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# Artificial Intelligence and Journalism: an Approach to the Portuguese Context

## *Inteligencia artificial y periodismo: una aproximación al contexto portugués*

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**ABSTRACT**
In recent years, various newspapers around the world have used algorithms and artificial intelligence in news produc-tion. In Portugal, the examples of news production using these technologies are rare, as are the studies on the subject. The incipient work that relates artificial intelligence and algorithms to journalism in Portugal is detectable in the Con-gresses of Sopcom. Among the 18 communications presented in the last decade (2011-2021), only one deals with the technological implications in journalistic routines, and none include the perceptions of journalists about the phenome-non, which justifies the importance of this work. In this article, based on the methodology that combines the theoreti-cal review and the application of a pre-test questionnaire to journalists (N=17) of the four national daily newspapers with the largest circulation: Correio da Manhã, Diário de Notícias, Jornal de Notícias and Público, we highlight three aspects: the lack of knowledge of journalistic content that uses artificial intelligence; openness to the use of artificial in-telligence and the need for training of journalists on the subject. This research has an exploratory scope and intends to extend it in the future, with the distribution of the survey to a larger number of journalists.

**Keywords:** Algorithms; training; artificial intelligence; perception; journalism; technology.

**RESUMEN**
En los últimos años, varios periódicos del mundo han utilizado algoritmos e inteligencia artificial en la producción de noticias. En Portugal, los ejemplos de producción de noticias utilizando estas tecnologías son puntuales, al igual que los estudios sobre el tema. Del

carácter incipiente de los trabajos que relacionan la inteligencia artificial y los algoritmos con el periodismo en Portugal es buena muestra los Congresos de la Sopcom. Entre las 18 comunicaciones presentadas en la última década (2011-2021), solo una trata sobre las implicaciones tecnológicas en las rutinas periodísticas y ninguna incluye las percepciones de los periodistas sobre el fenómeno, lo que justifica la importancia de este trabajo. En este artículo, basado en una metodología que combina la revisión teórica y la aplicación de un cuestionario pre-test a periodistas (N=17) de los cuatro periódicos diarios nacionales de mayor circulación: Correio da Manhã, Diário de Notícias, Jornal de Notícias y Público, destacamos tres aspectos: el desconocimiento de contenidos periodísticos que utilizan inteligencia artificial; apertura al uso de inteligencia artificial y necesidad de formación de los periodistas acerca de esta temática. Esta investigación tiene un alcance exploratorio y pretende ampliarse en el futuro, con la distribución de la encuesta a un número mayor de periodistas.

**Palabras clave:** Algoritmos; formación; inteligencia artificial; percepción; periodismo; tecnología.

## 1. Introduction

Newscasts hosted by robots, stock market opening and closing reports written by machines, code-driven data analytics used to support stories. Estimates indicate that, globally, 8 to 12% of current journalistic tasks are performed by automated systems (Cardoso & Baldi, 2021), and their expansion has been a short-term trend, imposing a series of challenges for the media, for journalists, and for communications studies.

In different parts of the world, media groups have been investing financial and human resources towards developing automated systems that can intervene in four distinct moments of the journalistic work process: 1. Production of journalistic text; 2. Data mining; 3. Distribution of news; 4. Content optimization (Kotenidis & Veglis, 2021).

At a Conference hosted in May 2021, under the topic «Artificial Intelligence and the future of journalism: will artificial intelligence take hold of the fourth estate?», the president of the European Federation of Journalists underlined three main issues to observe in the connection between artificial intelligence and journalism: a) the risk of deepening the rifts between large and small media companies; b) the need for data training for journalists in order to prepare them in new skills; and c) ethical challenges (Kaufman, 2021).

Similarly, at the same Conference, European Commission Vice-President Vera Jorová pointed out that artificial intelligence must be used at the service of journalists, contributing to wider media freedom and plurality, gaining importance, for instance, towards identifying falsehoods, analyzing potential threats, and facing disinformation (Agência Lusa, 2021).

Therefore, this article fits into the context of the efforts towards understanding the issues at the heart of the use of algorithms and artificial intelligence in journalism. In this paper, we sought to present notes on the state of the art of the relationship between AI and journalism in the Portuguese context, both in relation to the use of these technologies in news production and in research on the subject. On one hand, we were interested in understanding, even if in a preliminary way, how Portuguese journalists have perceived the use of artificial intelligence in their production routines. On the other hand, we aimed to identify the main aspects of the studies in Portugal about the theme.

## 2. On algorithmic society

With the understanding that journalism is a social institution (Berger & Luckmann, 2008) which produces a discursive reconstruction of the world based on a sense of fidelity between the journalistic report and daily occurrences (Franciscato, 2003), and is, simultaneously, both an influencer and a result of societal change, it is important, before discussing the implications of artificial intelligence and algorithms in the news production process, to lay out some notes on the wider scenario of social transformation.

A relevant perspective in this field is that of algorithmic rationality (Bruno, 2019), given the decisive space that is occupied by algorithms in the knowledge processes of a certain reality and in the architectures and flows of the decision making and management processes of that same reality.

It is worth emphasizing that, more than consequences in individual routines, this predominant role of algorithms has made a meaningful impact on the collective contexts. A landmark in this respect took place during the 2010 election in the United States, when Facebook introduced a mechanism which announced to the users of their platform which of their friends had already been to vote. By cross-referencing their user data with election records, the company now associated with Meta calculated that approximately 340 thousand people would not have gotten out to vote if they had not been shown this information about their friends who had themselves voted (Bond et al., 2012).

More than a decade after this fact, Facebook and other algorithm centred companies have built economic, cultural and technical oligopolies, and one of their effects is the partial control of political processes, which has been pointed out in several research initiatives on the role of Facebook itself and others, such as Twitter, on election results. This is made possible by the rise of digital platforms not only as facilitators of individual to individual and individual to institution mediation, but also as dynamic objects that function according to their controllers' goals, and that shape and manipulate connections (Van Dijck, 2013). These platforms' main lucrative activities are centred on data gathering, data processing and data generation, through the creation of metrics and trends from the digital data of their users (Grohmann, 2020).

This scenario has led researchers to affirm the existence of an algorithmic society, which should be based on legal principles such as the idea that the owners of algorithmic systems are the fiduciaries of information, that people who use and implement the systems have public responsibilities towards people who are not consumers or final users, that system owners are publicly obliged to avoid externalizing the costs and damages of their operations (Balkin, 2017) and that «a robot [or algorithmic system] should always make clear the identity of its creator, controller or owner» (Pasquale, 2017, p.1253).

Speaking of an «era of the algorithm», Rainie and Anderson (2017) list seven main topics related to the inevitability of algorithms, concerns and social challenges, which in our understanding can apply to the presence of algorithms in journalism as well: algorithms will continue to spread; good things are to come; humanity and human judgement are lost when data and predictive modelling become dominant; there are biases in algorithmically organized systems; algorithmic categorizations deepen rifts; unemployment will rise; there is a greater need for algorithmic training, transparency and oversight.

## 3. Journalistic routines in the era of the algorithm

The concept of routine comes up in association with the *modus operandi* within organizations and serves to highlight a habit or constant practice. Milagres (2011) points out a set of the main traits of routines, listed by several authors: repetitive; collective; non-deliberated (self-imposed); stable; dynamic; processual; dependent on context and history. In summation, «routines are patterns of behaviour that lead to the formation of and come from rules – explicit and implicit – and the predisposition to certain responses when faced with certain 'triggers'» (Milagres, 2011, p.189).

According to the theory of journalistic practice, there are five fundamental elements in the construction of journalistic routines: «practice, performance, environment, order and change» (Marocco, 2021, p.1). In accordance with this theory and Bourdieu's perspective, we consider that the journalistic field is indissociable from technological evolution, as «a field is a microcosm included in the macrocosm that is made up of the global social space» (Ryfe *cit in* Marocco, 2021, p.6).

Innovation in newsrooms is an «organizational process characterized by different dynamics, mechanisms and negotiations» (Paulussen, 2016, p.194), where different actors relate to one another. As these relationships change, «new hybrid contexts – technologies which intertwine with values, routines and sociocultural experiences – can arise» (Schapals & Porlezza, 2020, p.16). However, notions such as professional control and autonomy can be blockers of innovation (Paulussen, 2016), as there is a fear that technologies may have an impact in editorial autonomy (Deuze *cit in* Paulussen, 2016). Lack of financial investment, lack of specialized resources and fear of failure (Santos & Salaverría, 2021) are other factors which cause delays in innovation in the journalistic field.

Against a backdrop of crisis for the economic model of traditional journalism, Santos and Salaverría (2021) acknowledge that journalistic companies will need to adapt to the technological context they are in in order to achieve their goals when it comes to audience and profit, by using data bases, algorithms, automated systems and artificial intelligence in their favour. As Wölker and Powell (2015) write, automated journalism – the application of programmed algorithms towards the generation of news – can be seen as an opportunity because it allows for faster production of news in greater number, in several languages, and possibly with fewer mistakes and prejudices. Automated journalism transforms journalistic routines and brings with it «new actors in the make-up of the news product» (Aguiar & Andrade, 2020, p.72), including analysts, tech specialists and programmers. To consider the role of the journalist implies placing them within the structural changes that have been taking place within newsrooms. Several authors defend that the technologies do not replace the journalist, and instead move them towards the role of verifying, interpreting, and making sense of information (Anderson, Bell & Shirky, 2013; Quandt, Sant'Anna, Winques & Máximo, 2021). Wölker and Powell (2015) mention that algorithms are not fit for playing the role of gatekeeper, and that that role should continue to the played by journalists, as watchdogs of governments and society. However, in automated journalism, the algorithms gather information and provide it to the journalist in the form of an article. The action of this algorithm is determined ahead of time by a programmer. «The question is: would it not be necessary for the journalist to approach this knowledge and incorporate it into their productive routines?» (Aguiar & Andrade, 2020, p.76). In this case, the job of gatekeeper appears to fall to the mathematical formulas behind

the functioning of the algorithm, which are written by a professional who is not a journalist.

The relationship between journalists and techno-actors (Canavilhas et al., 2014), and the training of professionals with hybrid profiles «who are able to marry journalistic know-how with expertise on robot development processes, statistical regression, probability calculations; that is, machine programming at the service of journalism as new forms of fact-finding and, therefore, algorithmic mediation» (Aguiar & Andrade, 2020, p.73), raise fears regarding the preservation of the ethical values of journalism and the autonomy of the journalist as a content producer.

A study by Ruiz, Rubio and Verdú (2021) shows the collective vision of a group of 10 Spanish specialists on the use of algorithms in journalistic production. The questionnaires that were applied showed a general concern with ethical challenges, relating to privacy guarantees for users; the potential of the use of technology; transparency; training for journalists and journalism students; fake news; algorithmic bias/prejudice, among others. The same specialists considered that training in universities, internal norms for media functioning and deontological codes can contribute towards improving journalists' ethics when using technological instruments.

Cardoso and Baldi (2021) point out that there is «a human resources issue, given that journalists have not so far been trained towards work with data extraction, filtering, matching and visualization programmes» (p.17). As a strategy towards the capacitation of journalists for the understanding of challenges imposed using artificial intelligence, research groups and global initiatives have arisen, such as *Collab Challenges*, a series of collaborative experiments with participants from around 20 news organizations, where innovative solutions are explored towards improving journalism with the use of artificial intelligence. Aguiar and Andrade (2020) conclude that it is good that journalists acquire new knowledge related to technology, but that their job cannot be reduced to «a curator of information, who accompanies the news process in the new digital work platforms as a supporting actor» (p.77).

## 4. Technological applications in newspapers

Around the world, initiatives, and experiments with new technologies in journalism are arising. The creation of automated systems with different goals is more visible in large news brands *(The New York Times; The Guardian; Le Monde; Los Angeles Times; The Press Association; BBC)*. A study from the Knight Foundation, which analysed 130 journalistic brands' projects, found out that the purpose most often identified as the main reason for using artificial intelligence (AI) was «increasing news production capacity» (47%), followed by «cost reduction» (27%) and «revenue optimization» (12%) (Cardoso & Baldi, 2021).

In China in 2018, news agency Xinhua launched its first two robot newscasters. The agency pointed out that the creation of these robots would have as its main advantages the reduction in production costs, the efficiency in daily news, and an improvement in reporting quality (Silveira, 2020).

*The New York Times* has developed the *CMS Photo Project,* a photo lookup system which uses natural language processing (NLP) techniques, that has been consistently improved upon to become more precise and effective in identifying relevant photographs. All the developments in this software are shared on *NYT Open* (Frank, 2020)

under an open code policy, allowing anyone to find mistakes and participate in the improvement of this software.

An example of algorithmic application to news production is the *Los Angeles Times*' *Quakebot*, a software that will automatically write an earthquake alert for the newsroom. This alert is then verified by a newspaper editor, who will decide whether or not to publish it (Los Angeles Times, 2019).

A similar case happened during the coverage of Brasil's local election by *O Globo*, which created more than 5,500 stories automatically, based on a set of official data, with the goal of guaranteeing election coverage even for the smallest places in the country (Shaw, 2021).

In Portugal, Agência Lusa news agency had, for a time, a *software* that would write news stories about the stock market opening and closing (Nunes, 2019). Similarly, to what happened at the *Los Angeles Times*, the automatically written text would be validated by the journalist before publication. To some extent, these systems work like editorial algorithms, because they produce news, but require a certain level of human supervision (Marconi, 2020). In an interview with the newspaper *Eco*, Luísa Meireles, then director of Agência Lusa, stated that these technologies made routine work easier for journalists (Nunes, 2019). Today, the application is not used, as it is going through a second stage of development.

Another example is the *Zerozero* sports news outlet, founded in 2003, which deploys *Prosebot*, an algorithm which writes news based on the results of all competitions and types of sports. *Prosebot* accesses databases that make match and competition records available and produces text content through natural language processing (NLP) techniques.

> The main advantage of *Prosebot* is that it allows journalists to have a working draft for producing news. Through the tool's automated summaries, *Prosebot* works as a tool for making instant drafts that the journalist can use when writing news content. This can be particularly powerful in terms of scalability once we consider the amount of results that come out every week out of national and local championships, especially in the younger tiers. (Pires, 2021).

At a national level, there have been other sporadic cases of use of AI in journalism, such as newspaper *Público*'s story, «*Quanto é que a covid-19 já custou em contratos com o Estado?*» («How much has covid-19 cost in state contracts?»), in which automation was used for processing information. In this work, machine learning techniques were used to catalogue the 16,996 contracts celebrated between the Government and private corporations due to the covid-19 pandemic[1].

Software and algorithms applied to journalism perform repetitive tasks «that do not generate monetization or business opportunities» (Cardoso & Baldi, 2021, p.8), such as transcribing interviews, content translation, content classification, and others. As those tasks derive from «a choice between previously stated options or, in a final instance, between one and zero» (Han, 2021, p.50), their level of intelligence is, to some extent, questionable.

1. The story can be viewed at: https://www.publico.pt/interactivo/gastos-covid-19#/ . For this project, the last search was performed on May 16th, 2022.

One can conclude that technologies applied to journalism are part of the field of computation, but are not intelligent, as they result from logical mathematical rules (Carreira, 2017) and they do not make decisions on their own. Linden and Dierickx (2019) state that «news automation has stagnated at an 'unintelligent' mode: which is noticeable in the continued use of the same kind of software in newsrooms» (p.153). This stagnation is also a reflection of journalists' fears of losing their identity or being replaced by machines (Linden & Dierickx, 2019).

## 5. Materials and methods

Methodologically, this work started with a bibliographic overview on artificial intelligence, algorithms and, more specifically, their uses in journalism. Aside from reading works of reference on those topics, we sought to research how those issues are being discussed in scientific production in Portugal. As an analytical window, we chose to search the Conference Proceedings for the Sociedade Portuguesa de Comunicação (Sopcom), the main scientific association in the country, from the past decade (2011-2021).

Once we had identified the published articles that mention the expressions artificial intelligence, algorithm and machine learning, we adopted, as the next step, the construction of a survey pretext intended to gather the perceptions of Portuguese journalists on the use of algorithms and artificial intelligence in production routines, directed to professionals working in the newspapers *Correio da Manhã, Diário de Notícias, Jornal de Notícias* and *Público*. The choice of these outlets was based on the fact that they are the four daily national newspapers with largest circulation (print edition) and reach (digital) in the country, according to fourth trimester 2021, as mentioned in Table 1, data from Associação Portuguesa para o Controlo de Tiragem e Circulação- APCT[2].

Table 1. Paid circulation and reach data from the four main Portuguese daily newspapers in the fourth trimester of 2021 (APCT, 2022)

| Newspaper | Circulation (print) | Reach (digital) |
|---|---|---|
| Correio da Manhã | 48,025 | 2,521 |
| Jornal de Notícias | 24,227 | 4,358 |
| Público | 11,619 | 40,456 |
| Diário de Notícias | 1,866 | 1,834 |

Created by authors.

Developed in the *Google Forms* platform with multiple choice, scale classification and open questions, allowing journalists to express themselves freely on the subject, the questionnaire was distributed through email and social media (LinkedIn and Facebook) to the four newspapers, having become available for answers between April 6th and May 6th, 2022.

2. Data on the circulation of newspapers in Portugal can be found at https://www.apct.pt/analise-simples

Some of the questions in the questionnaire were: are Portuguese journalists familiar with content made with the aid of algorithms and/or artificial intelligence? Have they created such content themselves? In what way, for Portuguese journalists, can algorithms and artificial intelligence contribute to journalism? What level of knowledge do Portuguese journalists have on algorithms and artificial intelligence? Do they participate in events on the subject? What would they like to learn about it?

Even though, quantitatively, the number of surveys answered (N=17) does not allow us to make necessarily generalizable statements considering the total number of journalists in Portugal, the fact that these are journalists in the most circulated daily newspapers in the country and the content of the answers to the open questions allow for relevant contributions to the discussion on the use of artificial intelligence and algorithms in journalism in Portugal. In addition, it should be noted that, for a later study, interviews will be conducted with the participants of the questionnaire.

## 6. Results

Research in Conference Proceedings for the last five Sopcom conferences highlights a growing, yet still timid, interest in artificial intelligence research in communications sciences in the last decade in Portugal, as we were able to identify 18 works in this period that include some mention of the expressions: 'artificial intelligence', 'algorithm' and 'machine learning'. Analysis by edition of the Conference also shows there is a tendency for growth in interest on the topic, as mentioned in Table 2, as 78% (14) of the presentations were made between 2015 and 2019[3].

Table 2. Addresses published in the Conference Proceedings for Sopcom conferences citing artificial intelligence, algorithm or machine learning

| Edition/ Conference Year | Mentions of «artificial intelligence» | Mentions of «algorithm» | Mentions of «Machine Learning» | Amount of works mentioning these expressions |
|---|---|---|---|---|
| VII / 2011 | 4 | 0 | 0 | 2 |
| VIII / 2013 | 0 | 2 | 0 | 2 |
| IX / 2015 | 0 | 15 | 0 | 5 |
| X / 2017 | 6 | 12 | 0 | 7 |
| XI / 2019 | 0 | 2 | 2 | 2 |
| Total | 10 | 31 | 2 | 18 |

Created by authors.

A second level of analysis shows, however, little connection between journalism and artificial intelligence and algorithms in the research works showcased here.

3. Due to the Covid-19 pandemic, and the need for physical distance as a preventative measure, the XII edition of the Sopcom Congress, originally foreseen for 2021, took place in April 2022. Because of this, and as it was not published at the time of writing this article, the Conference Proceedings for this edition were not included in this research.

Reading the abstract and keywords for each of these 18 presentations allows us to state that only one is about the implications of technology for journalistic routines, and none of them includes journalists' perceptions on the phenomenon.

From this perspective, through the answers to the survey, we leave contributions on three aspects: lack of knowledge about contents that made use of artificial intelligence and/or algorithms; openness to the use of artificial intelligence and algorithms; and a need for training.

About the lack of knowledge, it is striking that more than half (52.9%) of surveyed journalists mention that they do not know any journalistic contents produced with the use of algorithms and/or artificial intelligence.

Additionally, we verified that, even among those who said they knew this kind of work, there is a misunderstanding about it, as when asked to mention examples, some gave vague answers («stock market analysis; weather forecasting», «just interview transcription») or incorrect ones («*Polígrafo* and Fact Checking», «interactive news»).

Asked about topics they would like to learn about regarding algorithms and artificial intelligence to apply them in their work routines, many journalists gave vague answers which also point to a lack of knowledge on the subject. Some answers:

> *What they are for (respondent 6)*
> *What new challenges can come from this issue (respondent 7)*
> *What tools exist on this level for the Portuguese language (from Portugal) and what state of development they are in*
> *Solid training on methods (respondent 9)*
> *How I can use them in an effective way and how they can help my work (respondent 11)*
> *Learn how they work so that, when possible, I can use them in my day to day (respondent 12)*
> *How they work, how I can use them to make my work better (respondent 13)*
> *The most basic tasks (respondent 15)*

When it comes to perceptions on the use of algorithms and artificial intelligence, we can identify, in general, an open posture from the surveyed journalists, considering that only three (17.64%) qualified incorporating these technologies as negative or very negative. Some answers on how algorithms and artificial intelligence can contribute to journalism give us some clues in this direction.

> *They can help confirm some facts in a more immediate way and sometimes it is hard to do in the day to day of the newsroom (respondent 1)*
> *Through the treatment of large amounts of data (making the journalists' work easier) and the segmentation of the presentation of information for different kinds of users (which results in a better experience while consuming information) (respondent 3)*
> *By optimizing time, for instance, by transcribing interviews, identifying the best/most serious messages from readers, etc (respondent 4)*
> *As a way to help filter information, «tidy up» newspaper websites, at least partially, selecting tags, defining and analysing audiences, etc (respondent 7)*
> *Not only for content optimization (such as SEO, tags, etc) but also in terms of data «cleanliness» / analysis, it can suit newsrooms. It matters, however, that we forget / set aside the idea of technological singularity that we imagined years ago: without*

*humans, AI does not work – and one cannot replace the other. They should, in fact, complement each other (respondent 15)*

About training, an indicator worth highlighting is that, among surveyed journalists, only one stated that they had already participated in some course or event related to algorithms and/or artificial intelligence. When asked about how they would qualify their level of knowledge on algorithms and/or artificial intelligence, through a Likert scale, no participant selected the top level, which represented an advanced knowledge.

It is also worth registering that only one of the journalists – who is among those who never attended any training – stated that they had made any content using artificial intelligence and/or algorithms, in this case in the stage of selecting material. During this experience, the participant noted that they had difficulty «because they did not have enough knowledge to use machine learning in the project.»

## 7. Discussion and conclusions

The data gathered in the questionnaire offers clues about the Portuguese scenario for the use of algorithms and artificial intelligence in journalism. It was possible to verify that, in general, journalistic content using these technologies in the country is still rare and scattered.

At the same time, the analysis of the Sopcom Congress Proceedings books indicates an early stage of research on artificial intelligence and algorithms in Portugal, being an even greater challenge to conduct studies that address the use of these technologies in journalism.

JournalismIA, a global initiative supported by the Google News Initiative, which intends to empower news organizations for the use of artificial intelligence, gathers in an open database example of newspapers which have used artificial intelligence techniques. Until our last visit, out of the 111 case studies, none of them is a Portuguese newspaper[4]. The data found in this research that neither of the four most circulated national newspapers regularly use algorithms or artificial intelligence in news production confirms this situation.

The lack of Portuguese newspapers using these technologies can be connected both to the lack of knowledge participants show about the topic, as well as about the small number of academic papers establishing a connection between emerging technologies and their journalistic use. Lack of knowledge about the potential of artificial intelligence appears, therefore, as a central point in the issue.

In the report for JournalismAI, which included 71 news organizations, almost half the participants mentioned the need for education and literacy in newsrooms (training, education, and alphabetization), and also the need to hire professionals with new abilities (Beckett, 2019).

In our survey applied to Portuguese journalists, this tendency comes through, as only one participant has ever participated in courses or events about artificial

4. The database for the JournalismIA production can be consulted at the following link: https://airtable.com/shrKhe7Js48HvBhmG/tblBcSZESOAuy5Q9A. For this project, the last search was performed on May 16th, 2022.

intelligence. Therefore, it can be concluded that several factors such as a lack of competency related to artificial intelligence, lack of knowledge and understanding on their potential, scepticism towards the use of these technologies and lack of financial investment (Cardoso & Baldi, 2021) constitute barriers to the application of algorithms and artificial intelligence in the field of journalism in Portugal.

This analysis also leads to the conclusion that the use of these technologies in journalism is at an early stage in Portugal, which still faces a fundamental stage of overcoming the high degree of journalists' unfamiliarity with the possible uses for algorithms and/or artificial intelligence. A relevant step may be investing in journalists' training, coupled with editorial and financial strategies that foster innovation within newsrooms.

In conclusion, we would like to point out the preliminary nature of the study we have presented here, which will be deepened by widening the survey to journalists in other outlets in the country, allowing, in a future article, for presentation of quantitative data that would be more representative of the perceptions of Portuguese journalists on the use of algorithms and artificial intelligence in their productive routines.

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