VISUAL REVIEW | Vol. 16, No. 5, 2025 | ISSN 2695-9631
International Visual Culture Review / Revista Internacional de Cultura Visual
https://doi.org/10.62161/revvisual.v17.5192

STUDY OF R&D PROJECTS IN ARTIFICIAL INTELLIGENCE APPLIED TO JOURNALISM IN SPAIN

FRANCISCO JOSÉ MURCIA VERDÚ [1], MARÍA JOSÉ UFARTE RUIZ [1], TATIANA SANTOS GONÇALVES [1]
[1] Universidad de Castilla-La Mancha, España

KEYWORDS

Artificial intelligence
Journalism
Communication
Research projects
R&D&i
Spain

ABSTRACT

This research develops an approach to a cartography of competitive research projects on artificial intelligence applied to journalism in Spain granted in the last decade. A query has been made in the database of the State Research Agency, in the section of grants awarded, using as search keywords: robot journalism, algorithmic journalism, automated journalism, computational journalism, augmented journalism, artificial journalism, and high-tech journalism. The findings indicate that 15 competitive projects have been granted between 2013 and 2023. On the methodological level, there is a trend towards documentary analysis work

Received: 09 / 02 / 2024
Accepted: 11 / 03 / 2024

1. Introduction

Artificial intelligence is an emerging and sophisticated tool (Pérez-Seijo et al., 2020) that has been implemented in more than a hundred media outlets around the world with a variety of objectives, products and models (Tejedor-Calvo, 2023), thanks to the fact that it produces diverse news (De-Lima-Santos and Ceron, 2022), frees journalists from mechanical and tedious tasks (Papadimitriou, 2016), improves the accuracy of information (Wölker and Powell, 2018), personalises content (Newman et al. , 2019), combats disinformation and fake news (Flores-Vivar, 2019), detects patterns and trends to make data-driven decisions (Lemelshtrich-Latar, 2018), and locates profiles in social networks (Ferrara et al., 2016).

In the field of communication, it is a "marriage between journalists and machines" (Graefe, 2016), already anticipated by Prisecaru (2016) when the first experiences began to emerge, but which has developed at a dizzying pace in recent years (Parratt-Fernández et al., 2021) and will soon become ubiquitous and applicable to any type of task performed by media professionals, given its increasingly visible presence (Brennen et al., 2022). This area of academic research, which has only been around for a few years but is of particular interest, has also given rise to a new professional profile. These are the exo-journalists (Tejedor and Vila, 2021), who are the counterpoint to the figure of the journalist who only produced text on the computer, and who are now combining all the possibilities of artificial intelligence with the productive routines of journalism to raise journalistic skills and media products to a higher level.

However, there is also a current of opinion among professionals and academics in the field of communication when it comes to assessing that this technology has opened different debates, ranging from the quality of automated news (Sandoval-Martín et al., 2019) to deontological issues (Ufarte Ruiz et al., 2021), legal issues (Montal and Reich, 2017) and reflections on the precariousness of the sector (Valdiviezo-Abad and Bonini, 2019). Even Ufarte Ruiz, Murcia Verdú and Túñez López (2023) speak of the emergence of the first synthetic media, that is, those without journalists and whose working routines depend on artificial intelligence.

However, this view coexists with that of Calvo Rubio and Ufarte Ruiz (2020), who argue that this technology will not have a negative impact on the journalistic labour market, but rather that the new territory of the communication ecosystem is full of nuances, cross-pollination and hybridisation. In this sense, Gutiérrez Caneda et al. (2023) point out that it is difficult to separate journalism from its technology, and in the current digital scenario, artificial intelligence occupies a prominent place, which is why it is necessary to include the teaching of this discipline and the tools used by this technology in the regulated studies of journalism degrees (Gonçalves and Melo, 2022). Nevertheless, the aim is to make this technology viable in the new context of the digital society, where there are many gaps (Boczkowski and Mitchelstein, 2013), but also opportunities (Lacy and Rosenstiel, 2015).

The complexity of artificial intelligence in journalism has not only stimulated scientific production in the field of communication since 2008 (García Orosa et al., 2023), but has also prompted academia and different sectors of society to apply for public funding to provide a holistic view of the impact, possibilities and challenges that this technology will introduce in journalism, especially when it is expected to mimic human thinking and behaviour and perform new cognitive functions in the future (Samuel et al., 2022). These subsidies are a tool widely used by states to encourage investment in research, development and innovation by companies and public and private institutions (Nagesh and Thomas, 2015).

For López and Vizoso (2021), what researchers and different sectors of society are looking for are answers that help to make a viable connection, all in the global context of a digital society. However, the project map is an object of study that has rarely been analysed in a scientific context, despite being an area of analysis that has been institutionalised as a disciplinary field (Caffarel-Serra et al., 2017), dating back to the end of the 20th century.This allows us to know where the interest of researchers is heading in order to explain an uncertain and very changing future for communication and its relationship with society.

In Spain, to date, there has been no objective analysis with scientific and methodological rigour of the competitive research projects that make up the study of artificial intelligence applied to journalism. At a general level, and without focusing on this discipline, only the research by Pacios et al. (2016), Díaz Nosty & De Frutos (2016), Barranquero and Limón (2017) and Caffarel-Serra et al. (2018) analyses communication research in governmental competitive projects, highlighting that the interest of project researchers is mostly focused on media communication and, to a lesser extent, organisational communication. Hence, the opportunity to carry out this pioneering research in the national scene and with few references in the

scientific literature. For this reason, this analysis is a forerunner in the field, making a first approximation of a mapping of competitive research projects on artificial intelligence applied to journalism in Spain that have been awarded in the last ten years. At the international level, the work of Ufarte Ruiz et al. (2024) stands out. They argue that the main framework programmes for research and innovation (R&D) in the European Union over the last ten years have been Horizon Europe and its predecessor Horizon 2020, which have funded a total of 29 competitive research projects analysing the impact, opportunities and challenges of this computer technology in the field of journalism.

This paper seeks to answer the following research questions: RQ1. How many R&D projects related to the application of artificial intelligence to journalism and communication have been awarded in Spain in the last ten years? PI2. What is the predominant affiliation? PI3. What is the budget of the awarded projects? PI4. What is the subject of the research? PI5. What are the most common research techniques used?

2. Methodology

The different methodological phases carried out in this study are presented in detail below, so that other researchers at different times and in different circumstances can replicate this process and obtain comparable results, completing or verifying them in coherent analytical spaces (Ortega-Mohedano et al., 2016).

2.1. Literature Review

In order to prepare this article, we first carried out a review of the scientific literature (Codina, 2017), which forms part of the secondary research and has allowed us to verify the absence of previous studies on the subject under study, as well as to assess the current state of research on this changing and novel topic. To this end, we have applied documentary review techniques with a compilation and descriptive approach (Bickman and Rog, 1998; Phillips and Pugh, 2008), in order to compare the main contributions of the state of the art (Ramírez-Montoya and García-Peñalvo, 2018), offering a contextualised vision of the subject under study, how it has evolved over time and according to context (Babbie, 1989; Fernández-Collado and Dankhe, 1995). This review shows a notable increase in academic production since 2015 and delimits future lines of research based on the identification of trends, strengths and weaknesses in published studies (Shahnazi and Afifi, 2017).

2.2. Boundary of the Universe

We have analysed the competitive research projects approved and funded at state level between 2013 and 2023, which appear in the database of the State Research Agency (AEI) in the section on grants awarded. This public body was chosen because it is the main body responsible for promoting scientific research in the country, whose mission is to promote scientific and technological research in all fields of knowledge through the efficient allocation of public resources. It should be noted that the projects presented in the various calls for proposals are evaluated by technical and selection commissions, which aim to guarantee independence and rigour in the decision-making process and select the projects to be funded in each call. Caffarel-Serra et al. (2023) explain that, in addition to the thematic priorities established by the Ministry of Science and Innovation, the evaluation criteria take into account the quality and viability of the proposed research, the scientific capacity of the team behind the project, the expected impact of the results and the suitability of the research for the economic budget requested. Therefore, only projects funded through public calls for proposals at national level are analysed, on the assumption that they are important indicators of the state of research in the field. The reason for excluding competitive research projects at regional, municipal and university level is that the different conditions imposed by the calls for proposals prevent comparable comparisons. Similarly, the year 2013 is taken as the starting point because this is when research into artificial intelligence in journalism finally took off (Calvo Rubio and Ufarte Ruiz, 2021).

2.3. Search for Descriptors

The indiscriminate use of the term artificial intelligence has led to it being used with a very diffuse variety of meanings (Broussard et al., 2019). For this reason, and in order to compile the research projects related to the object of study, a search strategy was designed in which we worked with the

different terms that allude to the use of this tool in the field of journalism and the media, both in the keywords of the projects and in their titles. Specifically, seven terms or sets of terms have been selected: 1) Robot journalism, so called by Lindén (2017) and Thurman, Dörr and Kunert (2017). 2) Algorithmic journalism, coined by Diakopoulos (2019) and Van Dalen (2012). 3) Automated journalism, used by Caswell and Dörr (2018) and Napoli (2014). 4) Computational journalism, indicated by Clerwall (2014), Coddington (2015), Gynnild (2014) and Karlsen and Stavelin (2014). 5) Augmented journalism, named by Pavlik and Bridges (2013). 6) Artificial journalism, named by Túñez López, Toural Bran and Valdiviezo (2019). 7) High-tech journalism, named by Salaverría (2014).

This search was combined with seven other labels: 1) machine learning; 2) computer vision; 3) speech recognition; 4) natural language processing; 5) automatic planning; 6) expert systems; and 7) robotics. This combination follows the suggestion of De Lima Santos and Salaverría (2021), who point out that artificial intelligence encompasses a complex set of techniques from the field of computer science that cut across these disciplines and social domains (Table 1).

Table 1. Search terms

("bots" OR "artificial intelligence" OR "artificial journalism" OR "robotic journalism" OR "algorithmic journalism" OR "automated journalism" OR "computational journalism" OR "augmented journalism" OR "high-tech journalism")	AND	("machine learning" OR "machine vision" OR "speech recognition" OR "natural language processing" OR "automatic planning" OR "expert systems" OR "robotics")

Source: Own elaboration.

The consultation was carried out between September and October 2023, so final approvals notified after that date are not included, but proof of concept projects from that year are. As a result, and after filtering out repetitions and projects that do not belong to the social sciences or are linked to information and communication technologies, 15 research projects awarded between 2013 and 2023 are analysed, which include some of the keywords mentioned above.

2.4. Analysis Instrument

The main analysis tool used in this phase of the research is the design of a protocol to record the variables selected to be included in the analysis (Table 2). The analysis tool used is in line with previous similar research (Paniagua Rojano and Rúas Araujo, 2023) and, in turn, can be valid for promoting the study of other types of similar research, to enable the work of typification and classification of the different variables that exist in the projects, both national and international. This type of study promotes reflection and progress in the discipline of communication from a research and transfer perspective. In the case of this research, the protocol has five levels of analysis: 1) Identification variables, where the title of the project, the reference, the key words, the year of award, the call for proposals and the type of aid are recorded. 2) Purpose of the research, which concerns the objectives. Four objectives are distinguished: a) descriptive, which registers, classifies, catalogues; b) explanatory, which establishes relationships between the data collected and establishes models or schemes to anticipate the evolution of the object of study; c) evaluative, which contrasts or validates models in order to refute or confirm them; and d) intervention, which intervenes in ongoing communicative practices in order to change behaviour, increase creativity or influence the process. 3) Economic profile, which includes the total research budget. 4) Institutional profile, which locates the university where the object of study is developed, as well as the autonomous community. 5) Methodological profile, which refers to the dominant research techniques. This information has been obtained from the data contained in the summary of each project. This level follows the proposal established by Lozano-Ascencio (2018), which establishes five types of methodological approaches, each of which includes several techniques: a) Conversational, which includes focus groups, interviews and group dynamics, among others; b) Observational, which can be systematic and participant; c) Documentary, which refers to the analysis of networks, webs, contents, discourses and documents; d) Surveys, whether of opinions, preferences or attitudes; and e) Experimental, which can be applied to subjects, groups or fields.

Table 2. Analysis protocol. Levels of analysis and variables

Levels of analysis	Variables
Identification	Project name, reference, key words, year of award and call for proposals
Purpose of the research	The aim of the research: to describe, explain, evaluate and intervene.
Economic profile	Total research budget
Institutional profile	Academic university of location, autonomous community
Methodology	The research techniques used to draw conclusions: conversational, observational, experimental, survey and documentary.

Source: Own elaboration.

In order to ensure the reliability of the coding, this table was applied in parallel to each project once the analysis guidelines had been defined (double-checking). This process avoided biases and methodological errors, thus optimising the validity and consistency of the results (Okuda Benavides and Gómez Restrepo, 2005).

3. Results

The application of the protocol described offers a set of revealing data, not only to answer the questions posed, but also to understand the characteristics and physiognomy of R&D projects on artificial intelligence applied to journalism in Spain. The results of the research are presented below, divided into six sections.

3.1. Project mapping

Between 2013 and 2023, the State Research Agency has awarded a total of 15 competitive research projects related to the application of artificial intelligence in journalism in the field of social sciences and information and communication technologies (Table 3).

Table 3. List of projects awarded by the State Research Agency between 2013 and 2023.

Year	Call for applications	Reference	Title	Concession (EUR)	Entity	Community / province
2015	R&D&I Projects (Research Challenges)	CSO2015-64955-C4-3-R	Audience influence in journalistic innovation and engagement management: risks and opportunities	36.300	University of Malaga	Andalusia-Malaga
2016	R&D&I Projects (Research Challenges)	CSO2016-79782-R	Keys to the redefinition and survival of journalism and challenges in the post-PC era. Emerging media, new narratives, aggregators, robots, *multiscreens*, *first mobile*, *apps.*	41.261	Complutense University of Madrid	Madrid-Madrid
Year	**Call for applications**	**Reference**	**Title**	**Concession (EUR)**	**Entity**	**Community / province**
2016	Research Networks	CSO2016-81882-REDT	Towards an inclusive journalism. Convergence and the role of Spanish journalism	20.000	Universitat Ramón Llull, Private Foundation	Catalonia-Barcelona

			in the global communication scenario.			
2017	R&D&I Projects (Research Challenges)	CSO2017-83890-R	Collaborative Ecosystem of Audiovisual Information Resources for Education	45.980	Autonomous University of Barcelona	Catalonia-Barcelona
2018	R&D&I Projects (Research Challenges)	RTI2018-095775-B-C41	News, networks and users in the hybrid media system	38.115	University of the Basque Country	Basque Country-Vizcaya
2018	R&D&I Projects (Research Challenges)	RTI2018-093346-B-C33	Digital-native cybermedia in Spain: narrative formats and mobile strategy	53.845	University of Santiago de Compostela	Galicia-A Coruña
2019	Europe Research	EIN2019-103492	Revolutionising the future of social communication with memetic engineering	19.500	Agencia Estatal Consejo Superior de Investigaciones Científicas (CSIC) (State Agency for Scientific Research)	Madrid-Madrid
2019	R&D&I Projects (Knowledge Generation and Research Challenges)	PID2019-106695RB-I00	Identifying gender bias in artificial intelligence. Technological, scientific and media discourses	42.350	Carlos III University of Madrid	Madrid-Madrid
2020	R&D&I Projects (Knowledge Generation and Research Challenges)	PID2020-114193RB-I00	*Politainment* in the face of media fragmentation: disintermediation, *engagement* and polarisation	85.321	University of Valladolid	Castilla y León-Valladolid
2020	R&D&I Projects (Knowledge Generation and Research Challenges)	PID2020-114007RB-I00	Innovation ecosystems in the communication industries: actors, technologies and configurations for the generation of innovation in content and communication.	117.975	University of Murcia	Murcia-Murcia
2021	Strategic Projects Focused on the Ecological Transition and the Digital Transition	TED2021-129402B-C21	Monitoring disinformation and its social impact through artificial intelligence: application to societal security	106.145	University of Granada	Andalusia-Granada
Year	**Call for applications**	**Reference**	**Title**	**Concession (EUR)**	**Entity**	**Community / province**

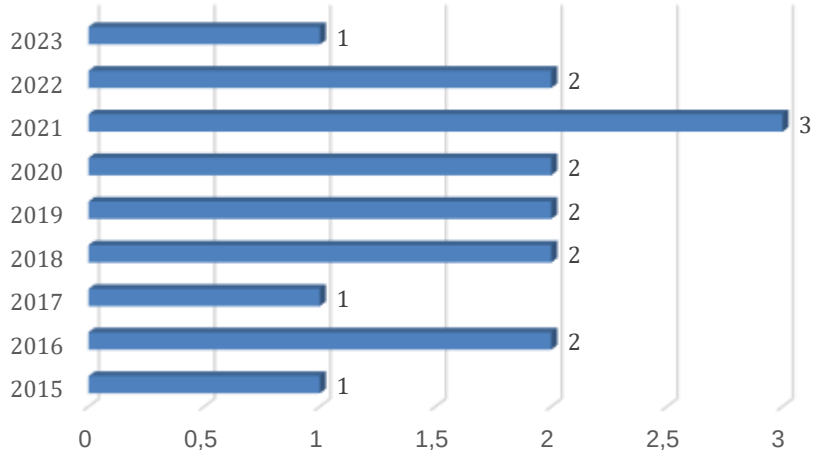
2021	Scientific and Technical Equipment	EQC2021-007535-P	Upgrading of a virtual TV set for the creation of a common transdisciplinary research service.	640.219	University of Santiago de Compostela	Galicia-A Coruña
2021	R&D&I Projects Proof of Concept	PDC2021-121720-I00	Combating misinformation and value criteria in TV and digital media election debates: verification platform and *blockchain*	65.550	University of Vigo	Galicia-Pontevedra
2022	Research Networks	RED2022-134211-T	Cybermedia and digital communication in a changing information ecosystem	17.500	University of the Basque Country	Basque Country-Vizcaya
2022	R&D&I Projects (Knowledge Generation and Research Challenges)	PID2022-138391OB-I00	The impact of artificial intelligence and algorithms on cybermedia, professionals and audiences	100.000	University of the Basque Country	Basque Country-Vizcaya

Source: State Investigation Agency (https://n9.cl/aee4w). Own elaboration.

3.2. Identification

In terms of implementation period, 2021 is the year with the highest number of competitive projects awarded, with a total of three (20%), followed by 2016, 2018, 2019, 2020 and 2022 with two research projects each. The years 2015, 2017 and 2023 each have one project, while 2013 and 2014 have no awards related to the application of artificial intelligence in journalism (Figure 1).

Graph 1. Year in which projects were approved



Source: State Investigation Agency (https://n9.cl/aee4w). Own elaboration.

Grants related to artificial intelligence and journalism were mainly awarded in the call for R&D&I projects (Research Challenges) with a total of 5 projects, followed by R&D&I projects (Knowledge Generation and Research Challenges) with a total of 4. Research Networks awarded two projects in this area and the rest of the calls accounted for one project each, with the call for Scientific and Technological Equipment awarding 640,219 euros to the University of Santiago de Compostela for a single project (Graph 2).

Graph 2. Type of call for aid grants

Source: State Investigation Agency (https://n9.cl/aee4w). Own elaboration.

In terms of keywords, the concept of "artificial intelligence" is the most recurrent, appearing in up to 9 research projects, representing 60% of the total, while other important labels are "automated", which is repeated in up to 5 projects, "robot", which is repeated in 4 cases, and "machine learning" and "algorithms", which are repeated in 3 cases (Table 4).

Table 4. Keyword/s per project

Project title	Key words
Audience influence in journalistic innovation and engagement management: risks and opportunities	Robot Journalism
Keys to the redefinition and survival of journalism and challenges in the post-PC era. Emerging media, new narratives, aggregators, robots, multiscreens, first mobile, apps.	Robots
Towards an inclusive journalism. Convergence and the role of Spanish journalism in the global communication scenario.	Artificial Intelligence; Robotics
Collaborative Ecosystem of Audiovisual Information Resources for Education	Artificial Intelligence; *Machine Learning*; Deep Learning; Machine Learning
News, networks and users in the hybrid media system	Automated Journalism
Digital-native cybermedia in Spain: narrative formats and mobile strategy	Automation
Revolutionising the future of social communication with memetic engineering	Artificial Intelligence
Identifying gender bias in artificial intelligence. Technological, scientific and media discourses	Artificial Intelligence; Algorithms; Automated News; Machine Learning; *Machine Learning; Natural Language System; Machine Learning*; Deep Learning
Politainment in the face of media fragmentation: disintermediation, engagement and polarisation	Automated Journalism; Algorithms
Innovation ecosystems in the communication industries: actors, technologies and configurations for the generation of innovation in content and communication.	Artificial Intelligence; *Blockchain*
Monitoring disinformation and its social impact through artificial intelligence: application to societal security	Artificial Intelligence
Upgrading of a virtual TV set for the creation of a common transdisciplinary research service.	Artificial Intelligence

Project title	Key words
Fighting misinformation and value criteria in TV and digital media election debates: verification platform and blockchain	*Blockchain*; *Machine Learning*
Cybermedia and digital communication in a changing information ecosystem	Artificial Intelligence
The impact of artificial intelligence and algorithms on cybermedia, professionals and audiences	Artificial Intelligence; Automated; Algorithms; Robotics; Robotics

Source: State Investigation Agency (https://n9.cl/aee4w). Own elaboration.

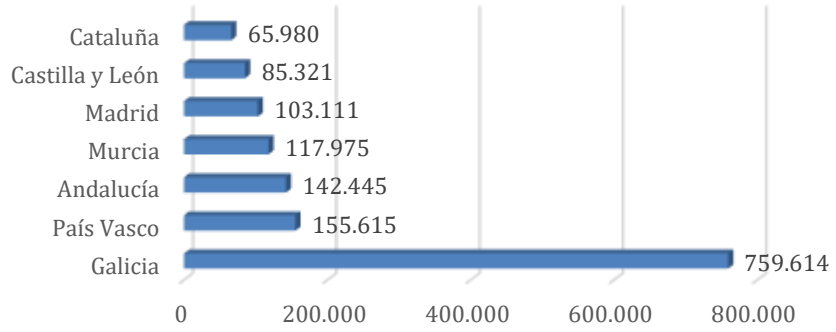
3.3. Purpose of the Investigations

The main objectives of the research projects analysed in Spain are intervention studies (5), which intervene in ongoing communicative practices in order to change behaviour, increase creativity or influence processes. This is followed by descriptive research, with four projects aimed at collecting, classifying and cataloguing data on this communicative practice, and explanatory research, which is also present in four projects that present models or schemes to anticipate the evolution of the study model or propose new perspectives. Finally, there are two projects with an evaluative objective, which aim to compare or validate theoretical or methodological models in order to refute or confirm them.

3.4. Budget

In terms of budget items, the projects awarded in the last ten years that focus their work on the application of artificial intelligence in journalism and the media totalled 1,430,061 euros. The leading universities in terms of funding are those of Santiago de Compostela, with 694,064 euros of the total, followed by the Basque Country with 155,615 euros, Murcia with 117,975 euros and Granada with 106,145 euros. On the other hand, by Autonomous Community, Galicia is the leader in research with a total of 759,614 euros, followed by the Basque Country with 155,615 euros, Andalusia with 142,445 euros and Murcia with 117,975 euros (Graph 3).

Graph 3. Project funding by community

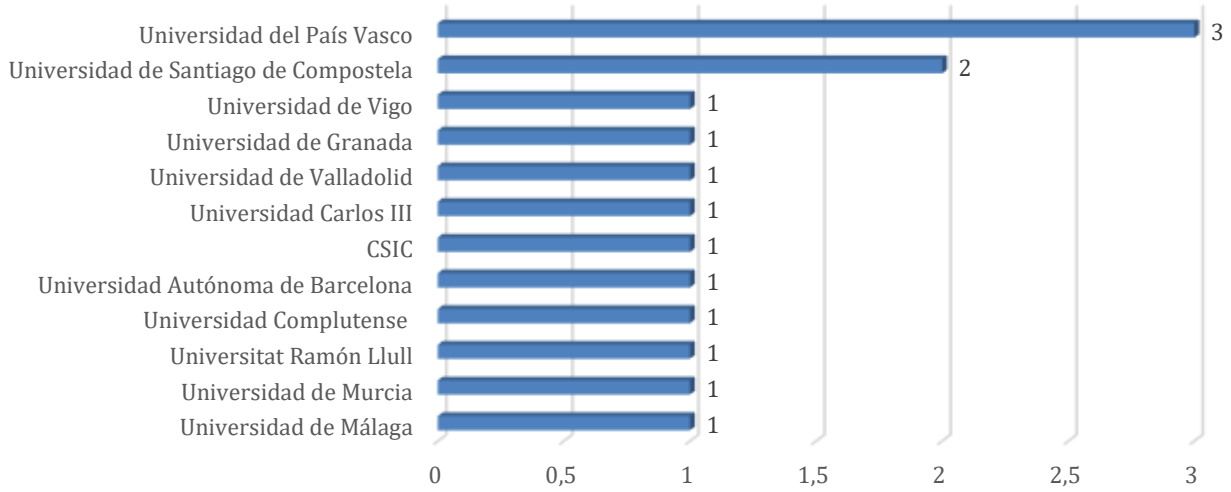


Source: State Investigation Agency (https://n9.cl/aee4w). Own elaboration

3.5. Autonomies and Universities

The Autonomous Communities that contributed the most research projects during the period analysed were Galicia, the Basque Country and Madrid, with three projects each, representing 60% of the total. Andalusia and Catalonia have two research projects each (26.67%), while the Autonomous Communities of Murcia and Castilla y León have one project each, representing 13.33% of the remaining research. More specifically, it is the University of the Basque Country that contributes 20% of these projects, more than any other university, followed by the University of Santiago de Compostela with 13.33% of the projects awarded. Between the two universities, they represent 33.33% of the total number of projects at national level in the selected period. The rest of the Spanish universities complete the ranking with one project each (Figure 4).

Graph 4. Number of projects awarded by entity

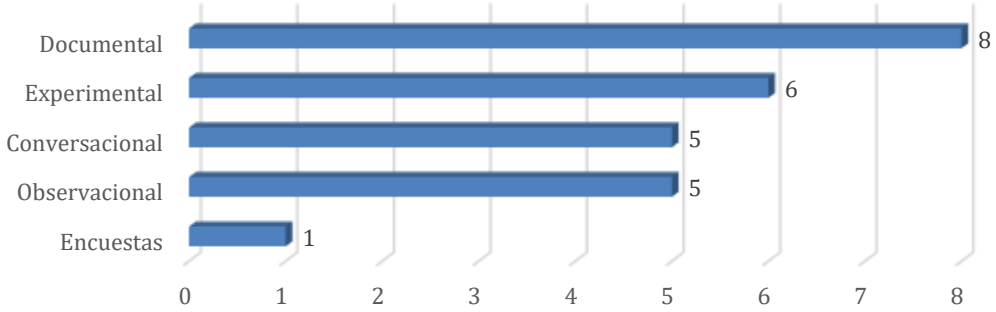


Source: State Investigation Agency (https://n9.cl/aee4w). Own elaboration.

3.6. Methodology used in the projects

Of the 15 projects analysed, nine projects support research using one research technique. However, three projects use two different techniques, two use three and one uses four different methods. Of these, document analysis (network, web, content, discourse, documentation) is the dominant research technique, present in no less than eight research projects. In second place are experimental techniques, used in up to six projects, followed by interview and observation techniques, used in five projects each. Finally, the survey technique is used in one project (Figure 5).

Figure 5. Research techniques used



Source: State Investigation Agency (https://n9.cl/aee4w). Own elaboration.

4. Conclusions

This research fulfils the initial objective of making a first approximation of the mapping of nationally competitive research projects on the use of artificial intelligence in journalism and the media in Spain that have been awarded over the last ten years. In the section on grants awarded, the National Research Agency shows that a total of 15 competitive research projects on this topic have been funded between 2013 and 2023. However, the number of grants is irrelevant if we consider the total number of R&D&I projects on artificial intelligence awarded in the last decade, despite the impact, opportunities and challenges that artificial intelligence brings to the field of journalism. In particular, the number of awards has increased steadily since 2018.

From the analysis of the projects, it is confirmed that there are a variety of keywords to refer to this discipline, due to the fact that there is no clear line that limits its scope, in line with what Vállez and Codina (2018) have pointed out. Thus, the first question raised in this research is answered.

Along the same lines, the results allow us to answer the second research question by showing that more than half (60%) of the research projects analysed are concentrated in the Autonomous Communities of Galicia, the Basque Country and Madrid. Specifically, the public university, as opposed to the private university, is hegemonic in terms of the number of concessions. In this respect, the University of the Basque Country, with 20% of these projects, is the most important university, followed by the University of Santiago de Compostela, with 13.33% of the projects awarded. Between the two universities, they represent 33.33% of the total number of projects at national level in the selected period.

According to the amount granted to the projects analysed, the universities with the highest amount are those of Santiago de Compostela with 694,064 euros, followed by the Basque Country with 155,615 euros, Murcia with 117,975 euros and Granada with 106,145 euros. The total budget allocated to the 15 projects approved in recent years amounts to 1,430,061 euros (PI3).

With regard to the fourth question posed in this study, when Spanish researchers define the objectives of their work, they opt for intervention studies in ongoing communicative practices, that is, strategies to modify behaviour, increase creativity or influence a particular process. In second place are projects that aim to collect, classify, catalogue, present and develop data on this discipline. With regard to the last question, it should be noted that of the five methodological techniques studied in this research, documentary analysis is the dominant one, being used in up to eight projects.

From the set of data analysed, it can be concluded that the study of artificial intelligence in the field of journalism has been attracting academic attention for some time, with a significant increase in the number of research projects and applications. Specifically, the research projects awarded by the National Research Agency for the period 2013-2023 in Spanish universities have many similarities, both in the configuration of the study objectives and in the use of predominant techniques. These similarities are also confirmed when we take into account the Autonomous Communities, the universities and the years studied. On the other hand, the national grants awarded to this type of project began in 2015, as is the case in Europe, but research into the impact, opportunities and challenges that artificial intelligence brings to the field of journalism is an object of study that will continue to develop in the country, following the trends that are consolidating in an increasingly communicative society and market.

This paper, while answering the five research questions, has certain limitations and leaves open possibilities for future research. Limiting the analysis of project studies to the national level excludes other types of research findings. There are also other limitations, such as the rapid obsolescence of the research due to the continuous emergence of new works and technological tools, the rapid evolution of the subject matter and the derivations of these projects due to the advancement of the field of analysis. However, the aim of this work is not to draw conclusions that can be generalised, but to consolidate descriptive knowledge about a research problem that requires scientific contributions in order to progress in its definition. For this reason, this diagnosis becomes the starting point for researchers who want to know which R&D&I projects receive the most concessions. In this way, there is a lot of scope for the development of similar research that could provide more knowledge about this discipline. For example, it remains to be seen what the principal investigators of these projects think about the weaknesses, threats, strengths and opportunities of AI research in Spain. Another relevant issue is the knowledge of gender in the management of projects, in order to identify gender gaps in scientific research and support gender equality policies in research management, following the recommendations of Horizon 2020, which requires a gender perspective both in the composition of teams and in the object to be researched and its social transfer (Gómez-Escalonilla and Caffarel-Serra, 2022). It is therefore necessary to continue to study variables such as the quality, impact, internationalisation and scope of scientific research carried out in the country.

5. Acknowledgments

This research is part of the research project "Artificial Intelligence and Journalism: contents, audiences, challenges and curricular development (2023-GRIN-34286)", financed within the Research Plan, 85% of which is co-financed by the European Regional Development Fund (ERDF).

References

Babbie, E. (1989). *The practice of social research*. California: Ed. Wadsworth, Pub Co.

Barranquero, A. & Limón. N. (2017). Objetos y métodos dominantes en comunicación para el desarrollo y el cambio social en las Tesis y Proyectos de Investigación en España (2007-2013). *Revista Latina de Comunicación Social*, *72,* 1-25. https://doi.org/10.4185/RLCS-2017-1151

Bickman, L. & Rog, D. (1998). Why a handbook of applied social research methods? In: Bickman, Leonard & Rog, Debra J. (Eds.). *Handbook of applied social research methods*. Thousand Oaks, California: Sage.

Boczkowski, P. J. & Mitchelstein, E. (2013). *The news gap. When the information preferences of the media and the public diverge*. Cambridge, MA: The Mit Press. https://doi.org/10.7551/mitpress/9780262019835.001.0001

Brennen, J. S., Howard, P. N. & Nielsen, R. K. (2022). What to expect when you're expecting robots: Futures, expectations, and pseudo-artificial general intelligence in UK news. *Journalism, 23*(1), 22-38. https://doi.org/10.1177/1464884920947535

Broussard, M., Diakopoulos, N., Guzman, A., Abebe, R., Dupagne, M. & Chuan, C. H. (2019). Artificial intelligence and journalism. *Journalism and mass communication quarterly, 96*(3), 673-695. http://doi.org/10.1177/1077699019859901

Calvo Rubio, L. M. & Ufarte Ruiz, M. J. (2020). Percepción de docentes universitarios, estudiantes, responsables de innovación y periodistas sobre el uso de inteligencia artificial en periodismo. *Profesional De La información Information Professional, 29*(1). https://doi.org/10.3145/epi.2020.ene.09

Calvo-Rubio, L.M., & Ufarte-Ruiz, M.-J. (2020). Percepción de docentes universitarios, estudiantes, responsables de innovación y periodistas sobre el uso de inteligencia artificial en periodismo. *Profesional De La información*, *29*(1).159-176. https://doi.org/10.15581/003.34.2.159-176

Caffarel-Serra, C., Ortega-Mohedano, F. & Gaitán.Moya, J. A. (2017). Investigación en Comunicación en la universidad española en el período 2007-2014. *El profesional de la información, 26*(2), 218-227. https://doi.org/10.3145/epi.2017.mar.08

Caffarel-Serra, C., Ortega-Mohedano, F., & Gaitán-Moya, J. A. (2018). Communication research in Spain: Weaknesses, threats, strengths and opportunities. *Comunicar, 56,* 61-70. https://doi.org/10.3916/C56-2018-06

Caffarel-Serra, C., Redondo-García, M., & Rubira-García, R. (2023). Una década de Proyectos I+D+i en Comunicación (2008-2018). En Caffarel, C.; Lozano, C.; Gaitán, J.A.; Piñuel, J.L. (Eds.), MAPCOM. *Quince años de investigación sobre comunicación en universidades españolas*. Salamanca: Comunicación Social Ediciones y Publicaciones. https://doi.org/10.52495/c5.emcs.20.mic8

Caswell, D. & Dörr, K. (2018). Automated journalism 2.0: Event-driven narratives. *Journalism practice, 12*(4), 477-496. https://doi.org/10.1080/17512786.2017.1320773

Clerwall, C. (2014). Enter the robot journalist. Users' perceptions of automated content. *Journalism practice, 8*(5), 519-531. https://doi.org/10.1080/17512786.2014.883116

Coddington, M. (2015). Clarifying journalism's quantitative turn. A typology for evaluating data journalism, computational journalism, and computer-assisted reporting. *Digital journalism, 3*(3), 331-348. https://doi.org/10.1080/21670811.2014.976400

Codina, L. (2017, 20th April). Revisiones sistematizadas y cómo llevarlas a cabo con garantías: Systematic reviews y SALSA Framework. Lluís Codinal. https://www.lluiscodina.com/revision-sistematica-salsa-framework

De Lima Santos, M. F. & Salaverría, R. (2021). Del periodismo de datos a la inteligencia artificial: desafíos que enfrenta La Nación en la implementación de la visión artificial para la producción de noticias. *Palabra clave, 24*(3), e2437. https://doi.org/10.5294/pacla.2021.24.3.7

De Lima Santos, M. F. & Ceron, W. (2022). Artificial intelligence in news media: Current perceptions and future outlook. *Journalism and media*, *3*(1), 13-26. https://doi.org/10.3390/journalmedia3010002

Diakopoulos, N. (2019). *Automating the news. How algorithms are rewriting the media.* Cambridge, Massachusetts, Harvard University Press. https://doi.org/10.4159/9780674239302

Díaz Nosty, B. & De Frutos, R. (2016). *Tendencias de la investigación universitaria española en Comunicación*. España: Thomson Reuters-Aranzadi.

Fernández-Collado, C. & Dankhe, G. (eds.) (1995). *La comunicación humana: ciencia social*. México: McGraw-Hill.

Ferrara, E., Varol, O., Davis, C., Menczer, F. & Flammini, A. (2016). The rise of social bots. *Communications of the ACM, 59*(7), 96-104. https://doi.org/10.48550/arXiv.1407.5225

Flores Vivar, J. M. (2019). Inteligencia artificial y periodismo: diluyendo el impacto de la desinformación y las noticias falsas a través de los bots. *Doxa comunicación, (29),* 197-212. https://doi.org/10.31921/doxacom.n29a10

García Orosa, B., Canavilhas, J. & Vázquez Herrero, J. (2023). Algorithms and communication: A systematized literature review. *Comunicar, 74,* 9-21. https://doi.org/10.3916/C74-2023-01

Gómez-Escalonilla, G. & Caffarel-Serra, C. (2022). Mapa de los grupos de investigación en comunicación en España. *Revista Latina de Comunicación Social, 80*, 1-19. https://doi.org/10.4185/RLCS-2022-1513

Gonçalves, A. & Melo, P. V. (2022). Artificial intelligence and journalism: An aproach to the Portuguese context. *Fonseca, journal of communication,* (25), 23-24. https://doi.org/10.14201/fjc.29682

Graeffe, A. (2016, 7th January). *Guide to automated journalism*. Columbia Journalism School. https://www.cjr.org/tow_center_reports/guide_to_automated_journalism.php

Gutiérrez Caneda, B., Vázquez Herrero, J. & López García, X. (2023). AI application in journalism: ChatGPT and the uses and risks of an emergent technology. *Profesional de la Información, 32*(5), e320514. https://doi.org/10.3145/epi.2023.sep.14

Gynnild, A. (2014). Journalism innovation leads to innovation journalism: The impact of computational exploration on changing mindsets. *Journalism, 15*(6), 713-730. https://doi.org/10.1177/1464884913486393

Karlsen, J. & Stavelin, E. (2014). Computational journalism in Norwegian newsrooms. *Journalism practice, 8*(1), 34-48. https://doi.org/10.1080/17512786.2013.813190

Lacy, S. & Rosenstiel, T. (2015). *Defining and measuring quality journalism*. Brunswick, New Jersey: Rutgers University.

Lemelshtrich Latar, N. (2018). *Robot journalism, can human journalism survive?* Israel: Centro Interdisciplinario Herzliya.

Lindén, C. G. (2017). Algorithms for journalism: The future of news work. *The journal of media innovations, 4*(1), 60-76. https://doi.org/10.5617/jmi.v4i1.2420

López García, X. & Vizoso, Á. (2021). Periodismo de alta tecnología: Signo de los tiempos digitales del tercer milenio. *El Profesional de la Información, 30*(3), e300301. https://doi.org/10.3145/epi.2021.may.01

Lozano Ascencio, C. (2018). Estudio de proyectos I+D y de tesis doctorales: La producción efímera. In Piñuel, José Luis (Dir.); Caffarel, Carmen, Gaitán, Juan Antonio, y Lozano, Carlos (eds.): *Investigación, Comunicación y Universidad. Research, Communication and University. Proyectos I+D y Tesis doctorales, Debates y Encuestas a investigadores en las Facultades con Grados en Comunicación*. Salamanca: Comunicación Social Ediciones y Publicaciones. ISBN: 978-84-17600-12-9. D.O.I.: https://doi.org/10.52495/c1.emcs.18.mic7

Montal, T. & Reich, Z. (2017). I, robot. You, journalist. Who is the author? Authorship, bylines and full disclosure in automated journalism. *Digital journalism, 5*(7), 829-849. https://www.doi.org/10.1080/21670811.2016.1209083

Nagesh, D. & Thomas, S. (2015). Success factors of public funded R&D projects. *Current science, 108*, 357-363.

Napoli, P., M. (2014). Automated Media: An Institutional Theory Perspective on Algorithmic Media Production and Consumption. *Communication Theory, 24*(3), 340-360. https://www.doi.org/10.1111/comt.12039

Newman, N., Fletcher, R., Kalogeropoulos, A. & Nielsen, R. K. (2019). Reuters Institute. Digital news report 2019. Reuters Institute for the study of Journalism. https://Reutersinstitute.politics.ox.ac.uk/sites/default/files/2019-06/DNR_2019_FINAL_0.pdf

Okuda Benavides, M. & Gómez Restrepo, C. (2005). Métodos de investigación cualitativa: triangulación. *Revista colombiana de psiquiatría, 34*(1), 118-124. https://www.redalyc.org/pdf/806/80628403009.pdf

Ortega Mohedano, F., Pereira Galhardi C., & Igartua, J. J. (2016). A quantitative approach to the television programs aimed to child and youth audience in Brazil. *Communication & society, 29*(3), 49-68. https://doi.org/10.15581/003.29.3.49-67

Pacios, A. R., Vianello-Osti, M., & Rodríguez-Bravo, B. (2016). Transparency and access to information on research projects in Spanish public universities. *El profesional de la información, 25*(5), 721-729. https://doi.org/10.3145/epi.2016.sep.02

Paniagua Rojano, F. & Rúas Araujo, J. (2023). Aproximación al mapa sobre la investigación en desinformación y Verificación En España: Estado De La Cuestión. *Revista ICONO 14. Revista Científica de Comunicación y Tecnologías Emergentes, 21*(1). https://doi.org/10.7195/ri14.v21i1.1987

Papadimitriou, A. (2016). *The future of communication: Artificial intelligence and social networks. Media & Communication Studies.* Mälmo University. http://www.diva-portal.org/smash/record.jsf?pid=diva2%3A1481794&dswid=5239

Parratt Fernández, S., Mayoral Sánchez, J., & Mera Fernández, M. (2021). The application of artificial intelligence to journalism: An analysis of academic production. *Profesional de la información, 30*(3), e300317. https://doi.org/10.3145/epi.2021.may.17

Pavlik, J. V., & Bridges, F. (2013). The emergence of augmented reality (AR) as a storytelling medium in journalism. *Journalism & communication monographs, 15*(1), 4-59. https://doi.org/10.1177/1522637912470819

Pérez Seijo, S., Gutiérrez Caneda, B., & López García, X. (2020). Periodismo digital y alta tecnología: de la consolidación a los renovados desafíos. *index.comunicación, 10*(3), 129-151. https://doi.org/10.33732/ixc/10/03Period

Phillips, Estelle M., & Pugh, Derek (2008). *La tesis doctoral. Un manual para estudiantes y sus directores.* Barcelona: Bresca Editorial.

Prisecaru, P. (2016). Challenges of the fourth industrial revolution. *Knowledge horizons, economics, 8*(1), 57-62. https://www.orizonturi.ucdc.ro/arhiva/khe-vol8-nr1-2016/09.%20Petre%20Prisecaru.pdf

Ramírez Montoya, M. S., & García Peñalvo, F. J. (2018). Co-creación e innovación abierta: Revisión sistemática de literatura. *Comunicar: revista científica iberoamericana de comunicación y educación. 26*(54), 9-18. https://doi.org/10.3916/C54-2018-01

Salaverría, R. (2014). Periodismo en 2014: balance y tendencia. *Cuaderno de Periodistas, 29*, 9- 22. https://cutt.ly/atiBV3T

Samuel, J., Kasyap, R., Yana, S., & Pelaez, A. (2022). Adaptative cognitive fit: Artificial intelligence augmented management of information facets and representations. *International journal of information management, 65*, 102505. https://doi.org/10.1016/j.ijinfomgt.2022.102505

Sandoval Martín, M. T., La Rosa Barrolleta, L. A., Herranz Fernández, F. J., & Franco Álvarez, M. G. (2019). *Estudio sobre la calidad de las noticias automatizadas en español*. Presentado en XXV Congreso internacional SEP oportunidades y riesgos del periodismo hiperconectado, 180.

Shahnazi, A. F., & Afifi, T., D. (2017). Strategies for literature reviews. In: Allen, Mike (Ed.), *The SAGE Encyclopedia of Communication Research Methods.* SAGE publications. https://doi.org/10.4135/9781483381411

Tejedor Calvo, S. (2023). *La Inteligencia Artificial en el periodismo: Mapping de conceptos, casos y recomendaciones.* Barcelona: Editorial UOC.

Tejedor, S. & Vila, P. (2021). Exo Journalism: A Conceptual Approach to a Hybrid Formula between Journalism and Artificial Intelligence. *Journalism and Media, 2,* 830–840. https://doi.org/10.3390/journalmedia2040048

Thurman, N., Dörr, K., & Kunert, J. (2017). When reporters get hands –on with robo– writing. *Digital journalism, 5*(10), 1240-1259. https://www.doi.org/10.1080/21670811.P.2017.1289819

Túñez López, J. M., Toural Bran, C. & Valviviezo Abad, C. (2019). Automatización, bots y algoritmos en la redacción de noticias. Impacto y calidad del periodismo artificial. Revista Latina de Comunicación Social, (74). https://doi.org/10.4185/RLCS-2019-1391

Ufarte Ruiz, M. J., Murcia Verdú, F. J., & Manfredi Sánchez, J. L. (2024). High-Tech Journalism on the R&D&i Map in Europe (2013-23). In Sixto-García, J., Quian, A., Rodríguez-Vázquez, A. I., Silva-Rodríguez, S. y Soengas-Pérez, X. (eds.), *Journalism, Digital Media and the Fourth Industrial Revolution*. Palgrave Macmillan.

Ufarte Ruiz, M. J., Calvo Rubio, L. M. & Murcia Verdú, F. J. (2021). Los desafíos éticos del periodismo en la era de la inteligencia artificial. *Estudios sobre el mensaje periodístico*, *27*(2), 673-684. https://doi.org/10.5209/esmp.69708

Ufarte Ruiz, M. J., Murcia Verdú, F. J., & Túñez López, J. M. (2023). Use of artificial intelligence in synthetic media: first newsrroms without journalists. *Profesional de la información*, *32*(2), e320203. https://doi.org/10.3145/epi.2023.mar.03

Valdiviezo-Abad, C., & Bonini, T. (2019). Automatización inteligente en la gestión de la comunicación. *Doxa comunicación*, (29), 169-196. https://www.doi.org/10.31921/doxacom.n29a9

Vállez, M., & Codina, L. (2018). Periodismo computacional: evolución, casos y herramientas. *El profesional de la información*, *27*(4), 759-768. https://doi.org/10.3145/epi.2018.jul.05

Van Dalen, A. (2012). The algorithms behind the headlines: How machine-written news redefines the core skills of human journalists. *Journalism practice*, *6*(5-6), 648- 658. https://doi.org/10.1080/17512786.2012.667268

Wölker, A., & Powell, T. E. (2018). Algorithms in the newsroom? News readers' perceived credibility and selection of automated journalism. *Journalism*, *22*(1). https://doi.org/10.1177/1464884918757072