CAN AUTOMATED NEWS HELP LOCAL JOURNALISM? AN EXPLORATORY STUDY IN PORTUGAL

Adriana Gonçalves & Ricardo Morais

In recent years, much has been said about how Artificial Intelligence (AI) and other emerging technologies may be able to help the media, and in particular local media, namely in the selection and filtering of large amounts of data, but also in the fight against disinformation (Rinehart & Kung, 2022; Newman, 2022; Beckett, 2019). However, despite the technology's potential, several unknowns remain, such as the real impact these technologies can have on the local news landscape, or whether these media outlets, known for their continued difficulties, can make use of these tools effectively. These questions arise not as a kind of brake on innovation in smaller newsrooms but as a result of a gap identified in different reports (Reuters Institute, The Associated Press), which show that these technologies "(...) have so far been centered among "large" publishers" (Rinehart & Kung, 2022, p. 4).

In this context, it is essential to reflect on local newsrooms' conditions to harness these technologies since, as with any innovation, a period of experimentation and adaptation is necessary. In the case of media outlets featured in the Associated Press study, researchers couldn't find any motivation to go through this period of experimentation. The reasons for this were the newsroom staff's lack of knowledge, time, and money (Rinehart & Kung, 2022).

However, it is also important to note that there are already some good examples among local media outlets, such as the newspapers *Bergens Tidende* from Sweden or *Bärgslagsbladet* from Norway, to mention just a few, where Artificial Intelligence has been successfully used in the automated production of articles. Considering these examples, while remaining aware of the Portuguese reality in terms of working conditions (Morais, Jerónimo & Correia, 2020; Jerónimo & Correia, 2020; Camponez et al., 2020), in this exploratory article we challenge two Portuguese local media directors to reflect on the opportunities and challenges of using AI in the newspapers they manage. Thus, through exploratory interviews with the directors of *Jornal do Fundão* and *Região de Leiria*, we sought their opinions about using automation technologies and AI in local journalism, and also on which activities could benefit from these technologies, how journalists' work can change, and what it would take for newsrooms to start using these tools.

We believe that the collected testimonies, more than giving us definitive answers, allow us to identify a set of clues that can be for the continuation of reflection on the potential of these tools, the difficulties of implementation in the Portuguese context and the path that should be taken so that the Portuguese local media are not left behind when it comes to the use of AI in local journalism.

In terms of structure, this article opens with a literature review about the transformations in journalism, the potential of AI systems and, in particular, news automation. Secondly, we present some journalistic projects of local scope that have stood out through their use of AI tools. At the same time, we establish a comparison with the Portuguese reality, highlighting some of the main challenges that local media outlets face. Thirdly, we briefly present our methodological procedures, explaining what led us to choose these two local newspapers and presenting the script that served as the basis for the interviews. Finally, we present our main results, giving voice to the directors of the newspapers, and we end with final considerations, where we try to highlight the most critical aspects that the interviewees identified, and leave some paths for future investigations.

Journalism and Artificial Intelligence: the potential of news automation

Journalism is a complex social practice involving diverse actors, institutions, and constantly changing technologies (Wiard, 2019). Today, journalism is going through profound changes due to accelerated technological innovations and a crisis of funding. In a context where communication becomes fluid and ubiquitous, using new AI tools is a survival strategy for some media outlets in order to streamline repetitive tasks and speed up certain processes (Cardoso et al., 2021).

Different automation software, databases and AI techniques have been integrated into several news organizations worldwide, working alongside traditional journalists, "thus blurring the boundaries between journalism, computer science and statistics" (Lindén, 2018, p. 238). Consequently, all stages of journalistic work, news gathering, gatekeeping, text production, and news dissemination, are changing.

News automation, which converts structured data into text based on rules, is one field that raises the most questions (Sirén-Heikel et al., 2019). This field is also known as computational journalism (Hamilton & Turner, 2009), machine-written news (Van Dalen, 2012), algorithmic journalism (Dörr, 2015), automated journalism (Graefe, 2016), robot journalism (Latar, 2018) or semi-automated journalism (Torrijos, 2021). News automation can be helpful in news stories that are centred around structured data, as happens in such beats as sports, weather, finance, traffic, and real estate (Lindén, 2018). Nevertheless, regardless of the beat, the purpose is always the same: "to make newsrooms more efficient, for instance, by increasing the volume [of news production]" (Lindén, 2018, p. 242).

However, implementing these technologies uses up financial and human resources, which are scarce at most media outlets, especially at the local level. Rivas-de-Roca (2021) highlights that "the local press enjoys lower levels of AI use due to its limited economic capacity" (p.166). However, some local media outlets have implemented robotization and achieved exciting results, such as an increase in their coverage of specific subjects and a higher

number of subscribers. Although it is true that the use of automation and AI in local journalism is going through an experimental phase, in a context where the "traditional business model that once supported local news crumbles" (Hess & Waller, 2017, p. 59), some studies in the field of sports show that automation reduces non-value-added tasks that take up a lot of journalists' time (Torrijos, 2019).

The evolution of technologies has allowed all kinds of information to be saved and stored by algorithms on the internet, contributing to the digitization and "datafication of life" (Lemos, 2021). Datafication allows for the conversion of all actions into tracking digital data (Lemos, 2021) that influences all activities, including journalism. The availability of large amounts of data boosts the use of AI technologies to process it.

Artificial Intelligence is an umbrella term for "a range of technologies such as automated statistical data analysis, machine learning, and natural language processing" (Deuze & Beckett, 2022, p.2). AI tools can be used in news gathering, content creation and dissemination processes (Deuze & Beckett, 2022) and have become increasingly important because of the high abundance of accessible data. A marked increase in speed of information circulation also triggered the use of AI in journalism.

In this context, news automation has become an emerging field interconnecting journalism and big data (Carlson, 2015) and can be a valuable tool to help media companies overcome their severe economic crisis: "The changes in content proliferation, the habits of media consumers and the obsolete business model of selling audience to advertisers trigger innovation in media organizations" (Pashevich, 2018, p.56).

The concept of "automated journalism" began to be discussed around 2009-2010, when Narrative Science and Automated Insights, two technology companies, were founded in the United States (Lindén, 2018). Their robots were used in media outlets such as *Forbes* and the *Associated Press*

(AP). In 2010, the *Los Angeles Times* released a software named *Quakebot*,[1] which automatically generates earthquake alerts (Graefe, 2016; Danzon-Chambaud & Cornia, 2021). In 2014, the *Associated Press* introduced the use of the *Wordsmith*[2] software "to automate production of thousands of quarterly corporate earning stories straight from financial data feeds without human intervention" (Rinehart & Kung, 2022, p.3). Today, the AP uses AI technology "to get early warnings of breaking news events, generate short summaries from longer narrative text, classify and apply digital metadata to news content and transcribe audio from video in real time" (Rinehart & Kung, 2022, p.3).

This was how news organizations took the first steps towards introducing automation in news production. Ever since, several news organizations have begun producing automated news articles, starting with leading media groups with high economic capital. *BBC, Reuters, Bloomberg*, and *The Guardian* have started to automate local information, sports results, and finance markets (Lara-González et al., 2022). In France, *Le Monde* also used automation during the Departmental Election night in 2015[3] (Lindén, 2018). A similar case took place in the coverage of local elections in Brazil by the newspaper *O Globo*, which automatically created more than 5,500 stories based on an official dataset to guarantee informative coverage even for the smallest districts in the country (Shaw, 2021).

"JournalismAI Case Studies Database"[4] compiles a list of other cases which includes 112 examples of news organizations worldwide that use AI tools for several tasks, including 22 which use it for news automation. These cases are from the UK, Sweden, Norway, USA, Germany, Australia, Argentina and Canada. Even though most examples are from internationally

1. More information about "Quakebot" available at: https://www.latimes.com/people/quakebot
2. More information about "Wordsmith" available at: https://automatedinsights.com/customer-stories/associated-press/
3 More information about the partnership between "Le Monde" and "Syllabs" available at https://www.lemonde.fr/le-monde/article/2015/03/23/des-robots-au-monde-pendant-les-elections-departementales-oui-et-non_5995670_4586753.html
4. Available at: https://airtable.com/shrKhe7Js48HvBhmG/tblBcSZESOAuy5Q9A

recognized media, such as the *BBC*, the *Associated Press* or *The Washington Post*, two local Nordic media outlets stand out: *Bärgslagsbladet*, part of *Bonnier Local News*[5] (Sweden), and *Bergens Tidende*[6] (Norway), which we will analyse further.

AI tools started being used by large US media companies and gradually emerged in smaller media outlets, such as *Hoodline* or small companies, such as Local Labs (Lindén, 2017; Wang, 2018; Rivas-de-Roca, 2021). Large media groups that use news automation frequently work with technology companies, such as Narrative Science (USA), Arria (UK), AX-Semantics or Text-On (Germany), Narrativa and Linguastat (Spain), Syllabs (France), United Robots (Northern Europe), among others.

Nevertheless, some media outlets have decided to strengthen their teams with programmers, IT specialists, designers and data analysts, or to cooperate with universities or start-ups to develop automated solutions. *Zerozero.pt*[7] is one such case: a sports media outlet founded in 2003 in Portugal, and the first case of news automation in the country, resulting from a collaboration between computer engineers (from University of Porto) and journalists. *Prosebot*[8], the solution they came up with, generates news pieces about the results of all football matches across the different leagues, using natural language processing (NLP) techniques (Canavilhas & Gonçalves, 2023). The main advantage is that it gives journalists an operational base for writing news. Through the tool's automatic syntheses, *Prosebot* works as an instant drafting tool journalists can use to write articles. This solution can be compelling in terms of scalability if we consider the number of matches that take place every weekend in national and local championships, especially if one includes the youth leagues (Pires, 2021).

At the local level, media companies struggle to find the human resources, time, or money to invest in AI and automation. Even so, in the United

5. More information about "Bärgslagsbladet" available at: https://www.bblat.se/
6. More information about "Bergens Tidende" available at: https://www.bt.no/
7. More information about "ZeroZero" available at: https://www.zerozero.pt/
8. More information about "Prosebot" available at: https://www.zerozero.pt/prosebot.php

States, 192 local newsrooms state that AI is helpful to their journalists and surrounding communities (Rinehart & Kung, 2022). Some smaller companies have helped this process along, such as Local Labs[9], a small company founded in 2006 in Chicago that provides local editions for metro newspapers in the city's suburbs (Lindén, 2017). Local Labs "centralises editorial processes with its combination of a newsroom management system with partly automated content creation and proactive gathering of events information" (Lindén, 2017, p.67). The use of automation ensures the same work can be done by fewer people, with all the advantages and risks this implies. However, this is an opportunity for newspapers to optimize journalists' work and have cheaper publishing solutions (Lindén, 2017).

Hoodline[10], a hyperlocal news website in San Francisco, is another example of an outlet "focused on the local stories that can be found by mining large data sets" (Wang, 2018, n.p.). The data is collected, analysed and filtered, and then *Hoodline* uses an automation software developed by Automated Insights[11] to generate articles from these data. The owner of the project emphasises that "robots are definitely not going to take over human journalists' work" but notes that, as happens at *Hoodline*, the "local news wire is meant to amplify the work local reporters are uniquely positioned to do" (Wang, 2018, n.p.).

In this first section, we would like to mention how all stages of the journalistic work process can potentially be affected by AI. Above all, we highlight how several media outlets have integrated AI into their newsrooms. We realise that major media conglomerates and outlets work mainly with specialised companies to develop automated solutions, but that some local projects have also sought to assert themselves in this context. It is precisely these kinds of projects that we will focus on in the next section.

9. More information about "Local Labs" available at: https://locallabs.com/
10. More information about "Hoodline" available at: https://hoodline.com/
11. More information about "Automated Insights" available at: https://automatedinsights.com/

How automation can work for local media: the cases of Bärgslagsbladet (Sweden) and Bergens Tidende (Norway)

Aforementioned United Robots is one of the organizations that has worked the most in the field of automated journalism out of Northern Europe. United Robots created their first software in 2015, when the local media group, *Bonnier Local News*, saw the opportunity to cover sports matches using technology. Today, this software even sends out text messages with interview questions to each team's coaches after the game. After this experience, the company looked for "opportunities to automate publishing in cases where speed is important and content can be personalized" (Lindén, 2018, p.242). In fact, United Robots has become the most renowned technology company developing AI solutions for media groups across several countries.

Bärgslagsbladet is part of the *Bonnier News Local* group, previously *Mittmedia.* The project's website shows that this small local publisher employs five journalists and an editor-in-chief, and covers the towns of Köping, Arboga and Kungsör, west of Stockholm. *Bärgslagsbladet* uses news automation in the topics of sports and real estate. The software produces news articles through a Natural Language Generation (NLG) process, using data from Everysport and the Swedish Land Registry (United Robots(a), n.d.).

In 2019, this software produced almost two thousand articles which were published automatically on the *Bärgslagsbladet* website and on its app. The United Robots website shows that local journalism is a daily battleground where journalists must decide "how to use limited editorial resources while making sure all the important stories get done" (United Robots(c), n.d., n.p). In this organization, automation is used for basic tasks, making them faster and more consistent. The newsroom uses it to distribute and report stories that would otherwise not get covered.

Another good example is *Bergens Tidende*, a regional title from the Schibsted group in Norway, which has been using news automation for coverage of the real estate market since 2019, also through United Robots' software. One of the reasons for using automation is the high amount of official data available,

which the software can easily handle. The bot chooses the approach that the article will adopt, evaluates real estate property data extracted from the Swedish Land Registry, applies an algorithm in collaboration with Google Street View and selects the most appropriate image to illustrate the content (Rivas-de-Roca, 2021). As a result, *Bergens Tidende*'s website includes a Homes Sales section that represents 5% of all article conversions. In a year, twelve thousand automated articles were published. According to The Project Lead, dozens of houses are sold in Bergen every day, which makes this content relevant and in high demand from buyers, sellers and others. United Robots claims that these software-generated news articles are high quality and provide value for readers at a local level (United Robots(b), n.d). The software also creates an automated annual report about local businesses, which was not previously published due to lack of resources. Today, this automated content is a success with many subscribers.

Nordics "have been at the forefront of developing and using robot journalism" (Borchardt, 2022, p.2), mainly because they have an open data culture. Pashevich (2018) recognises that "the experience of Norway shows that indeed news agencies have the necessary resources to develop automated journalism and that, no matter how beneficial the technology is for the local press, smaller newsrooms cannot afford to develop a text-writing robot in-house" (p.61), so working in partnerships with start-ups or universities can be a solution.

In these two cases, the newspaper directors point out as the main advantages the exponential increase in published news articles, and the expansion in coverage of specific regions and subjects that were not reported on before due to a lack of time and human resources. Subscriptions growth and higher audience engagement are also mentioned as key changes that came with automated content. In the same way, a study by the Knight Foundation, which analysed 130 projects by journalistic brands using automation, identified the main goals of these projects as: "increase in the capacity to produce news" (47%), followed by "cost reduction" (27%) and "revenue optimization (12%)" (Cardoso & Baldi, 2021, p. 9).

It becomes clear that automation can contribute to local journalism for a set of different reasons. Likewise, the two projects analysed here suggest possibilities that other local media outlets can explore. However, we must acknowledge that these two journalistic projects emerged in countries with very particular characteristics, which are interesting to consider when assessing the application of AI technologies in the Portuguese context. It is precisely this analysis that we will make in the next section.

The reality of Nordic countries and the challenges local journalism faces in Portugal

The culture and societal organization in Nordic countries, such as Sweden, Finland and Norway, differ significantly from those of Portugal. This difference can also be seen in journalism, for instance when it comes to the relationship between audiences and the media. "In Northern and Western Europe, which have strong and sophisticated democratic governments, there is a distinctive interest in media innovation and experimentation at the local level, and especially the emergence of hyperlocal start-ups" (Hess & Waller, 2017, p.82).

In fact, most research about software-generated news and other technologies are about case studies in these countries, where the use of technology is at a more advanced stage. Several constraints hinder the adoption of technological innovations in Portuguese journalism. Studies show that Portuguese media outlets are still very traditional, especially as the country's population becomes more aged, preferring to watch television instead of resourting to online media outlets to access information. On the other hand, news consumption by younger audiences mainly takes place online via apps or social media. Therefore, there is a gap in the news consumption habits of the older population and young people.

The prevalence of more traditional forms of media consumption, which can be a factor of resistance to the introduction of new technologies to newsrooms, is just one of the problems that affects local media in Portugal. The

truth is that there has been a vast amount of research that, in recent decades, has been dedicated to studying and analysing local journalism in its most varied dimensions (Morais & Jerónimo, 2023; Jerónimo et al., 2022a; 2022b, 2022c; Jerónimo & Esparza, 2022; Cardoso et al., 2021; Jenkins & Jerónimo, 2021; Carvalheiro et al., 2021; Morais et al., 2020; Camponez et al., 2020; Jerónimo & Correia, 2020; Ramos & Correia, 2020; Quintanilha et al., 2019; Campos & Jerónimo, 2019; Correia et al., 2019; Cardoso et al., 2017).

In this context of a growing body of research on local media, it's relevant to highlight the studies that, on the one hand, comprehensively analyse the working conditions of journalists (Jerónimo et al. 2022a; Morais et al. 2020), but also those that focus on how new technologies have transformed newsrooms and brought a set of new challenges to media outlets, which almost always face difficulties from the point of view of managing human and material resources (Morais & Jerónimo, 2023; Jerónimo et al., 2022c; Jenkins & Jerónimo, 2021; Correia et al., 2021; Campos & Jerónimo, 2019; Morais et al., 2020; Jerónimo & Correia, 2020; Ramos & Correia, 2020; Quintanilha et al., 2019; Cardoso et al., 2017).

The challenges that Portuguese local media companies face are not new. However, they remain associated with the lack of investment in one of the most critical elements for developing the activity: the journalists themselves. Portuguese local media companies continue to look for a business model that will allow them to survive in a context marked by the loss of advertising revenue and, more importantly, readers, or at least by their shift to other platforms (Morais et al., 2020).

This scenario is familiar. It has only deteriorated over time as the search comes up empty for solutions that help bring the country closer to other realities, such as that of the Nordic countries mentioned in this study. There is, however, a commonality between Portugal and the reality of the Nordic countries: the strong connection between citizens and local journalism. In the Portuguese case, the pandemic also demonstrated, even

more significantly, the importance citizens give to local media (Jenkins & Jerónimo, 2021; Jerónimo et al., 2020).

One of the main differences between the two realities is found in the willingness to pay for news. In the Nordic countries, there is a long tradition of subscribing to quality newspapers in print, both local and national. According to the most recent reports, 33% of Swedes pay for online news from national media and local news publishers (Newman et al., 2022, p.104). Many local news publishers have attracted growing numbers of online subscribers in recent years. In Portugal, the scenario is quite different since, according to the Digital News Report Portugal 2022, "only 12% of the Portuguese claim to have paid for news in digital format in the previous year – five percentage points fewer than the global average of 17%" (Cardoso et al., 2022, p. 29).

This data helps us understand how that there are two very different realities when talking about local journalism. Not only are these two societies with very different levels of development in the specific case of journalism, the working conditions for journalists are also different, as well as the commitment to the digital form and the willingness to pay for news content. All these factors are also essential towards understanding the options for integrating AI in Portuguese local media newsrooms, as we will see later in this work.

Methods and Research Questions

This exploratory study combines a literature review with a qualitative approach through semi-structured interviews with the directors of two local Portuguese newspapers: *Jornal do Fundão* and *Região de Leiria*. *Jornal do Fundão* and *Região de Leiria* are traditional media outlets founded in 1946 and 1984. Both have a weekly print publication, a website, and a strong presence on social media.

The selection of these two news outlets followed two conditions: first, we selected local newspapers that had benefited from Google funding or

participated in projects promoted by Google. Both *Jornal do Fundão* and *Região de Leiria* have participated in the Google News Showcase. This platform's aim is to "help participating publishers share their expertise and editorial voice through an enhanced storytelling experience" and "an improved online news experience that benefits readers and publishers" (Google News Showcase[12]). *Jornal do Fundão* has also been supported by the Journalism Emergency Relief Fund, created by Google Initiative News with the goal "to support small and medium-sized news organizations producing original news for local communities" (Google News Initiative[13]). *Região de Leiria* was also distinguished by Google's Digital News Innovation Fund (DNI), dedicated to discovering and supporting digital news projects and enhancing the quality of journalism (Digital News Innovation Fund[14]).

The second condition was the geographical distribution in Portugal, since the goal was to identify local media in the country's peripheral regions. The selected newspapers do not aim to statistically represent the local media universe in Portugal; the sample is only intended to explore and discuss the potential uses of AI in Portuguese local journalism.

We decided to use the interview technique as it is useful when exploring new topics (Boyce et al., 2006), like news automation, and understanding the context behind specific situations (Duarte, 2005). The use of AI in Portuguese media outlets is at an experimental stage. We are unaware of any cases of news automation application in the Portuguese local media ecosystem, so conducting exploratory interviews and collecting local outlet directors' opinions about this possibility seemed the most appropriate way to approach this subject.

Concerning our research questions, with this work, we are trying to understand: Can automation technologies and Artificial Intelligence help

12. More information about "Google News Showcase" available at: https://support.google.com/news/publisher-center/answer/10018888?hl=en
13. More information about the "Journalism Emergency Relief Fund" available at: https://newsinitiative.withgoogle.com/info/journalism-emergency-relief-fund/recipients
14. More information about the Google's Digital News Innovation Fund available at: https://newsinitiative.withgoogle.com/dnifund/

local media professionals? (RQ1); What activities performed by journalists in newsrooms could be aided by Artificial Intelligence tools? (RQ2); What are the main challenges to introducing Artificial Intelligence tools in local newsrooms? (RQ3).

In the following point, we present some of the main ideas brought up by the two newspaper directors, which help us find answers to the questions that guided us in this work, and that, above all, serve as a contribution towards a reflection on the importance, possibility and operationality of the adoption of AI tools in Portuguese local media.

Discussion and results

At a time when the potential of Artificial Intelligence is at the center of much discussion across the most varied areas of activity, we started by trying to understand the opinion of the interviewees about the possibility of using AI tools and specifically automation technologies, in journalism. The Director of *Região de Leiria* considers that AI represents a "great opportunity in the various stages of a newspaper's work: in the collection and analysis of information; in the production of journalistic pieces whether in text, audio or video formats; in the publication and distribution of journalistic content; and, lastly, in promoting content and engaging readers". Despite the potential she identifies, this journalist believes that media outlets with fewer resources and less financial capacity "will not be able to keep up with the technological advancement taking place in larger newsrooms". The Director of *Jornal do Fundão* shares this idea. He views the introduction of these technologies to local media newsrooms as distant. Although he believes that the introduction of AI to these outlets will still take time, he highlights the potential of automation and the possibility that AI tools can "free up journalists to create more demanding investigative content", releasing them from some of the routine activities that take up much of their time.

The Director of *Região de Leiria* also mentioned this possibility of allowing journalists to dedicate themselves to other types of content that require

more time and commitment, such as investigative journalism, reporting, or interviews. The interviewee believes that "professionals can, with the help of AI, have time to perform more time-consuming jobs that machines and systems are still unable to do, or that they cannot do with the sensitivity and analytical eye typical of humans." For the Director of *Jornal do Fundão* it all boils down to making the most of time, which is increasingly scarce, above all considering that "(...) the requirements are many, and newsrooms, as we know, are not exactly elastic. (...) Journalists have to write for multiple platforms and respond to multiple challenges." In this context, the head of this newspaper argues that "anything that grants journalists time is extraordinary".

Thinking concretely about the use of automatic text for writing news, we tried to understand whether the heads of these two weeklies consider that this could be used in the newsrooms they coordinate. The Director of *Jornal do Fundão* understands that the process could be used for "breaking news, so-called hard news, updates," as long as it is public interest content that would require time from the journalist that they do not always have or would have to withdraw from other activities that require more dedication, both in terms of research and production. The Director of *Região de Leiria* gives as an example the press releases from the Portuguese Institute of the Sea and the Atmosphere (relating to information about the weather), which are already prepared and sent out using AI, stressing that "news based on communications, numerical or statistical information and which translates into repetitive, standardized and uncreative work, could be produced in an automated way".

However, the interviewees are certain that the potential for using AI tools is much broader than that, and that several areas could benefit from it in the newsrooms they coordinate. The Director of *Jornal do Fundão*, for example, believes that "(...) automation can be useful not only in the writing stage, in the automatic writing of a short text, but also the process of research or guidance of the journalist in researching a more in-depth topic, for example, by pointing out some paths, some research guidelines, because without

research there is no good journalism". The Director of *Região de Leiria* shares this idea, especially considering "the size of local media teams." For her, AI tools "could make an excellent contribution to collecting, analysing and processing large amounts of data. They would allow us to do work that we are currently not in a position to do, which could be a breath of fresh air. Making some journalists data scientists, for example." But for this interviewee, AI can also be significant "in identifying false information, in the fight against fake news" since she considers that, at the local level, "it is more difficult to prove what has been said, what has been done, it is more difficult than in the national media". In addition to being an essential fact-checking tool, the Director of the *Região de Leiria* also sees a possibility for use in content customization, as well as for interactions with readers, namely through "(...) chatbots, moderation systems and response to comments", which could be "(...) a way to achieve greater involvement with readers".

Both Directors see the potential for using AI in the newsrooms they lead. However, they also emphasize many challenges to adopting these new tools. The Director of *Jornal do Fundão* names one of the biggest and main challenges as the lack of "financial support." He also draws attention to the specifities of local media, which force people to think differently. "The local press has other routines that are different from the national and international press because it isn't as based on breaking news, hard news, as the big news outlets. The rhythm of the regional press is different; we often talk about newspapers where news is not abundant. (...) The regional press has less current material to work on, so it does not ask for these 'helpers' so urgently, which can also justify this delay in adopting these instruments." Despite the challenges, the head of the weekly does not doubt that AI tools will eventually reach all newsrooms. The Director of *Região de Leiria* makes several observations concerning the challenges facing the introduction of AI tools in newsrooms. The journalist begins by recalling the difficulties that local media outlets face, questioning "how local newspapers, many with a noose around their throats and taking their first steps in the digital medium, are going to find the money and staff to seize all the opportunities that

technology offers, namely with AI?" The professional also believes that it is already a challenge to manage a newsroom and the workflow for paper and digital. Introducing a new dimension can make the work even more difficult, especially because of the scarcity of resources.

Nevertheless, the Director of *Região de Leiria* also addresses other issues regarding the relationship between local media outlets and the communities where they operate. For the journalist, it is also a challenge to understand how "machines can be put in place to produce news articles without limiting themselves to being megaphones for politicians and companies, generating texts without any critical sense?" Proximity to sources, interaction with readers, and the way the readers would perceive the work of newspapers are some of the other issues raised by the Director when considering the introduction of AI in newsrooms. In this context, the journalist asks: "How are we going to tell readers that some of the news they are 'consuming' is made by machines? What will their reaction be? And what do we do if the reaction is bad?" The possibility of errors is also addressed, as well as who is accountable for them, without forgetting privacy issues associated with the amount of data AI tools can access. Finally, the journalist also recalls what she believes is a considerable challenge: the lack of literacy of a large part of the population, to whom it would be difficult to explain what AI is.

These excerpts from the interviews of the two directors can help us to reflect on a set of challenges facing the introduction of AI journalism to local media newsrooms that cannot be ignored. In the next section, we highlight the essential aspects of this work, establish connections between some of the perspectives presented with the literature review, and suggest paths forward for further research in this area.

Conclusion

Regarding the questions that guided this work, we can conclude that automation technologies and Artificial Intelligence can help local media professionals (RQ1), at least that is what the interviewed Directors believe

– they envision great potential for these tools to help journalists have time for the more demanding activities in newsrooms. Concerning which activities performed by journalists in newsrooms could be assisted by Artificial Intelligence tools (RQ2), the answers point to the possibility that AI can perform some of the most mechanic and routine tasks. The Directors suggest AI can be helpful in the news writing process and also during the research stage, as well as content verification and the management of the relationship with readers. Finally, regarding the main challenges to introducing AI tools in local media newsrooms (RQ3), the interviewees identify lack of investment, resources and time for the necessary training and experimentation as the most important hurdles that must be overcome.

The interviews with these two directors of the local media have thus allowed us to understand that it may be too early to think about introducing AI to local journalism. It is at least this idea that we are left with when we relate the answers we obtained with our collected data from the literature review. The field of studies on local media that has been consolidated in recent decades in Portugal demonstrates that there are several problems in local media newsrooms, and lack of investment, and consequent lack of human resources, is perhaps the one that most affects the activity of these media outlets and their outlook for future development.

The interviews allowed us to corroborate this while dispelling the popular notion that there is resistance to change or a lack of will to innovate on the part of local journalists. The two Directors' responses show they have little doubt about the potential of AI tools, particularly for the generation of automated news. The question of whether AI will come to their newsrooms does not arise in terms of the potential application of the technology, but rather in terms of how this introduction could possibly be made in the face of such a vast range of challenges that make it difficult even to write for a weekly print edition, a website and social media. The lack of professionals, the shrinking of newsroom staff, the lack of investment and even the lack of support from readers continue to be factors that characterize the reality of Portuguese local media outlets, and that distance them from other realities

where the introduction of new technologies can be done much faster, as ended up happening with AI.

In this context, the examples that we have presented, coming from Northern Europe, serve only to show that it is possible to use AI tools successfully in local media to work on the most varied themes. Even though these are good examples, they fail to be seen as more than a reality far removed from the one we have in Portugal where, even at a national level, experiments with the use of AI by the media are still scarce. However, the examples presented also show us another critical aspect that must be considered by local media. The road to introducing AI tools to local media cannot be walked alone, firstly because of the lack of resources, but also because the best international examples of usage show us the importance of collaborating with private companies and also with universities in the development of solutions adapted to the needs of each local media outlet. These collaborations should also be the path that Portuguese local media should follow. At the same time, we argue that thinking about possible applications and developing a strategy and a plan is necessary before moving forward. This planning is essential so that the already scarce resources of the local media ecosystem are not used up through simple experiments without continuity. In this sense, the need for further research becomes evident.

On the one hand, it would be important to study the companies that have developed AI tools in Portugal, in order to understand which solutions have the potential to be adopted by local media. The same happens with universities. It will also be important that research in the area of local media and proximity journalism can expand beyond the field of journalism; that is, increasingly multidisciplinary approaches and investigations will be fundamental to enhance the area of AI in journalism.

As we mentioned at the beginning of this work, more than answers, we seek, with this exploratory investigation, to promote reflection about the potential of AI tools, but above all, about the impact of their practical and actual use by the local media.

References

Beckett, C. (2019). *New powers, new responsibilities. A global survey of journalism and artificial intelligence*. Journalism AI, Polis, Department of Media and Communications, The London School of Economics and Political Science. https://www.lse.ac.uk/media-and-communications/polis/JournalismAI/The-report

Boyce, C., & Neale, P. (2006). *Conducting in-depth interviews: A guide for designing and conducting in-depth interviews for evaluation input* (Vol. 2). Pathfinder International. https://bit.ly/41FeVn3

Borchardt, A. (2022). Go Robots, Go! the Value and Challenges of Artificial Intelligence for Local Journalism. *Digital Journalism 10 (10).* 10.1080/21670811.2022.2149584

Camponez, C., Miranda, J., Fidalgo, J. Garcia, J. L., Matos, J. N., Oliveira, M., Martins, P. & Silva, P. A. (2020). *Estudo sobre os Efeitos do Estado de Emergência no Jornalismo no Contexto da Pandemia Covid-19*. Sopcom.

Canavilhas, J., & Gonçalves, A. (2023). Produção de texto automático no jornalismo desportivo português: estudo exploratório do Prosebot/Zerozero.pt. *methaodos.Revista De Ciencias Sociales, 11(2)*. https://doi.org/10.17502/mrcs.v11i2.682

Cardoso, G., Paisana, M., & Pinto-Martinho, A. (2022). *Digital News Report Portugal 2022*. OberCom - Observatório da Comunicação ISCTE-IUL Media Lab. Available online: https://obercom.pt/wp-content/uploads/2022/06/DNRPT_2022_FINAL_14Jun.pdf (accessed on 13 March 2023).

Cardoso, G. & Baldi, V. (2021). *Algoritmos e notícias - A oportunidade da inteligência artificial no jornalismo.* OberCom - Observatório da Comunicação. https://bit.ly/41ELXUf

Cardoso, G., Baldi, V., Quintanilha, T. L., & Paisana, M. (2021). *Impacto do Coronavirus e da crise pandémica no sistema mediático português e global Versão III*. OberCom–Observatório da Comunicação. Available online: https://obercom.pt/wp-content/uploads/2021/02/Covid_III_FINAL.pdf (accessed on 13 January 2023).

Carlson, M. (2015). The Robotic Reporter: Automated journalism and the redefinition of labor, compositional forms, and journalistic authority. *Digital Journalism 3 (3), 416-431.* https://doi.org/10.1080/21670811.2014.976412

Carvalheiro, J. R., Morais, R., & Ramos, G. (2021). Imprensa regional, meios digitais e a (nova) diáspora. *Observatorio (OBS*),* 15(3). https://doi.org/10.15847/obsOBS15320211714

Correia, J. C., Jerónimo, P., & Gradim, A. (2019). Fake news: Emotion, belief and reason in selective sharing in contexts of proximity. *Brazilian Journalism Research,* 15(3), 590–613. https://doi.org/10.25200/BJR.v15n3.2019.1219

Danzon-Chambaud, S. & Cornia, A. (2021). Changing or Reinforcing the "Rules of the Game": A Field Theory Perspective on the Impacts of Automated Journalism on Media Practitioners. *Journalism Practice*, 1-15. 10.1080/17512786.2021.1919179

Deuze, M., & Beckett, C. (2022). Imagination, Algorithms and News: Developing AI Literacy for Journalism. *Digital Journalism*, 1-6. 10.1080/21670811.2022.2119152

Dörr, K. N. (2016). Mapping the field of algorithmic journalism. *Digital journalism,* 4(6), 700-722. https://doi.org/10.1080/21670811.2015.1096748

Duarte, J. (2005). Entrevista em profundidade. In Duarte, J. & Barros, A. (Eds.). *Métodos e técnicas de pesquisa em comunicação,* 62-83. Atlas.

Graefe, A. (2016). *Guide to Automated Journalism*. Columbia University Libraries. https://doi.org/10.7916/D80G3XDJ

Hamilton, J. T., & Turner, F. (2009, July). Accountability through algorithm: Developing the field of computational journalism. In *Report from the Center for Advanced Study in the Behavioral Sciences, Summer Workshop,* 27-41.

Hess, K. & Waller, L. (2017). *Local journalism in a digital world.* Bloomsbury Publishing.

Jenkins, J., & Jerónimo, P. (2021). Changing the Beat? Local Online Newsmaking in Finland, France, Germany, Portugal, and the U.K. *Journalism Practice* 15(9), 1–18. https://doi.org/10.1080/17512786.2021.1913626

Jerónimo, P., & Correia, J. C. (Eds.) (2020). *O Pulsar da Proximidade nos Media e no Jornalismo*. LabCom Books.

Jerónimo, P., & Esparza, M. S. (2022). Disinformation at a Local Level: An Emerging Discussion. *Publications,* 10(2), 15. https://doi.org/10.3390/publications10020015

Jerónimo, P., Ballesteros, C., Sá, S., & Morais, R. (2022a). Jornalistas locais e condições laborais sob um olhar de género. *Ex æquo* 45, 157–75. https://doi.org/10.22355/exaequo.2022.45.11

Jerónimo, P., Ramos, G., & Torre, L. (2022b). News Deserts Europe 2022: Portugal Report. MediaTrust.Lab/LabCom. Available online: https://labcomca.ubi.pt/wp-content/uploads/2023/02/news_deserts_europe_2022_.pdf (accessed on 11 March 2023).

Jerónimo, P., Correia, J. C., & Gradim, A. (2022c). Are We Close Enough? Digital Challenges to Local Journalists. *Journalism Practice* 16(5), 813–827. https://doi.org/10.1080/17512786.2020.1818607

Jerónimo, P., & Correia, J. C. (Eds.) (2020). *O pulsar da proximidade nos media e no jornalismo*. Livros LabCom.

Lara-González, A., García-Avilés, J. & Arias-Robles, F. (2022). Implantación de la Inteligencia Artificial en los medios españoles: análisis de las percepciones de los profesionales. *Textual & Visual Media 15,* 1-16. https://doi.org/10.56418/txt.15.2022.001

Latar, B. (2018). *Robot journalism: Can human journalism survive?* World Scientific.

Lemos, A. (2021). Dataficação da vida. *Civitas, Revista de Ciências Sociais,* 21(2), 193-202. http://dx.doi.org/10.15448/1984-7289.2021.2.39638

Lindén, C. (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

Lindén, C. (2018). Algorithms are a reporter's new best friend. News automation and the case for augmented journalism. In *The Routledge Handbook of Developments in Digital Journalism Studies*, 237-250. Routledge.

Morais, R, & Jerónimo, P. (2023). "Platformization of News", Authorship, and Unverified Content: Perceptions around Local Media. *Social Sciences,* 12, 200. https://doi.org/10.3390/ socsci12040200

Morais, R., Jerónimo, P. & Correia, J. (2020). *Jornalismo na Região Centro: Trabalho, Tecnologia e Negócio*. LabCom Books.

Newman, N., Fletcher, R., Robertson, C., Eddy, K. & Nielsen, R. (2022). *Reuters Institute Digital News Report 2022*. Reuters Institute for the study of Journalism. Oxford University. Available online: https:// reutersinstitute.politics.ox.ac.uk/sites/default/ files/2022-06/Digital_ News-Report_2022.pdf (accessed on 13 January 2023).

Newman, N. (2022). *Digital News Project. Journalism, Media, and Technology Trends and Predictions 2022*. Reuters Institute for the Study of Journalism. University of Oxford. https://ora.ox.ac.uk/objects/ uuid:3802db3d-fcb0-42fd-be10-90123d37a6f5

Pashevich, E. (2018). Automation of news production in Norway: Augmenting newsroom with artificial intelligence. [Master's Thesis in Nordic Media Department of Media & Communication Faculty of Humanities, University of Oslo]. https://www.duo.uio.no/handle/10852/63213

Pires, R. (2021, August 1). *Prosebot: o comentador de bancada baseado em inteligência artificial.* Notícias Universidade do Porto. https://bit.ly/3PGPaND

Rinehart, A. & Kung, E. (2022). *Artificial Intelligence in Local News. A survey of US newsrooms'AI readiness.* The Associated Press.

Rivas-de-Roca, R. (2021). Oportunidades de la robotización en el periodismo local: el caso de 'Mittmedia'. *Index. comunicación,* 11 (2), 165-185. https://doi.org/10.33732/ixc/11/02Oportu

Shaw, R. (2021). *Uso de Inteligencia artificial en los medios de comunicación de América Latina*. Centro Latinoamericano de Investigación Periodística (CLIP). https://bit.ly/3LUNxZx

Sirén-Heikel, S., Leppänen, L., Lindén, C. & Bäck, A. (2019). Unboxing news automation: Exploring imagined affordances of automation in news journalism. *Nordic Journal of Media Studies*, 1 (1), 47-66. https://doi.org/10.2478/njms-2019-0004

Torrijos, J. (2021). Semi-automated Journalism. Reinforcing Ethics to Make the Most Artificial Intelligence for Writing News. In Luengo, M. & Herrera-Damas, S. (Eds.). *News media innovation reconsidered: ethics and values in a creative reconstruction of journalism,* 124-137. Wiley. https://doi.org/10.1002/9781119706519.ch8

United Robots (a) (n.d.). *Automated real estate texts drive subscription sales in Norway*. https://www.unitedrobots.ai/resources/cases/automated-home-sales-texts-drive-subscription-sales

United Robots (b) (n.d.). *Newsroom automation playbook series. Reimagining local sports*. https://www.unitedrobots.ai/download-sports-playbook

United Robots (c). (n.d.). *Newsroom automation playbook series. Supporting the tiny newsroom*. https://www.unitedrobots.ai/download-local-newsroom-playbook

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

Wang, S. (2018, February 5). *Hyperlocal news site in San Francisco is reinventing itself with an automated local news wire*. NiemanLab. https://tinyurl.com/y8hwgtzx

Wiard, V. (2019). Actor-network theory and journalism. In *Oxford Research Encyclopedia of Communication*. https://doi.org/10.1093/acrefore/9780190228613.013.774