de la Universidad de Navarra expresamos nuestro consentimiento para que el artículo "**Building the future of European Public Service Media: innovation priorities, key points and optimization areas in PSM"**, con DOI https://doi.org/10.15581/003.37.3.107-123, publicado en ***Communication & Society* 37.3 (2024)**, cuya coautoría corresponde a César Fieiras Ceide, Martín Vaz Álvarez y Miguel Túñez López, sea utilizado por su autor principal

César Fieiras Ceide
DNI: 34282109B

como parte de su tesis doctoral, planteada como una tesis por compendio de publicaciones.

Y para que conste a los efectos oportunos, firmo la presente

en Pamplona, a 28 de junio de 2024

José Félix Villanueva

Director del Servicio de Publicaciones

Profesional de la información

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Mediante este escrito expresamos nuestro consentimiento a que el artículo **"Estrategias de inteligencia artificial en las radiotelevisiones públicas europeas: usos, previsiones y retos futuros"**, con DOI: https://doi.org/10.3145/epi.2022.sep.18, sea utilizado por su autor principal, César Fieiras-Ceide, con DNI: 34282109B, como parte de su tesis doctoral, planteada como una tesis por compendio de publicaciones.

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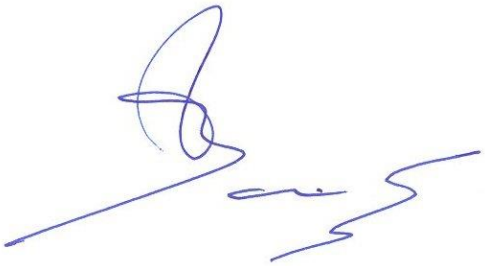

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Fieiras-Ceide, C., Crespo-Pereira, V., & Túñez-López, M. (2024). Innovación y metaverso: primeras experiencias y casos de uso en los medios públicos de Europa [Innovation and metaverse: first experiences and use cases in European Public Service Media]. *Revista Mediterránea de Comunicación/Mediterranean Journal of Communication*, 15(2), e26903. **https://www.doi.org/10.14198/MEDCOM.26903**

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Fieiras-Ceide, C., Ufarte-Ruiz, M.J (2023). Tendencias y previsiones de innovación en la realización audiovisual y retransmisión de eventos deportivos: optimización de la experiencia de usuario en DAZN y Movistar Plus+. IC – Revista Científica de Información y Comunicación (20), pp. 253-274. ISSN: 2173-1071. https://dx.doi.org/10.12795/IC.2023.I20.11,

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Tirant lo Blanch 2023. ISBN: 9788419825261

Título del capítulo: Sistemas adaptativos basados en inteligencia artificial como nuevas soluciones personalizadas de tecnología educativa. págs. 253-271

Autores: Cesar Fieiras Ceide y José Miguel Túñez López

DOI: https://doi.org/10.36151/TLB 9788419825261

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Título del capítulo: Cocreación en el universo e-sport: estrategia de la RTP para captar a público joven

Autor: Cesar Fieiras Ceide

DOI: https://doi.org/10.36151/TLB 9788419226730

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Fieiras Ceide, C.; Martínez Solana, Y. (2023): «Cómo acelerar un periodismo de vanguardia: laboratorios de innovación en las noticias de BBC y VRT». En Fieiras Ceide, C.; Túñez López, J.M.; Rodríguez Castro, M. (eds.), *Innovar en innovación televisiva. Análisis de casos de éxito en los medios públicos europeos*. Salamanca: Comunicación Social Ediciones y Publicaciones. ISBN: 978-84-17600-96-9

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Nesta tese de doutoramento analízase o estado da intelixencia artificial nos medios de comunicación públicos e privados, cunha mirada particular sobre as dinámicas de implementación desta tecnoloxía, os profesionais e departamentos implicados, os usos específicos, así como as repercusións e efectos xerais que está a ter sobre a profesión, sobre as redaccións e sobre o perfil do xornalista, matizando as previsións de crecemento e os retos de futuro que se albiscan con respecto a esta tecnoloxía. O segundo prisma que se estuda de forma transversal neste proxecto é o concepto de innovación e as áreas e tecnoloxías prioritarias sobre as que estes axentes focalizan os seus esforzos para construír a súa versión futura.