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From Frequency to Algorithm: Current Implementation of AI in Spanish radio stations

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ABSTRACT

Introduction: The Spanish radio sector is entering a process of strategic reconfiguration in which artificial intelligence is beginning to redefine how its content is produced, distributed and consumed, breaking down traditional boundaries and shaping radio as a more dynamic, interactive and participatory medium. This study analyses in detail the AI implementation strategies of the six large media groups that manage the 10 most listened-to radio stations in Spain (Prisa Radio; Ábside Media; Atresmedia Radio; KissMedia; RNE and Radiocat). **Methodology:** Through in-depth interviews with innovation, technology, digital and strategy managers, we explore current applications, organisational dynamics, the professional profiles involved, the barriers identified and future prospects. **Results:** The results show an uneven integration of AI at two speeds: on the one hand, significant advances in content personalisation, workflow optimisation, verification, diversification of business

models and experimentation with synthetic voices are identified, while broadcasters are still in the initial stages, focused on the use of basic automation tools for content management and transcription of broadcasts. **Discussion:** The main barriers detected point to the lack of economic resources, cultural resistance and the scarcity of specialised profiles, although the first internal ethical regulations aimed at guaranteeing a transparent and responsible use of these technologies are already being outlined. **Conclusions:** The industry agrees on the potential of AI to transform radio through personalised experiences, immersive narratives and more efficient processes.

Keywords: artificial intelligence; innovation; radio; algorithms; automation; journalism.

1. INTRODUCTION

Radio, a medium traditionally associated with immediacy and emotional connection, faces the challenge of adapting to an era of technological change. In this context, Artificial Intelligence (AI) is emerging as a key tool capable of redefining both the internal processes of broadcasters and their relationship with their audiences. While other sectors, such as television or the press, have adopted AI technologies more quickly (Fieiras et al., 2024), Spanish radio is now starting to explore its possibilities, balancing innovation with its deeply rooted editorial values.

This article analyzes how the main radio groups in Spain are integrating AI into their operational and commercial strategies. Through in-depth interviews with innovation, technology, digital and strategy managers, it provides a detailed overview of current applications, organizational challenges and future predictions in a sector in transition. The adoption of AI is not only an opportunity to streamline processes and personalize content, but also raises fundamental questions about ethics, sustainability, and the impact on media professionals.

Similar studies examining the impact of AI on the main radio channels in Spain have not been found in the academic literature. However, some recent research has begun to address this issue in different contexts. Wei et al. (2022) analyze the opportunities and challenges of AI in Chinese broadcasting, highlighting its role in automating content and reconfiguring radio production models.

The concept of the Fourth Industrial Revolution (Schwab, 2016) is a historical process that the media is entering through Artificial Intelligence, Big Data, the evolution of computing, robotics, automation, the permanent collection of information, data processing and blockchain (Carlson, 2015). The challenge of managing the abundance of data in the so-called 4.0 Revolution has been handed over to machines (Gonçalvez et al., 2024) in processes that are accelerating in all sectors of society due to the participation of algorithms, AI and Big Data (Kusters et al., 2020).

Artificial intelligence is positioned as the great challenge for the next decade, which is why the European Commission, in the AI 2020 White Paper, has urged Member States to adapt their national plans. In the field of journalism, it makes possible to replace the tasks of information professionals through the use of algorithms in what has been called “artificial journalism” (Túñez-López et al., 2019), “automated journalism” (Carlson, 2015) and “algorithm journalism” (Diakopoulos, 2019), which will force the media to adopt a philosophy of constant change and renewal of ideas and ways of thinking (Fieiras Ceide et al., 2023).

The convergence between this human innovation of ideas and Artificial Intelligence has led to the use of the concept of Hybrid Intelligence (HI) (Sheikh et al., 2023) to refer to the use of algorithms that increasingly mimic the way a human brain behaves and reacts (Túñez-López et al., 2021), to combine the automation of routine tasks with the personalization of user experiences, and to improve the efficiency and effectiveness of communication and information (López-García, 2024).

All these names would serve to point out that technologies streamline processes and solve complex problems in journalism (Bismal & Kulkarni, 2024), for selection, recommendation and decision-making. However, at the level of corporate governance, it leaves two possible strategies for media companies: large conglomerates with their own technological solutions and the rest of the media groups that opt for external solutions to exist on the platforms, albeit with excessive dependence (Canavilhas & García-Orosa, 2024).

Content production is the most prominent area of application of AI in journalism today, from news selection to distribution and activation of business model (García-Orosa et al., 2023; Diakopoulos, 2019). In this sense, generative AI will help improve the efficiency of creation, personalization without human mediation (Risi & Pronzato, 2022), data analysis and task automation (Harb & Qabajeh, 2024; de Lara et al., 2022).

On a practical level, a study by the Reuters Institute has shown that 67 percent of newsrooms use AI in some way to summarize, transcribe or recognize images (Newman, 2023). On the horizon, big data is emerging as one of the most important digital tools of the next decade, as it will provide audiences with appropriate content based on their preferences and geolocation and consequently manage the exploitation of advertising (Fernández-Lombao & Campos-Freire, 2024). Content recommendation is also being considered in the European Broadcasting Union's Peach project, especially among young audiences.

Technological acceleration leads to changes in workflows, updates in professional profiles, the birth of new tasks and professions and the disappearance of others. All this is the germ of a climate of insecurity and uncertainty in the profession, with templates that are afraid of being replaced by machines (Wölker & Powell, 2021; Sánchez-García et al., 2023). This process has even given rise to the concept of the ex-journalist (Tejedor & Vila, 2022), understood as a person with knowledge of digital technologies and AI. This concept includes journalists with a high technical specialization in software and algorithmic programming, but also the profile of AI editor or AI strategist (Ufarte et al., 2024). These are profiles that work in multidisciplinary teams of journalists and engineers. However, the proliferation of offers for digital positions is not currently to the detriment of traditional ones since the former are mainly related to data engineering, cybersecurity, big data, cloud and in isolated cases with AI tasks (Fieiras-Ceide et al., 2023).

Automated news writing has not become widespread, although there are numerous examples of content development with AI for weather, sports or stock market information (Canavilhas, 2023), while the use of software for tasks such as transcribing interviews, translating content and analyzing the emotions of audiences is already considered popularized are being automated by dozens of media (Beckett & Yaseen, 2023) to accelerate flows (Newman et al., 2023), although without the existence of responsible rules (Helberger et al., 2022).

According to the WAN-IFRA survey of the World Association of News Publishers for 2023, the uses of AI in media newsrooms are focused on the following tasks: text creation (54%), research and information search (44%), workflow efficiency (43%), proofreading (43%), content curation (32%), topic ideation (32%), translation (32%) and personalization and interaction (19%) (Henriksson, 2023).

The Google News Initiative (2024) launched the first AI Launchpad program between February and July 2024 with the participation of eight publishing companies from eight countries based on three questions: Why experiment with AI? Is it better to build or purchase AI technology? and How to integrate AI into business beyond proof of concept? This is not a project aimed at radios, but the results have led to the generation of audio with AI for podcasts about the news of the day, such as those made by the newspaper El País, as well as algorithms for recommendation and audience monetization.

In addition to essays in the field of production, AI is emerging as a tool for the distribution and audience niche recruitment. According to the study Getting audio & podcasting on the media plan: A guide for mutual success

(IAB Media Center, 2024), OMG and Annalect have developed a methodology to measure the impact of audio and podcasting in omnichannel campaigns that will be useful to publisher houses and advertisers. Horizon Media and ArtsAI have been working in the same direction, with a project that incorporates streaming and podcast data to evaluate KPIs. These are interesting initiatives given the lack of approved standards for digital audio measurements and the attempt to bridge the gap between consumption and investment levels.

As a concrete reference to the headlines, the compilation of the most outstanding initiatives in the different fields of journalistic work in 2024 presented by Cano-Orón and López-Meri is significant: The United States and the United Kingdom are advancing in the automation of meteorology, sports and political news in media such as The Associated Press, The New York Times, The Washington Post, Los Angeles Times, BigTenNetwork, Forbes, GameChanger, Hoodline (San Francisco), ProPublica, Yahoo, Reuters, BBC, Hereford Times, MeteoGroup and The Derby Telegraph.

The PBS Public Television of the United States reported in the last quarter of 2024 on the uses that its newsrooms are giving to Artificial Intelligence. The list of tasks includes recommendation engines, cloud automations, PBS Kids research, headline and email writing, metadata extraction and creation, support chatbots, image tag generation, quiz generators, face swapping technology, search improvements, C2PA, personalization automation and cybersecurity.

In the European Union, they are experiencing Der Spiegel, Finanzen100.de, Fupa.net and Goekick.com in Germany, Le Monde, AFP and France TV in France and Lusa in Portugal. In Spain, news automation is a reality in Vocento's infoPlayas and infoEsquí services, as well as in the public media RTVE and CCMA for politics and elections and in digital media such as Sport Mundo Deportivo, 20Minutos, El Periódico, El Confidencial, El Español and the EFE Agency for politics and sports (Cano-Orón and López-Meri, 2024).

Le Monde is also expanding its innovation to the audio field, as do El País in Spain, The New York Times, The Washington Post, The Wall Street Journal, Bloomberg in the United States, Tortoise Media in Canada, The Economist and the BBC in the United Kingdom and The Japan Times in Japan, among others. The method consists of reconstructing the articles using synthetic voices, fed and designed by four actors, using software from the technology company Microsoft. The media reported after the summer of 2024 that the process had been perfected to the point that audios were no longer reviewed or edited.

1.1. Artificial Intelligence and radio

AI is also advancing in such human fields as the voice, which carries associated neurological, emotional and even legal values. It is already a reality that AI can clone human voices in natural and conversational contexts (Frąckiewicz, 2023). This type of progress is giving rise to synthetic media, that is, those without journalists or technicians (Mayoral et al., 2024; Ufarte-Ruiz et al., 2023).

In addition to voices, in linear radio, the use of AI affects tasks such as scripting, selecting songs and sound effects, creating playlists, programming programs and advertising, and archiving and documenting audio content. The objective is to save time from repetitive tasks so that human resources can perform other value-added tasks and reduce costs by automating mechanical work. The same happens in stations specialized in musical content, which already have the possibility of having artificial DJs who select songs based on the aesthetics of the station (Kuyucu, 2020).

The possibility of using algorithms in all phases of production and journalistic, management and broadcasting routines puts on the table the ethical debate on the combination of human and artificial resources (Pocino, 2022) while these technologies do not have the capacity for interpretation and creativity and do not know the ethical norms or deontological codes of the profession (Gonçalvez et al., 2024). Another challenge will be the

dissemination of audio deepfakes created by manipulations with high doses of realism (Souza and Santaella, 2021).

Artificial intelligence is presenting the opportunity to automate the production of content in its audio version through intelligent software. At the other extreme, it is being used to do the reverse path, that is, to create systems for detecting identity theft, synthetic voice recognition or deepfakes, as well as new neural models for synthetic speech recognition (Cano-Orón & López-Meri, 2024; Conti et al., 2022; Gerhardt & Aichcroft, 2023; Jung et al., 2022; Tak et al., 2021).

The most recent milestone has been marked by the American company Futuri, which in February 2024 launched the world's first radio station without human intervention, whose music, news and other content programming is automatically generated from the large OpenAI language models. RadioGPT uses synthetic announcers who can change accents or clone voices and AI DJs who select songs and artists and provide relevant information in each case.

In the Spanish context, the first radio entirely generated by artificial intelligence was also launched in April 2024. Intar Radio has three virtual announcers called Ada, Itai and Romy, who present the contents selected by an AI - news, music and sports -, which also analyzes listening statistics in real time to adjust the program to each listener. The contents are a combination of general magazines, news and music.

Prior to the launch of an AI-powered radio station, other Spanish initiatives were limited to radio programs presented by synthetic characters created with artificial intelligence. The first experiment was the communicator Hiperia, from RTVE's Radio 3 of, whose appearance is that of a human of the Zeta generation who creates content on music and other cultural topics aimed at young audiences, was a finalist in the International Broadcasting Convention 2023 Awards. A year later, RTVE chose AI to automate the segmentation of news for distribution on digital platforms and social media.

For its part, in 2022, Cadena Ser launched Victoria, a synthetic voice that intervenes in the sports program Carousel Deportivo, as well as in Alexa, Amazon's virtual assistant. In addition, in 2024, the Prisa Group launched Verificaudio, an AI-based tool that detects deep fakes and verifies the authenticity of audio. At the local level, in April 2024, Radio Serranía de Cuenca began broadcasting a radio program with two synthetic personalities, VIRTUdes casAL and VIctor baRTUAL, who present the news from the Lower Serranía.

Such experiments are popping up around the world, with examples such as the creation of a synthetic presenter on China's People's Daily and the AI named Basia, which has been answering questions from the public on Radio Piekary in Poland since July 2024. This station was quick to declare that no employee would be replaced by the AI. On the contrary, in October 2024, OFF Radio in the same country announced the dismissal of its journalists and their replacement by the virtual presenters Emi, Kuba, and Alex.

In Germany, the Bavarian State Center for New Media (BLM, for its acronym in German) has approved the first national radio station powered entirely by artificial intelligence, a project that the government believes will redefine the future of media. According to the BLM, Absolut Radio AI meets all the requirements of the state's media law, although the final approval from the licensing and regulatory commission is still pending.

However, advances in experimentation do not prevent negative feedback from audiences to what they perceive as speakers with a lack of empathy or human attitude. In this sense, Furtáková and Janáčková (2023) presented a study that compiles radio initiatives around the world with synthetic announcers who did not connect with the audience, such as the station Couleur 3 in Switzerland, the presenter Eva of European Radio 2 in Slovakia, or the case of Hacsiko, the first virtual announcer in the Czech Republic, of Rádio Express FM, whose voice was cloned from the presenter of the morning show of the same station.

In addition, in line with the barriers to the use of AI, tools for content generation, data analysis, and idea generation, such as GPT in its various versions, can pose significant risks of inaccuracy and lack of empathy (Gutiérrez-Caneda et al., 2023).

Although the profession and academia advocate that journalists continue to control all stages of news production (Milosavljević & Vobič, 2019), it is true that the motivations of economic profitability push companies to invest in AI technological projects and reorganize their human staffs to achieve higher productivity ratios. However, the implementation of AI requires financial efforts, time and professional availability (Rinehart & Rung, 2022).

The need for legislation is evident in the practice of the profession and in the management of the journalistic companies of the future. A group of Canadian media, including CBC/Radio-Canada, filed a lawsuit against OpenIA in November 2024 to defend the content created by their employees. In the lawsuit, they argue that their content is verified, source-based, reliable, and subject to copyright protection, and that while they welcome technological innovations, they should not violate intellectual property or capitalize on the work of the media without requesting the permission of the owning companies.

In the chapter on self-regulation, Reporters Without Borders and sixteen partner organizations published the Paris Charter on Artificial Intelligence and Journalism at the Paris Peace Forum (2023), which sets out the following principles: ethics should govern technological choices within the media; human action should remain central to editorial decisions; the media should help society to distinguish with confidence between authentic and synthetic content; and the media must participate in the global governance of AI and defend the viability of journalism when negotiating with technology companies.

Similarly, the Poynter Institute's Onpoint report (2024) alludes to the responsible use of AI to reduce bias, with the goal of: 1) amplifying news content with Claude and Lede AI tools; 2) data journalism, with Google Pinpoint and Datasette; 3) deepening reporting, with Otter AI and Trint; 4) reaching underserved audiences, with Heygen and ETX Studio; 5) fact-checking, with Full Fact AI and Hive; 6) encouraging audience engagement, with Hugging Face and ChatGPT Plus; 7) automating, with Copilot's Github and Amazon Codewhisperer; 8) and visualizing data, with Adobe Firefly and Tableau.

In Spain, RTVE was the first media outlet to create a regulation on the use of AI, published in September 2024, with the aim of ensuring that RTVE professionals and RTVE suppliers use AI solutions in a responsible, secure, transparent and reliable manner, so as to comply with the organization's values.

2. OBJECTIVES

This research seeks to find out the strategic position before artificial intelligence of the main radio stations in Spain through the identification of the actions developed by Prisa Radio; Ábside Media; Atresmedia Radio; KissMedia; RTVE and Radiocat, the groups that own and manage the 10 radio stations to which the Association for Media Research (AIMC, 2024) accredits the highest number of daily listeners: SER, COPE, LOS40, Onda Cero, Cadena 100, Dial, Kiss FM, RNE, Rac 1 and LOS40 Classic.

The objective is to identify the current uses, the organizational and implementation dynamics, the departments and professionals involved, the perceptions of management and staff on the irruption of this technology, the impact on current and demanded professional profiles, as well as future forecasts that will allow anticipating the evolutionary trend of this technology in the sector. To achieve this, the following objectives are proposed:

Objective 1: To analyze the state of implementation of AI in these groups, their interest in the technology, and the professionals or departments involved in its management or research.
Objective 2: To evaluate the impact of Artificial Intelligence in the current and required routines and professional profiles in these media, as well as to know their management's impressions about this technology.
Objective 3: To determine whether these media apply AI solutions in the documentation, production, editing, distribution, recommendation and/or content verification stages.
Objective 4: To determine the future projections that these companies envisage with regard to artificial intelligence.

3. METHODOLOGY

This research is a descriptive exploratory research with a blind hypothesis on a purposive sample, justified by the impact and audience data of the subjects to be studied. We have chosen to use qualitative methods and have relied on in-depth personal interviews, in the form of a Delphi and in two rounds, with the professionals in charge of digital, technology or strategy of the six groups that own the 10 radio stations with the highest number of daily listeners in Spain, according to the first wave of 2024 of the General Media Study (AIMC, 2024). The list of stations and their number of listeners is presented in Table 1.

Table 1. *List of the 10 radio stations with the highest number of listeners on a daily basis in Spain*

Radio station	Daily listeners	Type	Group
SER	4.293.000	Generalist	PRISA Radio
COPE	3.485.000	Generalist	Ábside Media
LOS40	3.163.000	Topic	PRISA Radio
Onda Cero	2.078.000	Generalist	Atresmedia Radio
Cadena 100	1.689.000	Topic	Ábside Media
Dial	1.533.000	Topic	PRISA Radio
Kiss FM	1.059.000	Topic	Kiss Media
RNE	955.000	Generalist	RTVE
Rac 1	869.000	Generalist	Radiocat
LOS40 Classic	851.000	Topic	PRISA Radio

Source: Own elaboration from AIMC, 1st wave, 2024.

The sample is composed of professionals with strategic roles in digital transformation, innovation and technological strategy within the six most listened to radio groups in Spain. Priority was given to the selection of management profiles with a transversal vision, responsible for making decisions on the current state of implementation of Artificial Intelligence, which allows them to offer an accurate diagnosis of its impact and future projections.

Although the organizational structure varies among the groups analyzed, all of the interviewees have a comprehensive understanding of the role of AI in their stations. At Prisa Radio and Ábside Media, AI is part of transversal strategies with internal teams specialized in content personalization and workflow automation. Atresmedia Radio manages AI through specific projects and external suppliers, without a specific team dedicated to this technology.

At RNE and Radiocat, its implementation is managed within the digital operations and technology departments, with a focus on operational efficiency and optimization of internal processes, while at Kiss Media, the adoption of AI is more incipient and no specific area or professional has been identified for its development, resulting in a more limited implementation compared to the other groups.

In Kiss Media, the adoption of AI is more incipient and no specific area or professional is identified for its development, resulting in a more limited implementation compared to the other groups.

Despite these differences, the interviewees offer a global and well-founded vision of artificial intelligence in Spanish radio. Their access to strategic information and their participation in technological planning guarantee a detailed analysis of the current uses, challenges and prospects of this technology in the sector. Table 2 below shows the list of interviewees, with their name, position and the company to which they belong:

Table 2. *Convenience intentional sample*

Abbreviation	Name	Position	Company
(AO/Prisa)	Ana Ormaechea	Chief Digital Officer (CDO) -Director Digital-	Prisa Radio
(JH/RNE)	Jose Luis Hernán	Technical Resources Deputy Director	RNE
(JM/AM)	Javier De Mora Navarro	Innovation and Digital Strategy Director (COPE, C100, Rock FM, Megastar, TRECE)	Ábside Media
(IG/Atresmedia)	Ignacio Rojo	Chief Digital Officer	Atresmedia Radio
(JB/Kiss)	Julián Garvín	General Coordinator for Radio Station	Kiss Media
(CM/ Radiocat)	Carles Miró	Head of Digital Operation	Radiocat

Source: Own elaboration.

Interviews is conducted via video call using Microsoft Teams, Skype, and Google Meet between June 15 and December 10, 2024, with an average duration of 35 minutes each. A semi-structured questionnaire of no more than 12 questions is used, covering strategic approaches to artificial intelligence, workers' perceptions of this technology, current uses and applications, as well as forecasts of progress and impact.

The questionnaire is structured around four thematic blocks: strategy and vision on AI, which explores the strategic objectives of each media group in relation to artificial intelligence, their level of interest in the technology and the opportunities and challenges it poses for the radio sector; current uses and applications, with questions aimed at finding out about the AI tools and systems implemented in broadcasters and their level of integration in operational and editorial processes; impact on organizational and professional dynamics, analyzing changes in workflows, the professional profiles involved in AI management and the training required for its effective adoption; and future perspectives and challenges, with questions aimed at understanding the expected evolution of AI in Spanish radio, its potential for content personalization, the new business models that may emerge and the related ethical and regulatory challenges.

In order to ensure the comparability of the data and to structure the findings, units of analysis are defined to classify the responses obtained according to key aspects. These units are defined on the basis of the main themes addressed in the interviews and are used as criteria for the elaboration of the tables in the results section. Specifically, three axes of analysis are proposed: implementation strategies, which focuses on how each media group incorporates AI into its internal routines and processes; professional profiles and AI management, where the impact of the technology on the organizational structure and staff training is explored; and future prospects and related challenges, focused on the development forecasts and limitations identified in the expansion of AI in the radio sector.

Each of these units is analyzed in specific categories, which allows the systematization of the data and the subsequent representation of the results in summary tables. In this way, the classification presented in the results follows a predefined structure that facilitates comparison between the different radio groups analyzed and ensures a rigorous interpretation of the trends observed.

The design of the questionnaire facilitates the adaption certain questions according to the media group interviewed, including specific contents that reflect the reality of each company. Its semi-structured nature guarantees flexibility in the answers, allowing participants to provide information based on their experience and knowledge of the sector.

To ensure the validity of the study, a methodological triangulation based on three complementary sources of information is applied. First, an exhaustive review of the scientific literature on artificial intelligence in the media and its impact on content production and distribution processes is carried out. Second, the digital content and strategies of the studied broadcasters are analyzed in order to identify patterns of AI implementation on their platforms. Finally, the data obtained from the interviews are contrasted with these analyses to provide a comprehensive view of the current situation and future prospects of AI in Spanish radio.

4. RESULTS

The implementation of artificial intelligence in the Spanish radio sector is at an early stage, characterized by uneven levels of progress among the main groups. Although some are already exploring and experimenting with automated technological tools, levels of massive or strategic integration that can be considered transformative have not yet been reached. Two of the six groups (Prisa Radio and Ábside Media) are developing initiatives aimed at scalability and progressive optimization, although their strategies are still limited and focused on specific tasks. On the other hand, Atresmedia Radio is in a phase of exploring the benefits of AI, RNE and Radiocat have taken their first steps with initial tests, and Kiss Media has stated that the implementation of AI is still limited.

In general, AI is used in Spanish radio to optimize operational processes, such as transcription automation and basic content customization, as well as to deepen simple tasks and enrich their output. These tools allow broadcasters to experiment with more efficient ways of producing and distributing content, especially on digital platforms. However, organizational, ethical, and budgetary challenges limit more ambitious adoption. Key challenges include cultural resistance to change, lack of specialized staff, and budget constraints, which particularly affect smaller groups and local broadcasters.

Table 3. *Summary table of the main AI functionalities in the analyzed media groups*

Group	Functionalities				
	Process optimization	**Content customization**	**Enrich results Change flows**	**Ethical challenges**	**Monetizing**
Prisa	•	•	•	•	•
Ábside	•	•	•	•	•
Atresmedia	•	-	•	-	•
RNE	•	-	-	-	-
Radio Cat	•	-	•	-	-
KissMedia	-	-	-	-	-

Source: Own elaboration.

Despite these limitations, the progress made by some groups is evidence of a growing interest in exploring the possibilities of AI. Prisa Radio has implemented innovative tools such as Verificaudio, designed to detect audio errors and combat misinformation, setting a unique standard in the sector. Similarly, Ábside Media is committed to the personalization of content through transversal flows that integrate its radio, television and digital divisions. These initiatives reflect not only a strategic approach, but also a vision of the future that seeks to implement AI as a complement to, rather than a substitute for, human skills.

The interest in AI is not limited to editorial content, but also extends to monetization and the creation of new experiences for listeners. In this regard, Atresmedia Radio has initiated projects such as an ad server that allows the monetization of content on external platforms such as Spotify, and experiments with creative tools such as Stable Diffusion, used to generate podcast covers. For its part, RNE is integrating basic systems such as speech-to-text and Dalet Galaxy, improving the efficiency of key operational tasks, although its progress is limited by structural and organizational barriers.

RadioCat, although at an early stage, has adopted a structured approach to the integration of artificial intelligence, combining advanced audio cleaning, transcription and editing tools with strategic projects such as the digitization of its historical archive. This group aims to optimize operational processes and explore new ways to connect with its Catalan audiences, adapting to their linguistic and cultural standards.

The outlook is optimistic, and executives from these groups envision a future in which AI plays a key role in personalization, creating immersive narratives, and optimizing workflows. This vision includes not only improving the listener experience, but also creating new business models based on technological innovation.

(AO/Prisa Radio): *"AI will allow us to get closer to our audiences, but the challenge is to do it in a way that respects the essence of the media, the quality and the values that characterize the company".*

The adoption of artificial intelligence (AI) by leading Spanish broadcasters has been accompanied by a growing focus on ethics and transparency, and further integration will depend on overcoming current barriers, establishing clear strategies and ensuring a balance between innovation, economic sustainability and professional ethics. In this regard, all the companies interviewed stress the importance of ensuring that the implementation of AI is not only efficient but also respects the core values of journalism and is aligned with the expectations of their audiences. This ethical commitment translates into initiatives that seek to balance technological innovation with the protection of fundamental rights, such as privacy and the veracity of information.

Among the groups analyzed, Ábside Media stands out for the development of a specific internal rule to regulate the use of AI in its operations. This regulation aims to ensure that the tools implemented comply with the organization's ethical standards and also establishes a clear framework for assessing their impact on the quality of content and newsroom workflows. The document includes criteria for transparency in the use of algorithms, ensuring that decisions made by automated systems are explainable and understandable to both professionals and audiences. It also provides for periodic review of technology tools to ensure that they remain aligned with the company's values and long-term strategic goals. These measures also make it possible to anticipate potential regulatory changes and adapt quickly to a dynamic environment.

In other companies, without mentioning specific initiatives such as Ábside Media's, ethics is also prioritized as a central axis in the integration of AI. Prisa Radio emphasizes the need to use AI in a way that strengthens the credibility of the content and guarantees its consistency with editorial values. RNE, for its part, emphasizes respect for the public service principles that characterize the broadcaster, ensuring that the technologies used do not compromise the social mission of the medium.

4.1. Strategies, uses and implementation flows of AI in Spanish radio

The radio groups that have made the most progress in integrating AI have prioritized projects that focus on solving critical operational needs or optimizing the quality of authored content. In general, broadcasters are adopting approaches that combine workflow improvement, content personalization, and the exploration of new creative and commercial tools. All of these projects start with centralized management by the digital (CDO), technology (CTO), or strategy professional of each group, and are then landed at the various stations, taking into account their specific needs.

Although still limited in scope, these initiatives reflect an effort to balance technological innovation with available skills and resources. In addition, the adoption of AI is enabling the automation of repetitive tasks such as transcribing and classifying content, improving operational efficiency, while in other areas it is being used to explore immersive storytelling and monetization opportunities on digital platforms. However, adoption

continues to face economic and cultural barriers, slowing the development of more comprehensive strategies in the sector.

Prisa Radio integrates Artificial Intelligence in several areas of its operations, with a focus on process optimization and content personalization, and with special attention to disruptive projects that lead innovation in the sector. Its Verificaudio tool guarantees the authenticity of audios and fights misinformation, while the synthetic voice Victoria, developed with AI, participates with prior notice in programs such as Carrusel Deportivo and offers real-time updates through devices such as Alexa. In addition, the broadcaster is exploring voice synthesis to personalize news bulletins, as well as workflow automation to streamline content production and distribution. It also uses advanced algorithms that analyze listener preferences to tailor content more precisely, strengthening its connection with its audiences and maintaining a constant commitment to editorial quality.

Ábside Media has structured the use of AI in several key areas of its daily operations, consolidating it as a central tool in its technology strategy. They are working in this group on data analytics, personalization, and cross-functional workflow optimization by automating internal processes such as audio editing, including cuts and quality adjustments, and file classification. These tools increase operational efficiency, reduce production time, and free up resources for creative and strategic tasks.

Also noteworthy in this group are the efforts to integrate AI among its radio, television and digital divisions, unifying formats and improving editorial coherence. This approach includes the development of multiplatform content adapted to different audiences and channels, while maintaining the values and identity of the stations that are part of Ábside Media.

Atresmedia Radio focuses the use of artificial intelligence on creative innovation and revenue diversification, exploring advanced tools to optimize both internal processes and commercial strategies. On the creative area, the integration of generative tools such as Stable Diffusion has made it possible to automate the creation of podcast covers, reducing production costs and streamlining graphic design. These applications reflect a focus on operational efficiency and the visual quality in their content.

On the commercial area, the development of an ad server represents a strategic commitment to monetize content on external platforms such as Spotify. This tool will not only allow a more precise segmentation of ads, but strengthen Atresmedia Radio's presence in the digital ecosystem, adapting to new forms of listener consumption.

RNE uses the Dalet Galaxy system as a central tool to streamline the production and management of its content. This software automates processes such as transcribing and classifying programs, facilitating access to historical archives and improving operational efficiency in the newsrooms. In addition, Dalet Galaxy centralizes workflows, allowing teams to manage the recording, editing and distribution of content from a single platform, adapting to the demands of an increasingly digital media environment.

RadioCat has begun to integrate artificial intelligence with a focus on process optimization and preservation of its sound heritage. It uses tools such as Auphonic to improve audio quality, Sonix for transcriptions and subtitling, and Capwing to create subtitled visual content in Catalan, optimizing production and strengthening its connection with local audiences. It is also developing a strategic project of digitization and metadatatization of its historical archive, positioning itself as a benchmark for technological innovation in Catalan radio, combining short-term practical solutions with a long-term strategic vision. Kiss Media, for its part, has not adopted any specific Artificial Intelligence strategies.

The decision to outsource or develop AI tools internally defines not only the technological strategy but also the operational autonomy of each group. While Prisa Radio and Ábside Media prioritize internal customization to ensure full control over the processes, the other groups generally opt for external collaborations for specific projects and the contracting of external licenses.

The landscape of AI strategies, uses, and implementation flows in Spanish radio reflects a sector in transition. While some groups have made significant progress in key areas such as content verification, personalization, and monetization, others still face barriers that limit their ability to adopt these technologies. As broadcasters overcome these challenges, AI is expected to play an increasingly important role in redefining the industry's operating and business models. Table 3 below details the main strategies, key applications, and tools being deployed by each radio group.

Table 4. *Implementation strategies, uses and tools of AI in Spanish radio groups.*

Group	Key strategies	Outstanding application	Used tools
Prisa Radio	Process optimization	Audio checking	Verificaudio
	Content customization	Synthetic voice in programming	Victoria (synthetic voice)
		Exploring newsletter customization	Preference algorithms
Ábside Media	Customization and optimization of cross flows	Customization of content distribution based on audience preferences	Customization algorithms and internal automation tools
		Automated audio editing	
		File classification	
Atresmedia	Creativity application	Automated covers	Stable Diffusion
	Revenue diversification	External monetization	AdServer
		Audience analysis	Advertising targeting algorithms
RNE	Basic automation and centralization of operational flows	Automated transcription	Speech-to-text, Dalet Galaxy
		Program classification	
		Integrated content management	
RadioCat	Process optimization	Automated audio cleaning	Auphonic
	Sound heritage preservation	Historical file metadata and digitization	Metadata tools
	Visual content development	Subtitling and clip creation	Sonix, Capwing
Kiss Media	Not specified	Not specified	Not specified

Source: Own elaboration.

4.2. Professional profiles, training and management of AI in newsrooms

Although artificial intelligence (AI) has not yet directly transformed the management of human resources or the organization of departments in Spanish radio stations, its progressive adoption suggests that in the future it could have a significant impact on the distribution of roles and the operational structure of broadcasters. For now, the effects of AI are concentrated in specific areas related to staff training, management of technological tools, and strategic planning for the incorporation of new professional profiles.

In today's newsrooms, the professional profiles that manage AI tend to be integrated into multipurpose teams or already existing technical departments, rather than being specialists dedicated exclusively to this technology. At Prisa Radio, the integration of tools is managed by a technology team in close collaboration with the

newsrooms, which ensures that the solutions are adapted to editorial needs without the need to create specialized structures.

*(**AO/Prisa Radio**): "The success of the technology depends on its ability to be integrated without changing the essence of the newsrooms, optimizing the remaining tasks that we have identified as consuming a lot of time in which we do not extra value".*

Ábside Media has chosen a structured model with a small team dedicated exclusively to AI projects. This committee, made up of specialists in analytics and data science, acts as a link between the technological partners and the operational areas and is led by Javier De Mora, the Group's Director of Innovation and CDO.

(JM/Abside Media): *"AI requires not only technical knowledge, but also a strategic vision that combines technology with the narrative of the medium. For this, we will increasingly need specialized talent".*

At Atresmedia Radio, there is less reliance on internal teams and AI initiatives are typically managed through specific projects led by multipurpose profiles or in collaboration with external vendors. This is reflected in the use of generative tools such as Stable Diffusion, which has allowed the automation of specific creative tasks such as podcast cover design. However, this strategy limits the development of in-house skills and reinforces a dependency on third parties for more complex projects.

RNE, on the other hand, takes a more basic approach to managing AI-related profiles, with limited use of tools such as speech-to-text and content management systems. These technologies are mainly managed by existing technical departments, with no significant change in the distribution of roles or responsibilities within the broadcaster.

Grupo Godó has an artificial intelligence manager who regularly brings together the technology managers of each of the company's divisions to evaluate common AI solutions. In the radio section, it is Carles Miró, in charge of digital operations, who participates in these meetings. Without profiles dedicated exclusively to this technology, RadioCat is committed to internal training, combining general and specific sessions in small groups, which has facilitated technological adoption and optimized repetitive tasks without affecting editorial processes. At Kiss Media, the technological and innovation leadership lies in the figure of a technology manager.

AI training is a key element in groups that have advanced in the integration of this technology, although its scope varies considerably. Prisa Radio leads in this field, offering internal programs that train its team in the use of the tools. These initiatives ensure that the different professionals can maximize the use of the technology and adapt it to the specific needs of the newsrooms.

***(AO/Prisa Radio):** "Training teams is not optional; it is an essential investment to remain competitive in the digital* environment".

In this sense, Ábside Media encourages self-directed training and promotes learning through external collaborations. This model allows employees to gradually acquire key skills, while the group continues to develop its internal capacity to manage AI projects. However, Ábside also faces cultural challenges related to the perception of AI as an occupational threat, which has led the group to prioritize digital skills training programs as part of a broader cultural change strategy.

Atresmedia Radio's commitment is to continuous training through seminars and master degree programs that are accessible to all employees. Although this strategy encourages self-directed learning, specialization in IA is still limited, which hinders the consolidation of strategic projects.

(NR/Atresmedia Radio): *"Our priority is to train the teams to adapt to the new tools, but there is still room for improvement in specialization; it will be a gradual process, but one that will eventually be consolidated".*

At RNE, training is limited to basic tools and operational processes, such as automated transcription. This lack of specific programs reflects the broadcaster's budgetary constraints, which prioritize operational efficiency over technological innovation.

In terms of prototype management, the decision to develop AI solutions internally or outsource them to external providers differs between the groups. Prisa Radio and Ábside Media tend to manage their AI projects internally, leveraging their technical capabilities to develop customized tools that align with their strategic objectives. This model allows greater control over the technologies and facilitates their integration into operational flows.

In contrast, Atresmedia RadioRNE, Radiocat are more dependent on external suppliers for specific projects, such as automated visual content generation or data management. This hybrid strategy is more affordable from an economic point of view but limits the development of internal skills and creates a long-term dependency. KissMedia does not specify the nature of its projects.

4.3. Forecast for the integration of AI in Spanish radio and related challenges

Artificial Intelligence is presented as a technology with high potential to transform radio in Spain, not only in operational terms, but also in the way it will connect with audiences and innovate business models. Despite initial advances and current applications, broadcasters agree that the integration of AI will follow a gradual path, conditioned by economic constraints, cultural barriers and the need for clear ethical frameworks.

Media groups anticipate a central role for AI in the extreme personalization of content. Prisa Radio and Ábside Media are leading this vision, projecting the use of advanced algorithms to tailor newsletters, programs and listening experiences to listeners' individual preferences. In particular, Prisa envisions that personalization will not only improve the consumer experience but also open up new opportunities to connect emotionally with the audiences.

(AO/Prisa Radio): *"Personalization will be key to build audience loyalty and differentiate in an increasingly competitive market where optimizing the user experience will be fundamental".*

Another prominent future use is the integration of immersive and interactive narratives, an area in which Ábside Media and Atresmedia Radio have shown interest. These narratives would combine audio formats, visuals, and even real-time interactions, creating new forms of storytelling. Javier De Mora, from Ábside, believes that AI will not only transform content, but also the way listeners interact with it, making the experiences more immersive and meaningful.

Ábside Media foresees that personalized virtual assistants will play a key role in the transformation of radio broadcasting. These technologies would make it possible to adapt broadcasts in real time to the individual preferences of listeners, offering a fully personalized experience. This approach would position radio as an interactive and relevant medium for new generations.

In terms of monetization, Atresmedia Radio believes that AI will be fundamental in optimizing ad insertion on digital platforms, allowing not only more precise segmentation, but also the creation of personalized ads that adapt to the listener's context. This approach reflects an evolution towards more dynamic business models adapted to the digital era.

Although the outlook is optimistic, broadcasters also identify several challenges that could limit the full integration of AI. One of the main challenges is the economic sustainability of these projects. RNE, for example, has pointed out that the lack of dedicated resources and budgetary constraints hinder the planning and implementation of advanced technologies, while Radiocat faces major challenges, such as improving the quality of Catalan in technological tools and defining clear strategies to balance the dependence on external providers and the development of internal solutions.

Another major challenge is cultural resistance to change, especially in the workplace. In RNE, unions have expressed concerns about the impact of AI on current jobs, which has slowed the adoption of certain technologies. This type of resistance is not only an internal challenge but also reflects a broader sectoral concern about the balance between innovation and labor sustainability.

In addition, media groups have pointed to the need to establish clear ethical frameworks for the use of AI, particularly in areas such as voice synthesis and content personalization. All the companies surveyed emphasize the importance of ensuring transparency in the use of these technologies to guarantee that they do not compromise the privacy or trust of audiences.

In the long term, broadcasters agree that AI will not only be an operational tool, but also a driver of strategic change that will transform radio as a medium. Among the main future trends is the integration of virtual assistants into the listening experience. The forecast is that voice assistants will be able to fully customize broadcasts, offering content that is tailored to the user's needs in real time.

Another trend is the evolution towards a fully automated production model, where AI manages not only the creation of content, but also its programming and distribution. This approach would allow broadcasters to operate more efficiently, especially in local markets where resources are more limited. However, the groups also warn that this automation must be complemented by a human approach that maintains the quality and creativity of the content.

Broadcasters see AI as an opportunity to expand their presence in the digital ecosystem. Atresmedia Radio and Prisa Radio highlight that the future of radio will be linked to its ability to integrate with streaming platforms, mobile apps and smart devices, using AI as a bridge to connect with younger and more technologically advanced audiences.

5. CONCLUSIONS

The integration of artificial intelligence in the Spanish radio industry is laying the foundations for a profound transformation of the sector, marking a turning point in its operating model and in the relationship with audiences. Although the technological implementation is still at an early stage, the results show a panorama that combines outstanding advances with structural barriers that hinder its full adoption. This study has made it possible to identify the strategies, applications and challenges related to AI in the main radio groups in Spain, offering a comprehensive view of the current panorama and prospects.

Advances in AI are concentrated in key areas such as content personalization and operational optimization. However, these developments have not yet been translated into significant transformations in organizational structure and human resource management, reflecting an implementation that is more focused on solving immediate needs than on establishing a comprehensive long-term strategy. In this context, broadcasters face the challenge of balancing technological innovation with economic sustainability and the preservation of the editorial values that define their traditional activity.

Implementation strategies vary widely among the groups analyzed. While Prisa Radio and Ábside Media lead the way with advanced initiatives in personalization, automation and predictive analytics, other groups such as

Atresmedia Radio focus on specific creativity and monetization projects, RNE on automation in content management, Radiocat on sound editing, audiovisual production and digitization of its archive. On the other hand, Kiss Media's implementation of AI is still limited. These differences underline the importance of internal resources and strategic vision as determining factors for the adoption of AI in the sector, and open as a future line of research the monitoring of the progress of AI strategies in relation to the initial positioning with respect to this technology, the available resources and the specific interests of each company (**O1**).

AI is starting to have an impact on radio work routines, but without leading to significant structural changes in human resource management. The most advanced groups have integrated tools that automate repetitive tasks and improve efficiency but have not required the creation of new specialized departments, although there are specific committees to evaluate possible solutions. These companies are committed to collaboration between technological profiles and publishers, with internal training programs designed to maximize the potential of the tools adopted. However, cultural resistance to change continues to be an obstacle, especially in broadcasters that depend on traditional flows (**O2**).

In terms of practical applications, AI is playing a leading role in optimizing operational processes such as transcription, content classification and basic personalization of distribution. Tools such as those used by Prisa Radio and Ábside Media are examples of how AI can improve the quality of content and the relationship with audiences. At the same time, projects such as the ad server proposed by Atresmedia Radio show how AI can open up new commercial opportunities, positioning radio as a relevant player in the digital ecosystem (**O3**).

The future of Spanish radio is closely linked to the ability to overcome economic, cultural and ethical barriers. Media groups agree that AI will be a strategic driver to personalize experiences, explore immersive narratives and optimize business models. However, the development of clear ethical and regulatory frameworks will be crutical to ensure responsible use in line with editorial values. The internal regulations developed by Apse Media stand out as an example of how broadcasters can anticipate regulatory challenges and pave the way for broader technology integration (**O4**).

In summary, AI is emerging as a transformative tool for Spanish radio, but its effective implementation will depend on the ability of broadcasters to overcome current barriers and consolidate long-term strategies that combine technological innovation with ethical responsibility. This process will be key for the sector to maintain its relevance in a constantly evolving media environment.

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