Use of artificial intelligence in synthetic media: first newsrooms without journalists

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Ufarte-Ruiz, María-José; **Murcia-Verdú, Francisco-José**; **Túñez-López, José-Miguel** (2023). "Use of artificial intelligence in synthetic media: first newsrooms without journalists". *Profesional de la información*, v. 32, n. 2, e320203.

https://doi.org/10.3145/epi.2023.mar.03

Manuscript received on 28th July 2022
Accepted on 21th November 2022

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Abstract

The boom in artificial intelligence and automated technology in the journalistic profession has given rise to what are called synthetic media (Crusafon, 2022), media outlets that produce and publish texts, audio, videos, and other news content through processes executed solely by algorithms, without any intervention from journalists. This research has several objectives: to identify the first synthetic media outlets already operating, to describe how these newsrooms without journalists work, to better understand the type of content they produce, and to find out whether these are isolated and ephemeral operations or if, on the contrary, they mark the beginning of a trend toward journalism without the direct intervention of journalists. To this end, we have used an exploratory methodology, enabling us to identify four synthetic media outlets, which have been taken as an analysis sample: *JX Press Corp* (Japan); *Reuters News Tracer* (United Kingdom), *News Republic* (France), and *Videre AI* (Spain). An analysis of the news content on each project's web pages was combined with in-depth semistructured interviews with the heads of technology and communication of the three European ventures. The Japanese initiative has no human staff, so its chatbot was the only way to obtain information. The purpose was to learn about the initiatives' news production process, their impact on the journalistic profession, and their viability. This analysis helps demonstrate that the journalistic world's reliance on artificial intelligence is becoming increasingly evident and that communication agencies are the first companies to invest in developing and distributing synthetic content to benchmark media. These initiatives, although still limited, are the most recent step in the process of gradually integrating artificial intelligence into news production.

Keywords

Artificial intelligence; AI; Automation; Bots; News production; Robotized journalism; Artificial journalism; Newsrooms without journalists; Synthetic media; Synthetic journalism; Journalistic profession; Journalists; Digital native media.

Funding

This article is a result of the project "Public audiovisual media in the face of the platform ecosystem: models for the management and evaluation of public reference value for Spain" (PID2021-122386OB-I00), funded by the Spanish *Ministry of Science and Innovation*, the *Spanish Research Agency* (*AEI*), and the *European Regional Development Fund* (*ERDF*).

1. Introduction

The automation of news production and transmission is gradually becoming more widespread in the newsmaking process, to the point that there are newsrooms that are already fully staffed by robots that perform all the tasks involved in the stages of information gathering, text processing, and news transmission. Media outlets without journalists, or synthetic media (**Crusafon**, 2022), are the most recent development in the process of gradually integrating artificial intelligence (AI) into news production, which has led to an increasing robotization of news production since the first applications for the automation of journalism were created in the late 1980s (**Russell**; **Norving**, 2003).

Since the *Quakebot* algorithm of the *Los Angeles Times* first published news about an earthquake in California in March 2014 (**Ufarte-Ruiz**; **Manfredi-Sánchez**, 2019), this technology has been applied by leading international media outlets (**Prisecaru**, 2016), reshaping the way that news is produced with changes in journalistic routines and dynamics (**Diakopoulos**, 2019; **Flores-Vivar**, 2018; **Lindén**, 2017; **Lokot**; **Diakopoulos**, 2016; **Oppenheimer**, 2018; **Powers**, 2012; **Túñez-López**; **Toural-Bran**, 2018):

- In Brazil, they are used to write news about House bills (**Monnerat**, 2018),
- the Chinese media outlet *Southern Metropolis Daily* experimented with the *Xiao Nan* robot for text production (**Martin**, 2017), and
- the *Financial News* in South Korea publishes automated pieces about the stock market (**Jung** *et al*. 2017).

In Europe, **Gani** and **Haddou** (2014) note that *The Guardian*, the *BBC*, and *The Telegraph* have also joined in this trend, using AI to report election results in France (**Sánchez-Gonzales**; **Sánchez-González**, 2017) and Finland (**Melin**, *et al.*, 2018). In Sweden, the newspaper *Svenska Dagbladet* developed an algorithm to personalize its homepage (**Stern**, 2017); in Germany it is used for sports coverage (**Horky**; **Pelka**, 2017); and in Norway, it is used to increase the efficiency of journalists (**Karlsen**; **Stavelin**, 2014). **De-Lara**, **García-Avilés** and **Arias-Robles** (2022) state that, in Spain, the media outlets and specialized agencies that are investing in artificial intelligence are *Mediaset*, *El confidencial*, *Maldita.es*, *Newtral*, *ABC*, *El periódico*, *Marca*, *El mundo deportivo*, *As*, *Prensa ibérica*, *Antena 3*, *Prisa radio*, *Europa Press*, *Narrativa*, *Prodigioso volcán*, *RTVE*, *Google news España*, *El país*, *TeleMadrid*, *Agencia EFE* and *El español*.

News automation is currently in a developmental stage (**Calvo-Rubio**; **Ufarte-Ruiz**, 2021), intertwining artificial intelligence applications' role in

- improving productivity and efficiency (**Papadimitriou**, 2016);
- increasing business profit (**Mittal**; **Kumaraguru**, 2014);
- enhancing accuracy (**Silverman**, 2013) and objectivity (**Graefe**, 2016);
- examining the credibility (**Wölker**; **Powell**, 2018) and quality of automated news (**Sandoval-Martín** *et al.*, 2019);
- recognizing patterns and trends (**Lemelshtrich-Latar**, 2018; **Steiner**, 2014; **Van-der-Kaa**; **Krahmer**, 2014);
- reducing the impact of disinformation and fake news (**Flew** *et al.*, 2012; **Flores-Vivar**, 2019; **Manfredi-Sánchez**; **Ufarte-Ruiz**, 2020);
- finding profiles on social networks (**Dickerson**; **Kagan**; **Subrahmanian**, 2014; **Ferrara** *et al.*, 2016; **Tavares**; **Faisal**, 2013); and
- personalizing information (**Newman** *et. al.*, 2019; **Keeney**, 2015; **Slater**; **Rouner**, 2002).

The primary goal of automation is to make the journalist's work more efficient, so in the opinion of **Autor** (2015), its implementation in the media beyond the sports and financial sections is crucial (**Meehan**, 1977). New professional roles, such as impact editor and platform editor, are also in demand (**Sixto-García**; **Rodríguez-Vázquez**; **López-García**, 2021).

The result is that, currently, four out of ten newsrooms already use artificial intelligence in news production (*The Journalism AI Report*, 2019), a practice that, in the scientific literature, has been referred to as

- artificial journalism (**Túñez-López**; **Toural-Bran**; **Valdiviezo-Abad**, 2019);
- robot journalism (**Burrell**, 2016; **Kim** *et al.*, 2007; **Lee**; **Kim**, 1998; **Levy**, 2012; **Salazar-García**, 2018; **Van-Dalen**, 2012);
- algorithmic journalism (**Anderson**, 2013);
- automated journalism (**Caswell**; **Dörr**, 2018; **Clerwall**, 2014; **Napoli**, 2014);
- computational journalism (**Coddington**, 2015; **Cohen**; **Hamilton**; **Turner**, 2011; **Gynnild**, 2014; **Vállez**; **Codina**, 2018);
- augmented journalism (**Ferrer-Conill**, 2015; **Pavlik**; **Bridges**, 2013); or
- high-tech journalism (**Salaverría**, 2016).

The first synthetic media outlets emerged on this technological scene (**Crusafon**, 2022); they have digital newsrooms that produce and publish texts, audios, videos, and other digital content through processes executed solely by algorithms, without any intervention from journalists. These media outlets have ignored the legal implications (**Montal**; **Reich**, 2017; **Weeks**, 2014) and the ethical and deontological challenges posed by the use of artificial intelligence in journalism, which include fact-checking, training professionals for its use and application, promoting transparency, detecting and controlling algorithmic biases, and not losing sight of the sense of commitment and social responsibility inherent in journalism (**Craig**; **Ketterer**; **Yousuf**, 2017; **Díaz-Campo**; **Chaparro-Domínguez**, 2020; **Lewis**; **Westlund**, 2015; **Thurman**; **Dörr**; **Kunert**, 2017; **Ufarte-Ruiz**; **Calvo-Rubio**; **Murcia-Verdú**, 2021).

> Synthetic media outlets have digital newsrooms that produce and publish texts, audios, videos, and other digital content through processes executed solely by algorithms, without any intervention from journalists

The automated news agency *Reporters And Data And Robots* (*RADAR*), created jointly in the United Kingdom by the *Press Association* and the data journalism startup *Urbs Media*, can be seen as a forerunner to these projects. Since 2018, the company has produced and distributed about 30,000 local news items per month automatically, only using public and government agencies databases. Its development model is similar to that of the US news agency *The Associated Press*, which used the software *WordSmith* to produce about 1.5 billion articles in 2014 without the intervention of a human journalist (**Nilsson**, 2019).

It is true that the development of these media is still in its incipient phase, but some international ventures are already beginning to take shape. Even upon an exhaustive review of the scientific literature, it was still not possible to identify relevant research on synthetic media and their impact on the journalistic profession, despite the fact that **Acemoglu** and **Restrepo** (2019); **Bostrom** (2014); **Bravo-Orellana**, **Santana-Ormeño** and **Rodón-Módol** (2014); **Brynjolfsson** and **McAfee** (2014); **Cerezo** (2018); **Cervera** (2017); **Cosoy** (2017); **Matsumoto** *et al.* (2007); and **Valdiviezo-Abad** and **Bonini** (2019) have warned that letting bots into newsrooms could lead to an unemployment crisis in the sector. Only **Barrat** (2013) predicts that this tool means the end of the human era, though he does not go into detail.

Hence, we have the opportunity to carry out this pioneering research at the national level using few references to the scientific literature. At the international level, studies by **Wu**, **Tandoc**, and **Salmon** (2019) and **Graefe** and **Bohlken** (2020) partially analyze this recent and constantly developing phenomenon. The works published to date have focused on media outlets that have started using automated writing or that have established partnerships with companies that specialize in natural language generation software. Therefore, this research is a pioneer in the area, as it attempts to identify the first media outlets that produce and distribute news through procedures carried out solely by machines –where no journalists are involved in writing or creating voiceovers for the text– at a time when the rapid pace of economic, social, and technological changes has highlighted the important role that innovation plays in gaining a competitive advantage in the journalistic sector.

Newsrooms without any journalists pose a major challenge for the industry, despite the fact that studies tend to focus on large media outlets with huge newsrooms, notwithstanding the current fragmentation of the sector. This is why more and more authors have identified a need to cast the perspective of the centralism of newsrooms out of academia and focus on developments in the sector that fall outside the ways in which traditional journalism is done (**Deuze**; **Witschge**, 2017).

The aim of this study is not to make generalizable conclusions but rather to consolidate descriptive knowledge about a research problem that requires scientific research to better establish its definition. Due to its prospective nature, we start from a blind hypothesis. Our objective is to identify cases of important pioneers in this activity, through which we aim to answer the following research questions:

Q1. How do these projects simulate human behavior when managing content and navigating interactions?

Q2. Have they had a negative impact on employment?

Q3. Are these newsrooms the companies of the future?

Q4. Are journalists unaware of their existence?

Q5. Has the image of the profession been affected?

Q6. What is their impact on news from public media outlets?

2. Objectives and methodology

The main objective of this research is to identify companies, media outlets, and agencies that only use algorithms to generate news content in the same way that an editor would do but without human intervention from a journalist. The study has the following secondary objectives:

SO1: analyze the production process of automated news;

SO2: examine how it engages its audience in a personalized way;

SO3: measure its impact on the journalism profession; and

SO4: evaluate its economic viability.

The staged methodological design was required to achieve these objectives (**Igartua**, 2006), resulting in a methodological triangulation (**Gaitán-Moya**; **Piñuel-Raigada**, 1998), which, according to **Gómez-Diago** (2010) and **Soler-Pujals** and **Enrique-Jiménez** (2012), contrasts information across different sources to obtain sufficient contextualization of the phenomena studied. Each stage is presented clearly so that other researchers can replicate this process under different circumstances at a later time and obtain comparable results, supplementing them or corroborating them to enable a coherent analysis (**Ortega-Mohedano**; **Pereira-Galhardi**; **Igartua**, 2016).

First, we carried out a review of the scientific literature, part of the secondary research (**Codina**, 2017), which confirmed that there were no prior studies on the subject being studied. As a consequence, a methodology based on the nonprobabilistic sampling system, known as snowball sampling (**Goddman**, 1961; **Levand**, 2021), has been used. This technique, used in research when the population is variable and the sample is very small, is based on identifying subjects or experiences that are then gradually incorporated into the sample (**López-Roldán**; **Fachelli**, 2015; **Otzen**; **Manterola**, 2017). It has made it possible to recognize patterns that go beyond a fleeting snapshot of the state of play (**Sixto-García**; **López-García**; **Toural-Bran**, 2020) and to identify the intentional sample studied herein.

> Communication agencies are the first companies to commit to producing and distributing synthetic content to reference media

The exploratory study was based on data from two projects: (1) The global initiative *JournalismAI from the London School of Economics*, which helps the media use artificial intelligence responsibly, and (2) the Swedish company *United Robots*, which develops bots to automatically send content to audiences. To the indicators provided by these companies we have added the projects identified by **Dörr** (2016); **Fanta** (2017); and **Túñez-López**, **Toural-Bran** and **Cacheiro-Requeiro** (2018), who carried out a preliminary global mapping of the media outlets that rely on automating news production, as a research guide.

The fieldwork consisted of collecting and compiling data, for which an advanced *Google* search based on a series of keywords (Table 1) was used. The search was not limited by language, region, site or domain, file type, or date. Additionally, the selection criteria included only those initiatives that produce and publish news content through processes carried out exclusively by algorithms, without any human intervention. Searches were conducted every 15 days for six months (from January to June 2022), making a total of 12 searches. Such a time frame is necessary in a study type in which the breadth of the sample is unknown (**Mauri-Ríos**; **Ramon-Vegas**, 2015).

Table 1. Search terms

"Media outlet" OR "Media outlets" OR "Newsroom without journalists" OR "Newsrooms without journalists" OR "Synthetic media"	AND	"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"

As a result, four projects have been identified:

- *JX Press Corp* (Japan);
- *Reuters News Tracer* (United Kingdom);
- *News Republic* (France), and
- *Videre AI* (Spain).

The technique used for analysis was the case study, which provides the researcher with various resources such as interviews, participant observation, questionnaires, or bibliographic documents, allowing for sufficient contextualization of the phenomena being studied (**García-Avilés**; **González-Esteban**, 2012). Following the research of **Yin** (1981) on this research technique, this work does not attempt to make a statistical generalization but rather an analytical one, since it aims to find a pattern of behaviors rather than quantify sample frequencies (**Villareal-Larrinaga**; **Landeta-Rodríguez**, 2010).

Third, once the study units had been defined, an analysis sheet was drawn up and applied to each of the selected synthetic media outlets. This sheet was composed of a total of 20 classification codes, grouped under eight variables and three dimensions, in accordance with the objectives pursued (Table 2).

- The news production process dimension (D1) analyzed the way in which the media outlet simulated human behavior to detect newsworthy points (V1), through social listening (C1), the monitoring of social networks (C2), or the automatic selection, rating, and distribution of content (C3). In this same dimension, audience engagement methods (V2), such as unbiased and fact-checked news (C4), content personalization (C5), and speed of reporting (C5), were examined.
- The second dimension made it possible to determine the impact (D2) that these projects had on the job market (V3), assessing whether they have contributed to job destruction (C7) or, on the contrary, have had no effect on employment (C8). It also assessed their impact on the journalistic profession (V4) as well as the sector's awareness of synthetic media (V5).

- The third dimension aimed to determine their economic viability (D3), analyzing, as main potentialities (V6), their financial backing (C13), the media outlets affiliated with them (C14), and their client portfolio (C15). Economic constraints were separated into high investment (C16) and competition (C17), while also analyzing whether they were lacking (C18). Finally, we analyzed whether these projects are likely to stand the test of time and become the businesses of the future (V8).

Table 2. Analysis parameters

Dimensions	Variables	Classification codes
D1. News production process	V1. Simulation of human behavior	C1. Social listening
		C2. Social media monitoring
		C3. Selection, rating, and distribution of content
	V2. Audience engagement methods	C4. Unbiased and fact-checked news
		C5. Content personalization
		C6. Faster reporting
D2. Impact	V3. On the job market	C7. Job destruction
		C8. No impact on employment
	V4. On the image of the profession	C9. Negative impact on the profession
		C10. No impact
	V5. The sector's awareness of these projects	C11. The sector's awareness
		C12. The sector's lack of awareness
D3. Economic viability	V6. Potentialities	C13. Financial support
		C14. Affiliated media outlets
		C15. Customer portfolio
	V7. Constraints	C16. High investment
		C17. Competition
		C18. No limitations
	V8. Future prospects	C19. Has future prospects
		C20. Does not have future prospects

Prior to coding, five descriptive features were identified for each project:

- the name of the company;
- its year of creation;
- its founder;
- its main objectives, and
- the services offered.

The analysis sheet was initially completed using web content analysis (**Herring**, 2010), which provides for the inclusion of Internet elements, such as links and multimedia elements, and complements traditional content analysis (**Bardin**, 1986; **Krippendorf**, 2004). To ensure that the coding was reliable, each project's sheet was studied by each of the researchers in parallel, prior to defining the classification codes (*double-check*), and possible discrepancies, such as not considering AI to be a substitute for human journalists in synthetic media outlets, were considered in preceding meetings.

The fieldwork was rounded out with interviews with the heads of technology and communication from the three European initiatives. At *Videre AI*, we interviewed Javier Picazo, head of the technological service and digital transformation at the *Agencia EFE*, whereas, at *News Republic*, we interviewed Gilles Raymond, founder and CEO of the initiative. To address the aspects of *Reuters News Tracer*, we spoke with the Global Head of Communications, Jamie Austin. *JX Press Corp* is fully automated to the point that the interview had to be conducted through the company's chatbot, in the absence of human staff.

In the opinion of **Tejedor** *et al.* (2020), this technique makes it possible to obtain information on a phenomenon that has not been sufficiently covered in the scientific literature while at the same time providing explanatory elements and indications of possible new prospective phenomena that can become study variables for future research. In the same line, **Irvine**, **Drew**, and **Sainsbury** (2012) argue that interviews are useful to learn about the perspectives of the interviewed subjects, as well as their mental categories, interpretations, feelings, and predictions for the future.

The interviews were conducted during the month of June 2022 through *Google Meet* and *Zoom.* We used a semistructured projective questionnaire, that is, one with a common list of objectives or items that combined closed questions with open-ended, unstructured, and direct questions (Table 3). The questions were grouped into thematic sections: the

contextual aspects of creation, the news production process, the consequences that synthetic media have for the journalistic profession, and the projects' future plans.

Table 3. Case studies and interviews conducted

Case studies	Interviews conducted			
	Name	Position	Method of interview	Date
JX Press Corp	Company chatbots			June 9, 2022 June 12, 2022
Reuters News Tracer	Jamie Austin	Global Head of Communications	*Zoom*	June 17, 2022
News Republic	Gilles Raymond	Founder and CEO	*Zoom*	June 24, 2022
Videre AI	Javier Picazo	Head of technological service and digital transformation	*Google Meet*	June 20, 2022

The interviews were recorded and transcribed so that they could be used in content analysis, enabling an in-depth data analysis, taking into consideration the research objectives. The content analysis was conducted using the *Atlas.ti* version 9.1.7 software for *Windows* and was carried out in four stages:

- the recording of information from the interview transcript;
- the coding of the data;
- the identification of the information obtained on each of the aspects related to the objectives; and
- a final interpretation of the results obtained. The coding and categorization of the data have been replicated and agreed upon to avoid possible biases and to guarantee the reliability of the results.

With this methodological combination, the research problem has been viewed from different angles, and biases and methodological flaws have been avoided to optimize the validity and consistency of the findings (**Okuda-Benavides**; **Gómez-Restrepo**, 2005).

3. Results

3.1. *JX Press Corp* (Japan)

This Tokyo-based virtual news agency was founded on January 10, 2008, by Katsuhiro Yoneshige, although it became known in 2017 for reporting on the assassination of North Korean politician Kim Jong-Nam before any other media outlet. It has a capital of 100 million yen, and it has had three member organizations since its launch:

- *Japan Association for Public Opinion Research*;
- *Japan Internet Media Association* (*JIMA*);
- *Artificial Intelligence Disaster Prevention Council.*

This startup without journalists believes that

> "it has changed the way we do news thanks to Big Data and technology",

as its chatbot said. So when it comes to producing automated news, the artificial intelligence uses social listening to monitor social media platforms and find breaking news events domestically and internationally, to automatically write news stories, and to distribute them to its clients, which include the *Japan Broadcasting Corporation* (*NHK*) and television networks *Nippon Television*, *TV Asahi*, *TBS Television*, *TV Tokyo*, and *Fuji Television*. It also distributes automated news to newspapers *Asahi Shimbun*, *Yomiuri Shimbun*, *Mainichi Shimbun*, *Sankei Shimbun*, and *Chunichi Shimbun*; news agencies *Kyodo News* and *Kyodo Digital News*; the digital media outlet *Sankei Digital*; the platform *Panasonic Connect*; and the corporation *Quick Corp*, among others.

It offers two products to all of their clients:

- *Fastalert*, a technology service that filters out fake news and sends out news bulletins on accidents, natural disasters, and incidents.
- the free mobile application *NewsDigest*, which enables the consumption of breaking news from different points of view, such that it engages the audience with news written with a variety of sources and without bias. This application already has more than 1 million downloads in the *Apple Store* thanks to its instant coverage of the latest events.

The two services have been developed and are operated using the *XWire* tool, whose purpose is to automate the editing and distribution of news through natural language processing technology, which makes it possible to convert text or voice into structured information. Therefore, there is no human intervention in the whole process: "There are no reporters or news bureaus, but our news items are the fastest", the bot remarked. This situation "reduces the number of editorial staff and the operating costs".

The startup's value proposition is to "embody the fact that machines meet human expectations," so that, in the future, newsrooms will not have journalists, and there will be no orders from them. Regarding its viability, the company has financial backing from some high-profile companies in the country, such as news giant *Nikkei* and venture capital firms *Mitsubishi* and *CyberAgent Ventures*; however, the agency's website does not disclose revenue figures.

Sheet 1. Summary of the analysis of *JX Press Corp*

D1	V1	C1. Social listening C2. it monitors social networks and finds breaking news events C3. it automatically selects, composes, and distributes
	V2	C4. News written with different sources and without bias C6. Faster in revealing the latest news
D2	V3	C7. Reduced editorial staff
	V4	C10. It has not affected the image of the profession
	V5	C11. The country's journalistic sector is aware of the project
D3	V6	C13. Strong financial backing C14. Media affiliates and partner organizations C15. Broad customer portfolio
	V7	C18. No limitations
	V8	C19. It is a feasible project with prospects of success in shaping the future of newsrooms without journalists

3.2. *Reuters News Tracer* (United Kingdom)

This "cyber newsroom", as Jamie Austin called it, was created in January 2016 by the agency's R&D team to automate the entire news production process, including searching, classification, editing, and, finally, dissemination. Everything is done in real time, without human intervention, through ten machine learning algorithms that work in four different phases that correspond to the different stages in the production of a news item.

The first focuses on finding news events, for which it uses the conversations users have on *Twitter*. The software for the artificial intelligence and machine learning analyzes around 12 million tweets per day in real time, which represents 2% of the total number posted worldwide. Of this amount, half is selected randomly, and the other half comes from the accounts of organizations and influencers, which are selected by the agency's human journalists. Once the news stories have been found, the second phase begins, focusing on making sense of and contextualizing the data to make it newsworthy and engage the audience.

Sheet 2. Summary of the analysis of *Reuters News Tracer*

D1	V1	C2. It monitors social networks to find news events C3. It automatically categorizes, composes, and disseminates
	V2	C4. Unbiased and fact-checked information C5. Personalization of news items through the selections of news items or headlines C6. Increased speed in reporting the event
D2	V3	C8. No impact on employment
	V4	C10. It has not affected the image of the profession
	V5	C11. The agency's media partners are aware of the service
D3	V6	C13. It is financially backed by the agency C15. Same clients as the agency
	V7	C18. No limitations
	V8	C19. Feasible project if more sophisticated information is produced

To emulate this process, machine learning checks which breaking news events have already made the news using a database of 31 media outlets, such as *CNN*, the *BBC*, and *The New York Times*, among others. In addition, it knows where the event is taking place thanks to a database based on words and city locations. In this second phase, it also verifies the information by analyzing the source's profile, followers, media attachments, links, and tweet structure. The third phase focuses on writing the news item. Here, the algorithm composes a short headline and summary for each story, a design that aligns with *Reuters*' internal alert system, where breaking news is transmitted internally as short headlines. Finally, the system distributes the news items to the agency's journalists and clients so that they can publish the news as soon as possible.

However, journalists' interests may vary depending on the section they work for. Therefore, the algorithm is parameterized to personalize the news items through the selection of news or headlines. In addition,

> "this software's potential lies in its ability to detect news faster than other media outlets and its suitability to guarantee the veracity of the news event, giving it a one-hour-and-eight-minute advantage over other media," explains the global head of communications.

The system has several challenges, since its specialty is detecting accidents, conflicts, and natural disasters but not other more sophisticated information. For these reasons, "journalists will not lose their jobs because of automation", Austin qualifies.

3.3. *News Republic* (France)

This digital news provider was founded by Gilles Raymond, also its CEO, on January 1, 2008, and vanished completely on March 14, 2021. It began with a mobile version, which was later extended to tablets and smart watches, where it provided the user with personalized and relevant news to read "whenever they want and in the format they have chosen", explained its creator.

News Republic worked with more than 1 million topics, which helped personalize the user's news wall, working with more than 50,000 articles, thousands of photographs and videos, which were reproduced by algorithms to suit the reader's preferences. Raymond pointed out that one of the decisions they made from the beginning was "not to crawl the web" so as not to harm the rest of the media, but "we closed business agreements with thousands of companies all over the world" with the aim of publishing a huge amount of news per day for more than 40 countries and in 37 different languages. In its later versions, it published news from 53 countries. In this case, the user did not receive all the news offered by the company through their wall; rather, they chose which of the various options fit their preferred topics.

In relation to the automated news production process, the company had artificial intelligence software that carried out several phases: first, it learned what each news item meant, classified them into different categories, and verified their originality. After this, the user had to use the platform to select from the various topics suggested to customize the texts that would be displayed in the future. However, there was never any intervention from news professionals, although the initiative was fed by the texts produced by the various media outlets with which they had agreements.

In Raymond's opinion, this company does not replace an editor's work because "without journalists, there is no news", since they are the "only ones who can verify the facts". Therefore, this project was configured with a tendency toward disaggregation or misalignment. At the time of its launch, it had two limitations: The first was that some representative media outlets from different countries did not participate in the undertaking owing to a lack of awareness, and the second was the huge amount of news on the same topic that the reader received every day.

However, the main draw for the audience was the variety of information they could consume "on a personal device", in addition to having a "free" platform and being their "own news editor". In fact, "readers consumed an average of almost 200 pages a day", said the company's founder.

Regarding its viability, the initiative had 12.5 million users in 2015, which led it to win the award for *Best Mobile Media Publishing App* at the *Mobile World Congress*. *News Republic* went through different owners, and due to excessive competition, it was sold for $57 million to China's *Cheetah Mobile* in 2016, which, two years later, sold the venture, this time for $30 million more than it cost to *ByteDance*, a company owned by *TikTok*.

Sheet 3. Summary of the analysis of *News Republic*

D1	V1	C3. Selection, rating, and distribution of content
	V2	C4. Unbiased and fact-checked information C5. content personalization C6. faster reporting
D2	V3	C8. It did not replace an editor's work
	V4	C10. It did not damage the image of the profession
	V5	C11. The agency's media partners were familiar with the service
D3	V6	C13. Business agreements with different media outlets C15. Media partners from different countries
	V7	C17. Excessive competition
	V8	C20. The company vanished in 2021

3.4. *Videre AI* (Spain)

Agencia EFE and the *European Pressphoto Agency* (*EPA*) were selected in May 2022 by the *Stars4Media* exchange program between European media and technology companies to develop the artificial intelligence tool *Videre AI*, capable of clarifying the processes of cataloging, identification, and distribution of audiovisual content in the media. The program entailed a collaboration with German startup *Design AI*, which specializes in generating content through video using machine learning, and aimed to use automation to free journalists from tedious work, such as searching databases so they could focus on producing higher-value journalism. "The purpose was to empower the agency's human team, but never to replace it" ["*El propósito era empoderar al equipo humano de la agencia, pero nunca reemplazarlo*"], Javier Picazo elaborated.

However, this initiative, which was recognized as the best digital transformation project at *Stars4Media*, was never fully implemented because executing it was neither scalable nor viable.

> "Artificial intelligence and automation have a place in newsrooms, but their impact is still limited. A high initial investment would have been necessary" ["*La inteligencia artificial y la automatización tienen un lugar en las salas de redacción, pero su impacto aún es limitado. Fue necesaria una elevada inversión inicial*"] said Picazo.

Videre AI's role was to implement three phases of the audiovisual production process. The first two were related to the cataloging and identification of videos, automatically recognizing video images and generating file metadata, such as the date, keywords, duration, and journalistic genre –an essential task in streamlining the editors' workload and redu-

cing errors in metadata generation. These first stages were completed after a training process of four months and approximately 150,000 videos, and they were applied to a variety of newsworthy topics.

However, the program did not succeed in its third task: to automatically generate and distribute headlines, subheadlines, and short bodies of text to enhance the agency's audiovisual content.

> "The algorithm did not analyze or understand what was happening in the videos, despite being parameterized and having training data" ["*El algoritmo no analizaba ni entendía qué estaba sucediendo en los vídeos, a pesar de estar parametrizado y contar con datos de entrenamiento*"],

added the head of the technological service. He acknowledged that, despite this, it did manage to transcribe the voice to convert it into text in several languages.

Sheet 4. Summary of the analysis of *Videre AI*

D1	V1	C3. Cataloging, identification, and distribution of audiovisual content
	V2	C4. Fact-checked news C5. content personalized to the agency's media partners
D2	V3	C8. It did not replace the human team
	V4	C10. It did not impact the image of the profession
	V5	C11. The agency's media partners are familiar with the service
D3	V6	C13. It was financially backed by the agency C14. Large number of members C15. Same clients as the agency
	V7	C16. High initial investment
	V8	C20. The project was never fully implemented

In all of these stages, contrary to its main objective, journalist involvement was necessary, because they had to supervise the content. They were, in short, the ones "who provided the quality of information that the agency required" ["*quien aportaba la calidad informativa que requiere la agencia*"], explains Picazo. However, the program is a differentiating tool in the fight against disinformation and in fact-checking, as it is capable of recognizing videos that have already been posted, cataloging them, and checking their location or broadcast date, thus avoiding false news from pre-existing content or intentionally falsely localized content. Likewise, it was trained to deliver personalized content to the agency's media partners.

The project was co-funded by the European Union, and its partners included the *Vrije Universiteit Brussel* (*VUB*), the *European Media Laboratory* (*Euractiv Foundation*), the *European Federation of Journalists* (*EFJ*), and the *World Association of Newspapers and News Publishers* (*WAN-IFRA*).

4. Comparative analysis of the results

The combined study of the web content analysis of the four synthetic media outlets and the semistructured in-depth interviews with their heads of technology and communication allowed a comparative analysis of the results.

Table 4. Comparative analysis of the synthetic media outlets

Dimension	Variables	Classification codes	Synthetic media outlet			
			JX Press	*Reuters News Tracer*	*News Republic*	*Videre IA*
D1	V1	C1	✓			
		C2	✓	✓		
		C3	✓	✓	✓	✓
	V2	C4	✓	✓	✓	✓
		C5		✓	✓	✓
		C6	✓	✓	✓	
D2	V3	C7	✓			
		C8		✓	✓	✓
	V4	C9				
		C10	✓	✓	✓	✓
	V5	C11	✓	✓	✓	✓
		C12				
D3	V6	C13	✓	✓	✓	✓
		C14	✓			✓
		C15	✓	✓	✓	✓
	V7	C16				✓
		C17			✓	
		C18	✓	✓		
	V8	C19	✓	✓		
		C20			✓	✓

5. Conclusions

This research fulfills the main objective of identifying the first media outlets that produce and distribute news content through procedures carried out solely by machine, in which there is no intervention from any journalists. This is a pioneering study carried out at the national level that looks at a recent, on-going phenomenon, about which no scientific literature yet exists. This study identified four digital agencies in which no journalist is involved: the Japanese *JX Press Corp*, the British *Reuters News Tracer*, the French *News Republic*, and the Spanish *Videre AI***.**

> Media outlets are aware of synthetic media, and they have established partnerships and business agreements to receive automated news in real time on a daily basis

These companies were created from 2008 onward with the aim of fully automating news production through natural language processing and offering personalized content to the media and users. The results showed that there were similarities when it came to simulating human behavior in the news process (Q1). Assessment of these projects revealed that the algorithms learn from an initial set of data, such as images, voices, photos, objects, videos, and texts, among others, to select, classify, produce, and distribute artificial digital content with a realistic appearance and sound, based on programming indications. In short, they are voice clones, voice masks, unique expressions, photos, and interactive *bots* (SO1). This unbiased and fact-checked content has a unique interface that gives the media the opportunity to select and receive the topics they want, quickly and in a fully personalized way (SO2).

Regarding the impact they have had on the journalistic profession (SO3), the scope of analysis was not yet sufficient to draw conclusions, although, in the fields closest to the media outlets analyzed, it was not possible to determine whether the undertaking of such initiatives contributes to job destruction (Q2). The image of the profession has also not been affected (Q5), in line with the findings of **Aramburú-Moncada**, **López-Redondo** and **López-Hidalgo** (2022). Media outlets such as *CNN*, the *BBC*, or *The New York Times* are aware of synthetic media (Q4), and they have established partnerships and business agreements to receive automated news in real time on a daily basis. Japanese startup *JX Press Corp*, for example, counts Japan's public broadcaster, as well as other prestigious Japanese television stations and newspapers, among its clients. Specifically, the *NHK* pays a monthly subscription to this virtual news agency for its headline alert service, which is developed and disseminated entirely by robots. However, this preliminary study worked with a small sample, which prevented us from drawing conclusions about the impact that these projects have on the news from these public media outlets (Q6).

Instead, the research highlights that one of the main potentialities of the synthetic media outlets analyzed was the strong financial backing and the broad portfolio of clients they have. However, these initiatives had certain weaknesses, as there was no common interest in developing joint synergies or collaborative spaces that would allow them to share knowledge and acquire new clients. These ventures should seek efficient, sustainable models that serve the needs of journalistic practices. This requires more investment in experimentation, which is a starting point for future research (SO4).

Therefore, synthetic media would not be considered the companies of the future but rather a trend "toward disaggregation or misalignment" (Q3), as stated by Gilles Raymond, CEO of *News Republic*, which vanished on March 14, 2021. In this line, we added *Videre AI*, which was not fully implemented because it was unable to automatically generate headlines, subheadlines, and short texts to enhance the audiovisual content of *Agencia EFE.*

This research has not exhausted the issue studied; rather, it reaffirmed that newsrooms without journalists have raised an open and constantly evolving debate. This pioneering work in the journalistic field leaves possibilities for future studies open. Extending the analysis to other initiatives will make it possible to verify whether the trends detected in these media outlets are overall trends. Likewise, a comparative view enabling us to understand how public and private media use content executed solely by algorithms would be enriching.

> These initiatives, although they are still few, are the most recent step in a process of progressive incorporation of artificial intelligence into information production

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