Sports Data Journalism: Data driven journalistic practices in Spanish newspapers

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DOCTORAL THESIS

Title	Sports Data Journalism: Data driven jounalistic practices in Spanish newspapers
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Abstract

Working with data is always an important part of journalism but its combination with technology is an innovation for newspapers. In recent years, newspapers have started to adapt data journalism and data journalism became a part of newsrooms to the contrary of the traditional journalism environment in Spanish newspapers. This thesis aims to analyse sports data journalism practices in Spain with quantitative and qualitative approach with content analysis of 1068 data journalism articles published by 6 newspapers (Marca, Mundo Deportivo, AS, El Mundo, El Periódico, El Pais) between 2017-2019, and interviews with 15 participants from 6 newspapers (Marca, Mundo Deportivo, AS, El Mundo, El Confidencial, El País). Both quantitative and qualitative analysis focus on how data journalism is being adapted in Spain, its current situation and technical features, opportunities and threats in its development.

Resumen

Trabajar con datos siempre es una parte importante del periodismo, pero su combinación con la tecnología es una innovación para los periódicos. En los últimos años, los periódicos han comenzado a adaptar el periodismo de datos y el periodismo de datos se ha convertido en parte de las redacciones al contrario del entorno periodístico tradicional de los periódicos españoles. Esta tesis tiene como objetivo analizar las prácticas del periodismo de datos deportivos en España con enfoque cuantitativo y cualitativo con análisis de contenido de 1068 artículos de periodismo de datos publicados por 6 periódicos (Marca, Mundo Deportivo, AS, El Mundo, El Periódico, El País) entre 2017-2019, y entrevistas a 15 participantes de 6 periódicos (Marca, Mundo Deportivo, AS, El Mundo, El Confidencial, El País). Tanto el análisis cuantitativo como el cualitativo se centran en cómo se está adaptando el periodismo de datos en España, su situación actual y características técnicas, oportunidades y amenazas en su desarrollo.

Resum

Treballar amb dades sempre és una part important de l'periodisme, però la seva combinació amb la tecnologia és una innovació per als diaris. En els últims anys, els diaris han començat a adaptar el periodisme de dades i el periodisme de dades s'ha convertit en part de les redaccions a contra de l'entorn periodístic tradicional dels diaris espanyols. Aquesta tesi té com a objectiu analitzar les pràctiques de l'periodisme de dades esportius a Espanya amb enfocament quantitatiu i qualitatiu amb anàlisi de contingut de 1068 articles de periodisme de dades publicades per 6 diaris (Marca, Mundo Deportivo, AS, El Mundo, El Periódico, El País) entre 2017-2019, i entrevistes a 15 participants de 6 diaris (Marca, Mundo Deportivo, AS, El Mundo, El Confidencial, El País). Tant l'anàlisi quantitativa com el qualitatiu es centren en com s'està adaptant el periodisme de dades a Espanya, la seva situació actual i característiques tècniques, oportunitats i amenaces en el seu desenvolupament.

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Zeliha Işıl Vural

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1. Introduction and Objectives

Technology that has developed with great acceleration has spread all over the world with the effect of globalization and people's access to technology has become easier in time. This dissemination has made it easier to analyze, process, and transfer data. Over time, data that has been integrated into all areas of life has also affected the journalistic practices. The transformation of journalism has gained momentum in recent years thanks to data and has begun to leave the traditional journalism place to digital media. Although data is used in traditional journalism, the digital transformation of data and its transmission to the reader has revealed data journalism. Because data alone does not make sense, thanks to Inverted Pyramid of Bradshaw (2011), the data has begun to be passed on to readers as a story. With the developments in digital technologies, data journalism is becoming widespread and data journalism continues its development.

Wikileaks and *The Guardian Datablog* are accepted as the pioneers of data journalism however, the term ‘data journalism’ was accepted by *NICAR (National Institute for Computer-Assisted Reporting)* in 2014 and the term started to be used in media outlets and literature. But before *NICAR*, data journalism started to be taught in universities such as online data journalism training offered by *University of California at Berkeley* and continued with MOOC taught by *Knight Center for Journalism at the University of Texas* (Howard, 2014, p.50) and newsrooms were in a learning process. From 2013, data journalism was started to be adapted by some American and British newsrooms such as *FiveThirtyEight, the New York Times and the Financial Times*. Data journalism practices were seen in the rest of the world in similar times, and Spanish newsrooms started to adapt data journalism like other countries.

Despite the fact that there were data journalism practices in Spain, the official adaptation of data journalism in newsrooms was seen in *El Confidencial* in 2013. The success of *El Confidencial Data Unit* influenced other newsrooms and following years witnessed data journalism projects of *El Español, El Mundo, El Periodico*, and *El Pais* (Rojas Torrijos and Rivera, 2016, p.258). Through the increased demand on open data, transparency law was accepted in Spain and

open data initiatives started to be established. In the light of these, data journalism started to be used in not only politics, but also economics, culture, and sport.

Data and sports are an inseparable whole because of the high amount of advanced statistics produced by sports. This data which is used by clubs and sports professionals have started to integrate into journalism through the rapid transformation of digital journalism. Dynamic and continuous alteration in sports journalism created an interest in data visualisation in sports reporting and sports data journalism became a profession in recent years.

While the new narratives were emerging in the digital media, newsrooms started to realize the potential of data journalism in sports. Data journalism was used in various topics but it's suitability to sports was incontestable. It was hard to write an article without using sports data however the articles with visualised data was making sports more understandable and objective for readers. The significance of sports data journalism articles and its added value to sports were explained by Rojas Torrijos and Rivera Hernandez (2016) as:

> "one of the formulas by which an intelligent use of data can add value to the coverage of major sporting events is by telling a story visually through graphics, or by using statistics, which allow the reader to have all the tools necessary to become familiar with the participants in a competition and to follow it properly" (p.5).

Through the available tools and data in sports, the potential in sports data journalism were containing various techniques for extracting, analysing, and visualising sports data. This new narrative method was adding value to sports and increasing the quality of the content. In addition, sports data journalism was a tool to add new angles and perspectives to sports. Displaying advanced statistics visually was strengthening the bond between the reader, the journalist, and sports. Sports data journalism articles were not addressing specific consumers, it was a product for all readers and making the article more attractive (Rojas Torrijos & García Cepero, 2020, p.297).

In Spain, national newspapers adapted data journalism and currently most of the newspapers have separate data units. However, these units were working with all sections and they were not specialized in one topic. Under these circumstances, the adaptation process of sports data journalism is still continuing. Sports data journalism was started to adapt by newspapers in recent years when most of the newspapers improve their websites and make it more data and visual oriented. Especially the sports newspapers adapted this new narration technique and started to publish in their websites. *Marca*, *Diario AS*, and *Sport* started to publish these articles in different sections in their websites and this progress followed by *Mundo Deportivo*. The potential of sports data journalism was seen by national newspapers as well and data units of *El Pais*, *El Mundo*, *El Periodico*, and *Lavanguardia* started to create sports data journalism articles as well.

1.1. Research Objectives

Data journalism is accepted as a profession and adapted by most of the newsrooms in recent years. However, this adaptation process crawls in Spain and there are not enough specialists about the topic. While alternative media works on data journalism, mainstream media does not pay special attention to the topic Data journalism is still a minority profession among journalists because of the lack of interest of media outlets (Arias, Sanchez Garcia, Redondo, 2018, p.275). Because of this lack of interest, literature does not give the relevant answers in the current state of data journalism in Spain, deficiencies and obstacles in the current situation, adaptation process in Spanish newspapers, advantages of adapting data journalism, and this thesis aims to fill the gap in unanswered questions and shed light on these topics to contribute the literature and open a way to future research in this topic.

This thesis focuses on sports data journalism articles in the Spanish digital media and analyzes the articles of 3 national and 3 sports newspapers in the context of internal and external aspects of sports data journalism articles. The thesis points to the newsroom structures, technical features of articles, internal and external effects that shaped data journalism in Spanish newsrooms. It's also important to examine the journalistic environment in Spain and its connection with

political and economical issues in the country. To achieve this, 2 methods were used as content analysis and interview. These 2 methods are mutually complementary to examine the topic in the perspective of journalists as well. Both qualitative and quantitative results aims to find answers research objectives below:

Research Objective 1: To identify technical features of articles, and particularly:

- To study trends, visualisation styles, type of articles, most common topics, data sources and interactivity
- To identify the main differences in technical features of of articles in sports and national newspapers.

Research Objective 2: To analyze changes in journalistic practice, production process of articles, and more specifically:

- To examine newsrooms structures, departments and its effects on production process of articles.
- To analyze working conditions of data journalists.
- To analyze daily workflow in data stories' production processes and changes in workflow in big events and major competitions.
- To identify decision-making process of articles and to compare similarities and differences in decision-making processes in sports and national newspapers.
- To identify the tools used for data journalism articles and reasons to choose of tools.
- To analyze current needs in newspapers in order to adapt data journalism better.
- To study the adaptation process of data journalism in sports and national newspapers according to their daily work and working conditions: which newspapers adapted data journalism better and why?

Research Objective 3: To identify internal and external effects that shaped data journalism, and particularly:

- To study limitations and problems regarding access to both private and public data and its trustworthiness.
- To examine the positive and negative sides of transparency law in Spain.
- To discuss the inequality between accessed data in certain topics such as data linked with politics and economics.
- To understand economic motivations to adapt data journalism in sports and national newspapers.
- To compare reader engagement between sports and other data journalism articles and to understand the change in reader engagement in sports and national newspapers.

While quantitative analysis answers Research Objective 1, the qualitative approach answers other research objectives. However, quantitative analysis works as a complementary in qualitative analysis and supports the results.

1.2. Research Structure

This thesis is consisted of four sections which are described below:

Section I starts with the literature review and identifies the basis of this research. The section explains the transformations in journalistic practice with starting online journalism. Then, precision journalism and computer-assisted reporting is explained under the topics of digitalization in journalism in order to understand the routes of data journalism. The section continues with data journalism and presents the history of data journalism which includes Nightingale's *Polar-Area Diagram, Philip Meyer*, *Wikileaks*, *Afgan War logs* and its emergence in different continents of the world. Later on, the section focuses on data journalism practices in Spain and presents its development in the newsrooms in the lights of open data, transparency law, and open data initiatives. Sports data journalism in Spain is explained afterwards and the section focuses on the characteristics and techniques of data journalism. In the light of the theoretical background, Section I concludes with the method of the research and presents the overall design structure and detailed explanations of quantitative and

qualitative analyzes which include designs of the content analysis, codebook, and interviews.

Section II focuses on the results of quantitative analysis of this research and presents the analysis of the results collected from *Marca, Mundo Deportivo, Diario AS, El Mundo, El Periodico*, and *El Pais* through the designed codebook between 2017 and 2019 and the section ends by the comparative analysis of 6 newspapers. Results are presented under three main topics as:

- Topics and story properties.
- Number of creators, data sources, accessibility of data.
- Number of visualisations, visualisation types, form of interactivity, ratio of text and multimedia.

Section III focuses on the results of qualitative analysis of this research and aims to explain the results from a descriptive perspective. Results of the qualitative analysis are divided into 6 topics as:

- Production process in Spanish newsrooms.
- Access to data in Spanish data journalism.
- Being a data journalist in Spain.
- Current environment in Spanish newspapers after integrating data journalism.
- Reader engagement in data journalism.
- Journalists' opinions on data journalism and its future in Spain.

Section IV presents the conclusion and discussion of this research. The section starts with the summary of the results and explains the research objectives mentioned in the introduction in the lights of results. The sections continue with the discussion part where the personal perspective is explained and the sections ends by suggestions and further research.

SECTION I: THEORETICAL BACKGROUND AND METHOD

2. Theoretical Background

Starting from the 1970s, technological developments had started to influence journalism through the invention of videotext and followed by teletext and audiotext as new content delivery channels in the 1980s. When computers were involved in journalism, videotext has also attracted attention and seen as “a tool and symbol of an upcoming information society” (Boczkowski, 2004, p.21) in the context of the news that the society would reach according to their interest. 1980s was the time when Teletext had been started to be used by the newspapers from the United States and United Kingdom (Boczkowski, 2004, p.30) to reach its audience through “using television broadcast signal” (Domingo, 2006, p.43). With launching of World Wide Web, the very first newspapers had started to publish on the internet like *Palo Alto Weekly* (Díaz Noci, 2013, p.258) and *The Telegraph*’s *Electronic Telegraph* (Siapera and Veglis, 2012, p.462) as the first online newspaper of United Kingdom in 1994. The 1990s had witnessed an increasing interest in online journalism and it changed traditional newsroom organization within changing numbers of staff in online journalism departments. Boczkowksi (2004) summarized this transformation from Kirsner’s study in 1997 as “by July 1997 the *Chicago Tribune Interactive Edition* employed 80 people, *USA Today Online* employed 84, *the Wall Street Journal Interactive Edition* employed 90, and *the Washington Post Digital Ink* employed 100” (p.52). There were an increasing interest in online journalism in Europe too. Starting from 1994, *Le Monde* from France (Siapera and Veglis, 2012, p.53), *El Periódico de Catalunya*, *La Vanguardia, Avui, Abc* and *El Mundo* from Spain published their online issues (Masip, 2002, p.2).

BBC Online was also one of the pioneers in the online journalism industry. Less than one year *BBC Online* shared 140,000 pages with its readers which 61,000 of these were news. (Allan and Thorsen, 2010, p.24). *Drudge Report*’s big success was also a breaking point. Starting as an email newsletter and turning into a newsblog, the *Drudge Report* had published a sexual affair story about Bill Clinton and Monica Lewinsky and mentioned by other newspapers who served the breaking news in a short time. The big achievement of *Drudge Report* had also

influenced the online journalism industry (Díaz Noci, 2013, p.260). In 1999, *the Guardian* had included into the online journalism sphere within launching *the Guardian Unlimited* (is called nowadays as guardian.com) which published instant live coverages about sports also could be accepted as a liveblogging (Mi, 2015, p.140).

In the beginning of 1991, *Pyra Labs* launched *Blogger* which is an online software to build a website for people without knowledge about coding. *Blogger* had given journalists to reform themselves within freedom of speech (Knight, 2008, p.118), up to minute contents and critiques (Domingo and Heinonen, 2017, p.12) and ethics (Lowrey and Burleson Mackay, 2008, p.67). Domingo and Heinonen (2017) had divided journalistic weblogs into 4 categories as "citizen blogs" "audience blogs" "journalist blogs" and "media blogs" (p.7). While citizen and audience blogs are written by the public, journalist and media blogs are written by journalists. Some journalists like Kevin Sites, Matti Lintulahti, Matthew Buckland created their personal blogs to write about the coverages which are not under a media company (Domingo and Heinonen, 2017, p.10).

Starting from 2002, online journalism had started to rise with new initiatives. *The New York Times* decided to launch a database for its digitized archive since the beginning[1]. After a while, *Google News was* launched to combine news from different online channels. Richard Gingras explained the aim of *Google News* as:

> "We built Google News' homepage to help users discover diverse perspectives from multiple news outlets about the news of the day, prompting them to dive deeper into individual articles and making it easier to compare different views" (2019).[2]

When Adrian Holovaty launched *chicagocrime.org*, actions started to take part in journalism.[3] *Chicagocrime.org* was a synchronic map with police statistics which shown up to date crime information from Chicago (Cairo, 2017, p.84) and it's accepted as a key moment for data journalism as well (Zion and Craig, 2014, p.214; Stavelin, 2013, p.31). In 2011, when tablets were included into people's daily lives, *Amazon* made a huge step and launched *Kindle* in the context of e-

publishing. Through the popularity of tablets and its features, newsrooms had also met with longform journalism[4] and this meeting was clearly seen with the Pulitzer winner '*Snowfall*' by *the New York Times*[5]. In the year of 2016, *The Independent* had started to publish only online and digitalization started to be seen in journalism clearly.[6]

The value of online journalism had been understood in the September 11 attacks in 2001. September 11 was also an exam for weblogs. When there is no source of information, the world had been searching the answers on the internet about what was happening and online news sites mostly crashed because of traffic (Zelizer and Allan, 2004, p.120). The visiting numbers of the websites increased from hundreds of thousands to hundreds of millions during the day of September 11 (Díaz Noci, 2013, p.262). In the study of Zelizer and Allan (2004) pointed that:

> "As for the major news sites, it is worth pointing out that to date no other news the event had affected internet performance to a greater extent than this crisis. While events such as the 2000 US election, or before it the release of the *Starr Report* in 1998, had a considerable impact, September 11 and its immediate aftermath produced the most dramatic decline in the availability of the major news sites yet witnessed" (p.123).

The day of 7 July 2015, London bombings, was an important day for online journalism and citizen journalism as well. "More than 1,000 photographs, 20 videos, 4,000 texts, and 20,000 emails were sent to the *BBC* within six hours of the attacks. National tv news bulletins led with grainy mobile phone video" (Zion and Craig, 2014, p.61). Allan and Thorsen called this collaboration with society as "accidental journalism" in their article (Meikle and Redden, 2009, p.33). Shortly after 7 July, *BBC* launched "*UGC Hub*" (Meikle and Redden, 2009, p.30) to collect information from the public for making news (Hammond, 2015, p.8).

The year of 2008 has shown how social media can be a tool for journalistic approaches. Citizens started to serve information about Mumbai attacks with #mumbai hashtag on Twitter and newsrooms had started to collect information about the breaking news from social media (Siapera and Veglis, 2012, p.314,332) and *BBC* was sharing the tweet flood about Mumbai attacks (Meikle and Redden,

2009, p.34). This two way communication followed by other events such as elections in Iran (2009), Wikileaks (2010), Arab Spring (2011) and Gezi Protests (2013). Gezi Protests started with a few people in Gezi Park Istanbul to protect the green spaces from construction machines in the park. In a few days it turned into a national protest against the current government all around Turkey with the start of police attacks on the park. During the protest days the media did not serve objective information to citizens and the main news source was *Twitter* with related hashtags. Citizens from streets shared videos, photographs and even live broadcasting to inform society about what's actually happening.

The study of Boczkowski(2004) is still up to date in the context of transformation from print to online. According to Boczkowski, "an entity that has mostly been generalized, physically bound, place-bound, temporally bound (limited duration, fixed production cycles), media bound, loci-bound and in general, static" however, "has been extended by also being specialized, physically unbound, place-unbound, temporally unbound (unlimited duration, variable production cycles, media unbound (multimedia), loci-unbound (user-authoring), and in general, dynamic" (p.65).

2.1. Digitalization in Journalism

Throughout history, journalism has been reshaped many times by various influences of technology. Journalistic practices constantly interacted with new fields such as precision journalism and computer-assisted reporting in time and the interaction is still an ongoing process. Historical changes in digitalization in journalism have been performed in the last half of the 20th century in the United States by computer scientist and US Army rear admiral Grace Hopper. Hopper and his programmer team input the data about the previous election statistics into the *ENIAC* which is the first electrically operated computer with electronic data processing capacity. With these statistics they wrote algorithms and the *ENIAC* correctly predicted the results in 1952 (Howard, 2014, p.10). The progress in digital journalism was started with Philip Meyer in the 70s and main improvements have seen after the 80s with the development of computer-assisted reporting.

2.1.1. Precision Journalism

Philip Meyer, journalist and professor, is known as the pioneer of the use of statistics in journalism. His finding, “Precision Journalism” has been accepted as a theory which combines journalism and science while using statistical research methods starting from 1973 with his book. When he was a reporter in *Miami Herald* he started to be interested in investigative journalism and use of statistical methods in journalism. During his career, as a Nieman Fellow at *Harvard University*, he gained a deep knowledge about “quantitative methods in social sciences” and became a big part of Detroit’s Riot in 1967 (Meyer, 1991). According to his interview, getting involved in Detroit's Riot was a stroke of luck, when he went to Detroit to collaborate with the *Detroit Free Press*.

> “It became apparent that more was going on than could be reported by conventional means. I proposed a survey of residents in the riot area, and the editors found the funding and took me up on it” (Gehrke and Mielzicnuk, 2017).

His suggested study became so successful and *Detroit Free Press* won the most prestigious award, Pulitzer Prize[7]. After this innovation in journalism, other newspapers have started to use statistics in their news pieces such as *the Washington Post*'s report about the Vietnam War in 1970. After Meyer's contribution to journalism, he published his book *Precision Journalism* in 1973. The book mainly points to the use of quantitative research methods in terms of journalistic practices. Meyer doesn't address computers to achieve precision journalism, he was pointing to the importance of application of social science methods to journalism with a scientific point of view. In his words 'precision journalism' is:

> "A scientific journalism which means treating journalism as if it were a science, adopting scientific method, scientific objectivity, and scientific ideals to the entire process of mass communication" (1991, p.5).

Precision journalism contains more application methods for journalistic practices in terms of obtaining, analyzing and matching data through computer analysis. In his book, Meyer also describes this journalistic practice as database journalism (1991). In the light of all of this information, Philip Meyer also recognized as the pioneer of computer-assisted reporting (CAR). Bruce Garrison, journalist and the author of numerous books about journalistic practices, explains the link between two terms, precision journalism and computer-assisted reporting, as:

> "Precision journalism, the code word for a generation of computer assisted reporting, but the two terms essentially describe the same quantitative approaches to news reporting" (1998).

According to Meyer, a journalist should know "how to find information", "how to evaluate and analyze it" and "how to communicate it in a way that will pierce the babble of information overload and reach the people who need and want it". Meyer also points to 2 threats against precision journalism as "journalistic passivity" and "journalistic innocence". Media should make observations and present the news to the society, not create news, offers traditional journalism. However, innocence and passivity may cause more argumentative results in the

context of objectivity, less criticism, manipulation and easy domination. (1991, p.2-3).

Meyer (1991) claims that precision journalism has also a scientific approach in the context of the used methods and shared aims. It has both a scientific part and a market part as well.

> "Journalism began moving toward a more scientific stance along two separate paths. The increasing availability of computers made large bodies of data available to journalists in a way that was not possible before. And in the business office, the failure of newspaper circulation to keep up with the growth in number of households made publishers pay more systematic attention to the marketplace and the factors that motivated readers to spend time and money with the publishers' products" (p.6).

The scientific approach of journalism comes from the similarities between a journalist and a scientist. "Skepticism" is the main common characteristic between these two. A journalist always questions the truth that the public believes "observes" the case and "being open" about the findings to enlighten the others (Meyer, 1991, p.12).

Meyer explains two phases of data as "the input phase" as where all data collected and analyzed and "the output phase" as where the data is prepared for entry into the reader's mind. According to Meyer, under these 2 phases, six stages should be followed for data driven journalistic practices: data collection, data storage, data recalling, data analysis, data cleaning and data communication. These stages also show similarity with Paul Bradshaw's Inverted Pyramid (2011) which will be explained in the next chapters.

2.1.2. Computer-Assisted Reporting

In the end of 80s, computer-assisted reporting (CAR) started to take a significant role in newsrooms in terms of changes in journalistic practices with combining computers and reporting. Hammond claims that computer-assisted

reporting changed how people do journalism, how we think about journalism and "that change is not simply driven by new technologies but needs to be understood in broader contextual terms" (2017, p.2). Similarity between CAR and precision journalism is undeniable however the techniques which Meyer suggested are highly quantitative and based on statistical research than computer assisted reporting. Bruce Garrison (1998) does not only point the similarity between these two terms but also the difference in his book *Computer Assisted Reporting* as:

> "Precision journalism, as Meyer used the term, is a methodology for collecting information. CAR is similar, but the term more appropriately describes a range of computer based information gathering tools, not so much a research philosophy, that include precision journalism approaches utilizing computers".

In the same book, Garrison (1998) points out eight reasons for integrating CAR into the newsrooms as: productivity, cost savings, quality, analysis of information, competition, access to information, reliability and storage.

Journalists started to use CAR techniques in their stories from the end of the 80s and beginning of the 90s and some of their investigative stories such as "The Color of Money" (1989) by Bill Dedman, "The Power of Pork" (1996) by Pat Stith awarded with Pulitzer and these stories enlighten today's data journalists way (Garrison, 1998). Especially Dedman's "The Color of Money" is known as the main example of CAR and recognition of CAR in the newsrooms. Published in *Atlanta Journal* in 1988, "The Color of Money" was series of articles which reveals the discrimination and racist policies against black people about bank loans and mortgages in Atlanta financial institutions[8].

Through the use of CAR techniques in the articles, newsrooms started to get familiar with new technologies, data, visualisation, investigative journalism and CAR evolved to data driven practices which will be called data journalism in following years.

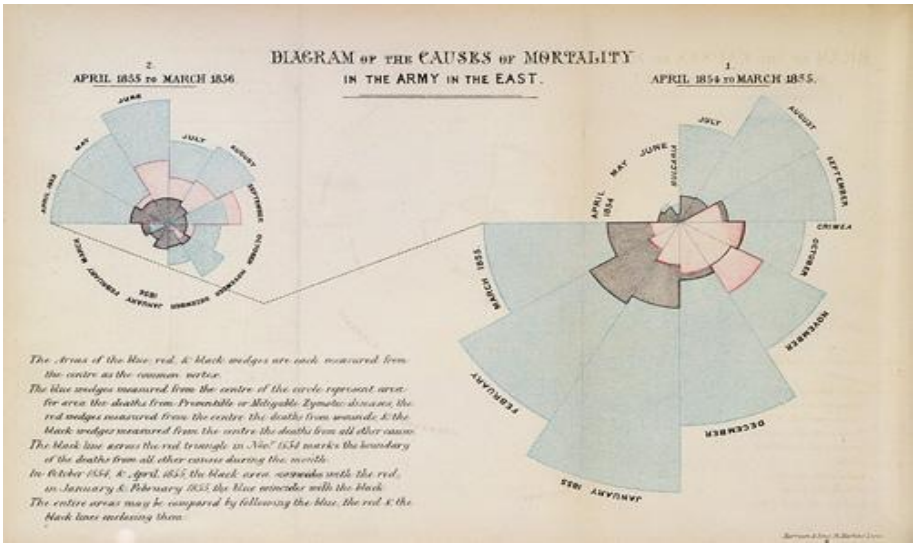
2.2. Data Journalism

2.2.1. Polar-Area Diagram as a Pioneer

Data visualisation is considered as the roots of data journalism. In that point, Florence Nightingale, the lady with the lamp, is also considered as the pioneer of data journalism with her Polar-Area Diagram. Her studies were inspired by Quetelet who is a Belgian statistician and founder of social statistics (Cairo, 2017, p.42). She was a nurse during the Crimean War (1853-1856) and created the Polar-Area Diagram with statistical graphics to visualise the reasons of soldiers' death during the war.

Great Britain, France and Turkey declared a war on Russia in 1854. However, the conditions of the soldiers were a disaster. There was not enough space on ships which were on their way to Black Sea from Bulgaria and medical supplies, necessary food equipment and horses were left behind. Injured soldiers were going to Turkey for treatment but the conditions in Turkey were even worse. Sheds were turned into hospitals but there were not enough medical and hygienic supplies, even doctors and nurses. As a result of these conditions outbreaks of typhus and cholera began and the number of deaths from illnesses was increased six times more than the number of death soldiers in battle fields. Florence Nightingale decided to go to hospitals in Scutari with 38 voluntary nurses. She kept a record of deaths of soldiers because of illnesses during her stay. When she came back, she presented her polar area diagrams which are called "coxcombs" by herself because of the vivid colors and dented appearance of the diagrams, about the Crimean War to the British government in 1858 (Lewis, 2015) (Image 1).

Image 1. Nightingale's Polar-Area Diagram



Her passion towards statistics to improve life conditions turned her into the pioneer of social statistics and inspired today's data journalists. Her studies still have a huge impact on today's life and can be used for every part of life like crime rates, health, journalism, etc.

2.2.2. The term: Data Journalism

Data became an everyday element in humans' lives. Use of data and combining with technology make everyday life easier. In the light of these changes, it was a fact that it would affect journalism too. After the developments of precision journalism and computer-assisted reporting, the term 'data journalism' emerged and attracted significant attention in both journalistic practices and academic fields. Working with data was always an important part of journalism but its combination with technology was a new innovation for newsrooms. There are still different opinions about what data journalism is or what it's not, however pioneers of data journalism always point the same direction: journalists are still journalists now, but at the same time they're both statisticians and designers. Alberto Cairo who is both a data journalist and a professor of University of Miami also summarize this transformation as "it's just journalism but data changes everything" (2017, p.116).

Veglis and Bratsas(2017) defined the concept of data journalism in their article as:

> "the process of extracting useful information from data, writing articles based on the information and embedding visualisations (interacting in some cases) in the articles that help readers to understand the significance of the story or allow them to pinpoint data that relate to them" (p.111).

Howard(2014) pointed to the steps of data journalism which will be accepted later by whole data journalists as a definition. According to Howard data journalism is "gathering, cleaning, organizing, analyzing, visualising, and publishing data to support the creation of acts of journalism" (p.4).

One of the most important pioneers of data journalism and also the innovator of *the Guardian Data Blog*, Simon Rogers, describes data journalism in his book *Facts are Sacred* (2013) and his blog[9] in 2014 in three parts. In his words these 3 parts are:

> "1. Data journalism is about using numbers to tell the best story possible. It is not about maths, or drawing charts or even writing code. It is about telling stories first and foremost – the maths and the charts and the code are all in service to that.
> 2. You're no longer thinking solely about words. Instead this is about the best possible way to tell that story.
> 3. The techniques of data journalism change all the time but they are marked out by an abundance of increasingly more accessible tools that allow sophisticated manipulation and analysis of data."

According to the article of Lewis and Waters(2017) 'data journalism' is a polysemic term (p.3). However, the most detailed and academic description of data journalism is explained by Coddington(2015) in his research "Clarifying Journalism's Quantitative Turn". According to Coddington (2015), there are three overlapping forms of data-driven journalism. These are CAR, Data Journalism and Computational Journalism. CAR is more investigative reporting based while data journalism is more based on open data and computational journalism is a combination of programming and algorithms (p.339).

2.2.3. Emergence of Data Journalism

> "Wikileaks didn't invent data journalism. But it did give newsrooms a reason to adopt it."[10] Simon Rogers

When Wikileaks published Afgan War Logs in 2010[11]It had repercussions all around the world and later it has started to be seen as the light which leads up the way of data driven journalism. However, Wikileaks itself should not be considered as the very first example of data journalism in terms of the stages of creating a data journalism piece (it only fulfills the first two stages which are data collection and data storage according to the pioneers of data journalism), but can be given as an example of the origins of data journalism (Baack, 2011, p.4).

A year before Wikileaks, *The Guardian* launched a datablog under the leadership of Simon Rogers and published data about the expenses of UK's Ministers of Parliament[12] and then they leaped forward with their data driven pieces about Afgan War that they took the data from Wikileaks[13].

Image 2 shows the increasing interest towards data journalism between 2009 and 2019. It's clearly seen that the interest has started to increase after *the Guardian Datablog, the New York Times* and Wikileaks.

Image 2. Google Trends Search about the term "data journalism" in countries between the years of 2009 and 2019[14]

The image proves the first claim about the increased interest after Wikileaks and *The Guardian* in terms of countries' interests towards data journalism. According to the graphic, the United States and United Kingdom led the way to

other countries and spread this term to the world search and learn about data journalism.[15]

Following years witnessed the improvement of data journalism and in 2014 the term “data journalism” officially accepted by the media through *National Institute for Computer-Assisted Reporting (NICAR)* (Howard, 2014, p.49). The year of 2014 and later witnessed the shine of data journalism all around the world.

2.2.4. Data Journalism in the United States

Before everything, *Chicago Tribune* (2002-2009) started to use governmental data of the state of Illinois as sources to achieve computer assisted news. However, they were not exactly data journalism, and may be considered as roots of data journalism in the US. Data journalism reached the US after the UK and after Wikileaks American newsrooms started to adopt data journalism with some blogs. *Vox, FiveThirtyEight*, *the New York Times* started to visualise data especially in politics and sports. Some authors and professors published books about data journalism and big data to light the way of data driven journalism. Alberto Cairo who is a professor from University of Miami pointed to the progress, techniques and the future of data journalism in his books *The Functional Art: an Introduction to Information Graphics and Visualisation* (2012), and *The Truthful Art: Data, Charts, and Maps for Communication* (2016). He claims that creating data news with just an obsession with data is irrelevant. Data journalism cannot be achieved for cheap or fast. He drew attention to the importance of technical skills and prior research to deal with data (Grassler, 2018).

Steve Doig and Simon Rogers played a crucial role in the development of data journalism in the US. Steve Doig who is a professor from the University of Arizona started to research data journalism and be interested in learning and creating data driven pieces. During his research he found that Hurricane Andrew in Florida damaged more new houses than the old ones. With this data he tried to link politics and society and tried to show significance of data using in newsrooms. Simon Rogers who is a pioneer of data journalism in the UK, left his job in *the Guardian* and started to work in *Google*. As a data editor and writer, he started to

publish articles from his blog to introduce data journalism to the US in a right way and teach data journalism techniques (Grassler, 2018).

According to the research of Lim(2018) who compared the progress of journalistic practices in South Korea and US analyzed that journalistic examples of US generally include more simple visualisations than South Korea however, American newsrooms try to engage with readers more with interactive news. Also in US news pieces mostly based on the visual than text so in this regard, American newsrooms are not highly connected with text to present the news (Lim, 2018, p.16).

2.2.4.1. The New York Times Case

The New York Times Web section launched in 1996 as an innovation in American journalism. According to observation of Boczkowski(2004) the web department was working separately from the rest and digitizing and converting the printed news for the online format. This initiative showed its significance with the reading numbers between 1996 and 1998 that page views increased to “60-80 million per month” (p.77). The year of 2007 was a milestone for *the New York Times* because the idea to launch an ‘Interactive News Technologies’ department came up from Aron Pilhofer and Matt Ericson with the vision of “reducing the bureaucracy associated with creating each project and elevating the status of the coders in working with reporters and editors” (Royal, 2012, p.11). Through the success of Interactive News Technologies department, employee numbers increased every year and *the New York Times* hired 25 employees between 2012-2015 (Ng, 2015, p.14). Presidential Elections in 2012 showed the application of data journalism by *the New York Times*. Data-driven stories about the election took a big part in *the New York Times*. Alieva(2017) found that the most of interactive news during the presidential campaign were “vertical/horizontal bars, tables, line graphs, geographic maps, pictures and illustrations'' in addition, during the election time the New York Times concentrated on “poll results and forecasts” (p.69). Later, *the New York Times* launched ‘*The Upshot’* as a data journalism blog in 2014 with 15 people (Olivo, 2015, p.43; Howard, 2014, p.24; Tandoc Jr. and Oh, 2017, p.997). Howard(2014) explained the importance of this initiative as:

> "That is precisely the model for open data journalism that embodies the best of the craft as it is practiced in 2014, and sets a high standard right out of the gate for future interactives at The Upshot and for other sites that might seek to compete with its predictions" (p.36).

2.2.4.2. The Washington Post Case

Adrian Holovaty and Alyson Hurt created a database at *the Washington Post* which covers "U.S. Congress Votes Database since 1991" in 2005 and this database became one of the pioneers of computational journalism. Holovaty explained the significance of the project as: "It was a milestone for me and for the Post, and helped set the bar for what news organizations could do with data on the web." (Howard, 2014, p.30). Followed by the "Truth Teller", in 2013, *the Washington Post* made an indelible impression in the context of computational journalism and fact-checking. The aim of "Truth Teller" was a real time fact-checking prototype for political speeches. Cory Haik from Washington Post mentioned that informing society in politics is crucial so newspapers should identify the truth because "facts themselves are increasingly under attack and falsehoods can easily and instantly find their way to a mass audience" (Uscinski and Butler, 2013).[16] Starting from 2013, *the Washington Post* shared outstanding data stories with its readers such as N.S.A. surveillance scandal (2013), Police Shooting Database (2015), President Elections (2016). *The Washington Post* shared N.S.A. scandal with *the Guardian* synchronously and revealed that "the N.S.A. is collecting a wide range of digital information from nine private internet firms as part of a program known as PRISM"[17] (Craig and Zion, 2014; Schulze, 2015, p.7). In 2015, *the Washington Post* published "Police Shooting Database in US" which is an award winning data journalism project. The project was a finalist in Goldstein Award, the winner in Polk Award, the winner in Sigma Delta Chi Award and most importantly the winner in Pulitzer Prize in the category of National News (Michalzki, 2016, p.42). Almost 5 year after the project, *the Washington Post* published their results about the project on August 9, 2019. According to the article, there are 5 findings: "Black Americans are disproportionately killed by police. Black men are more likely to be fatally shot while unarmed. Most people

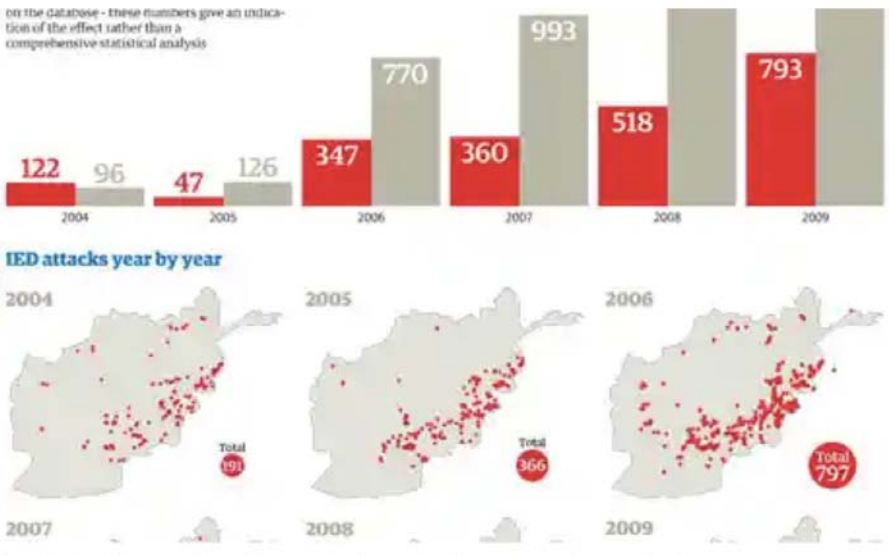
killed by police are young men. Since 2015, police have shot and killed an average of 3 people per day. More than 2,500 police departments have shot and killed at least one person since 2015" (Fox, Blanco, Jenkins, Lowery, 2019). Investigative and data journalism continued by Presidential Elections in 2016 and *the Washington Post* endeavored to perform principles of data journalism and moved with the times.

2.2.5. Data Journalism in Europe

2.2.5.1. United Kingdom

A year before Wikileaks, *the Guardian* launched its Datablog in 2009 under the leadership of Simon Rogers and published their first data driven piece about expenses of UK's Ministers of Parliament. Their second biggest data driven project was Afgan War Logs (Image 3). Wikileaks documents gave a chance to journalists to analyze and visualise data, and create a story from them. With these projects *the Guardian* officially introduced "data journalism" to the UK and turned into a pioneer.

Image 3. Visualisations about Afghan War in the Guardian Datablog



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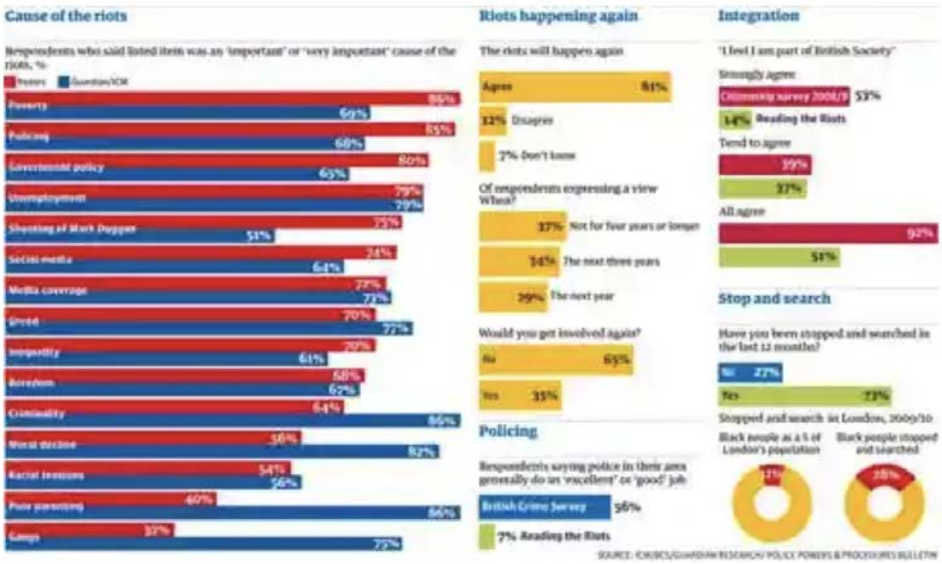
Rogers(2013) claims that data journalism was used by *the Guardian* for a long time but mostly as a form of computer-assisted reporting. Howard(2014) also points to the improvements of data journalism through Wikileaks and *the Guardian* in his research (p.7). It is surely beyond doubt that journalistic practices with data started and expanded the horizon of British newsrooms thanks to Wikileaks and Datablog. *The Guardian* also took part in the United Kingdom's open data policy. *The Guardian* continued significant data journalism pieces in 2011 with visualisations for UK Riots (Image 4) (Schulze et al., 2015, p.25).

Image 4. Visualisations about riots in the Guardian Datablog



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In 2012, public data source of the UK renewed and "the British government has doubled down again and again on the notion that open data can be a catalyst for increased government transparency, civic utility, and economic prosperity" (Howard, 2014, p.33). After *the Guardian, the Financial Times, BBC* and *Times* dove into the data journalism area and British newsrooms became one of the crucial countries in data journalism (Borges-Rey, 2016). While the progress and transformation in newsrooms were continuing, significant names of data journalism such as Simon Rogers, Paul Bradshaw were publishing articles, books and teaching data journalism to the society. Their contributions not only affected British newsrooms, but also it changed too many countries' point of views about data journalism.

2.2.5.2. Sweden

The main step about data journalism in Sweden was Journalism++ Stockholm[20] (which belongs to the international Journalism++) established by Swedish data journalists Jens Finnäs and Peter Grensund in 2013. They were the first Swedish journalists who specialized in data journalism. Their projects led other journalists' way and with this innovative step there were a data journalism conference in Stockholm[21] which is organized by Norwegian media network NxtMedia.

Until the research of Appelgren and Nygren(2014), data journalism was at the beginner stage and the term "data journalism" was not a recognized area in journalism in Sweden. Development of data driven journalistic practices was so new for newsrooms and there were obstacles such as lack of time and lack of technical skills to get into the data journalism area (p.395). According to the interviewees of the research, working with data was not new and there was an experience and interest. However, the challenging part was being familiar to the new concepts, programs and technologies to achieve it. According to the same research, there is a significant link between experience of journalists and their positive attitudes towards data journalism. However, the same journalists also claim that data journalism skills are not achievable for everyone (Appelgren and Nygren, 2014, p.403). Sweden also has democratic and free environment to do innovations in journalism in terms of finding data and its trustworthiness. Access to the public data is free for everyone in Sweden for a long time with The Swedish Freedom of the Press Act[22] in 1766 (Appelgren and Salaverria, 2018, p.987). As a result, data journalism in Sweden takes attention and rapidly growing but it still needs time to reach key countries like the US or UK.

2.2.5.3. Belgium

In Belgium, according to the research of Grassler(2018), the roots of data journalism has started in 2010 with an article of Association of Professional Journalists of Belgium about a meeting about data journalism tools and achieving this practice (p.128). Between 2010 and 2014 there were no noticeable

improvement about data journalism until Dataharvest[23] which is a networking event for specialized investigative and data journalists in Brussels. The biggest threat against the improvement of data journalism in Belgium was the problem to access public data. In the article of De Maeyer et al.(2015) points to the existence of data journalism in Belgium but the problems against its development as access to public data and its trustworthiness, lack of technical abilities and time management (p.442).

2.2.5.4. Greece

When data journalism started to spread all around Europe, Greece was also affected by this wind. Data driven journalistic practices in Greece was started with the economic crisis in the country in terms of informing the society and attitudes towards public institutions. It became more popular with the changes in "open data". After related legal procedures, Greece started to publish "open data" in 2010[24] and after Publicspending[25] is established by National Technical University of Athens with the aim of spreading data journalism in Greece in 2011 (Charbonneaux and Gkouskou-Giannakou, 2015, p.251).

2.2.6. Data Journalism in Rest of the World

2.2.6.1. Australia

Studies about data journalism are limited for Australia however, the term of data journalism emerged and started to be used in Australia around 2011. Until the years of 2014-2015 retained its originality (Wright and Doyle, 2018, p.9) and Simon Rogers described Australian data journalism as "the new punk" in *the Guardian* (2012). Data was important at Australian newsrooms but there was a lack of basic data skills. When *Fairfax* which is an Australian based media group, also runs in New Zealand created a small data team within their daily newspaper *The Age*, data journalism has started to rise and followed by the main publisher of Australia, *News Corp*, however they didn't invest as much as *Fairfax* (Wright

and Doyle, 2018, p.9). Until the main years of development (2015-2017), data driven pieces were generally interactive dashboards because of lack of data skills, and clear information about the production process of data driven pieces. Besides all these, Australian newsrooms were facing job cuts and cuts slowed the development of data journalism for a while. However, more journalists with more technical skills and higher degrees headed for this area and after this *ABC* started to give training about data. In the years when data journalism shone in Australia (2015-2017), courses in the universities have started and working with data has spread, “the process of normalisation has been made easier because the skills have become less technically demanding” and Wright and Doyle(2018) called this as “data normalisation” (p.11). Still, lack of time and sources point to common issues that Australian newsrooms face but internal and external collaborations of newsrooms and creates “community of data journalists” (Evershed described at Wright and Doyle, 2018, p.14).

2.2.6.2. China

Unlike many countries, there is no available environment in China to spread data journalism due to traditional journalism loyalty, governmental problems and problems about transparency of and obtaining data (Zhang and Feng, 2018). Even statistics in journalism and computer-assisted reporting aren't sufficiently known and analyzed. The very first book about precision journalism published in China in 1984. The publication didn’t affect the development of data driven practices until *Beijing Youth Daily* newspaper began to collect poll results and create reports for the public in 1996 (Zhang and Feng, 2018, p.15). ‘*Sohu.com’*, the very first data journalism blog, published in 2011 and shown as the first official example of data journalism in China. Followed by *NetEase, Tencent* and *Sina*, data journalism started to expand its effect in China as of 2012 (Zhang and Feng, 2018, p.1). According to the research of Zhang and Feng(2018), the most important factor standing against development of data journalism is difficulty to reach data and suspicion about its quality. Interviewees of the research point to the problems to access governmental data and state that there is no “participatory openness” (Zhang and Feng, 2018, p.13). According to the problems that pointed in the research, creating data driven pieces is a time and energy spending process for

the journalists and uncertainty for the newsrooms about gaining their investments. Besides all these, Chinese newsrooms realized that data journalism is a good way to gain social recognition thanks to Caixin and their international award-winning news[26].

2.2.6.3. South Korea

Use of data in South Korean journalism is based on governmental sources and the dominant of the media is traditional television networks. According to the Philippine Information Agency "the average time daily spent reading newspapers was 6.5 minutes, and the usage share was 7.8 percent, ranking third behind television at 49.9 percent and the Internet at 32.6 percent".[27] Data journalism looks more like a monopoly based on data driven pieces of TV networks. Naver is also another point to be addressed in terms of development of data journalism. *Naver*[28] is a Korean search engine used generally as a news portal and the society prefers to use Naver to access a news piece instead of visiting the actual page of the media outlet as *the Korea Herald* mobile section editor Yang Sun-jin stated to Philippine Information Agency. He also pointed that newsrooms invest and make innovations to compete with *Naver* in his same speech (2018). According to the research of Lim(2018), South Korean TV networks create "visually appealing" in their data driven pieces however with less interactivity and it decreases user engagement.

2.3. Data Journalism in Spain

2.3.1. Emergence of Data Journalism in Spain

The year of 2011 witnessed the growing of data journalism and different types of data driven projects in Spanish media. *RTVE* launched a data section which is under of *Audiovisual Innovation Laboratory* and they published their first project which is about the topics that Spanish political parties' mentioned in their election programs[29] (Ferreras Rodríguez, 2016, p.265). The laboratory offers data journalism pieces, webdocs, interactive stories and timelines.

Originally, MediaLab Prado was created by the City Council of Madrid in 2000 and later named as MediaLab Prado in 2007. After 2011, MediaLab Prado started organizing conferences and workshops about data journalism (Blanco-Castilla, Quesada, Cabra, 2016, p.55). To promote data journalism MediaLab Prado and CCCBLab started to provide some grants about the topic with the support of *The International Consortium of Investigative Journalists (ICIJ), Open Knowledge Foundation (OKFN)* and *European Journalism Center (EJC)* (Blanco-Castilla, Quesada, Cabra, 2016, p.61).

Nevertheless, one of the very first steps of data journalism in Spain was taken by MediaLab Prado with "Data Journalism Seminar" in 2011 before the transparency law in spite of inadequacy of the practices of the law. With their words the idea was:

> "...creating a working group on data journalism arises from the desire to promote the exercise of this discipline in Spain, where this type of research is still rare. Fuelled by the success of other groups of data journalists in other parts of the world, this group was created to address the difficulties and obstacles which currently exist in Spain, keeping this type of research from appearing more often in our media"[30].

In 2013, *El Confidencial Data Unit* launched by Daniele Grasso and Jesus Escudero as a game changing movement in Spanish data journalism. Innovation

is *El Confidencial Lab*'s main component and with their words: "not to win the race, but to change the rules. In El Confidencial Lab we think about how technology is writing the future of journalism, from creativity, risk and the possibilities that new tools offer to information and the media". According to the explanation of Daniele Grasso, Excel, Tableau, R, and SLQ are mostly used tools in *El Confidencial Lab* (Arias, Sánchez-García, Redondo, 2018, p.288). *El Confidencial Lab* put its signature under many important stories and successes like their projects "The Migrant Files" and "Generation E.". "The Migrant Files" won an award from Data Journalism Awards in "Data Stories on a Single Topic" in 2014 (Ferreras Rodríguez, 2016, p.265) and this success followed by 3 nominations in 2017 and one nomination in 2019. *El Confidencial* is also a member of European Data Journalism Network since 2017.[31]

El Español launched in 2015 by Pedro J. Ramirez and Antonio Delgado was running a data unit (Rojas Torrijos and Rivera, 2016, p.7). *El Español* was mainly into sports data journalism. Same researchers mentioned in another article which is written in the same year that in the first 1.5 year, El Español published 19 sports articles which were prepared with data visualisation techniques (Rojas Torrijos and Rivera, 2016, p.7). In the same year *El Mundo* also launched its data unit under Hugo Garrido. According to the conducted research of López, *El Mundo* generally uses Excel, OpenRefine, Tabula, Kimono Tableau, CartoDB and D3 for data journalism articles. *El Mundo Data* is an independent department however, they're collaborating with the editorial team when there's an important issue to publish (Rojas Torrijos and Rivera Hernandez, 2016b, p.20). According to the research of Arias, Sánchez-García and Redondo(2018), there are only 3 news organizations have an independent data journalism department which are *El Confidencial, El Diario, El Mundo* while others (*RTVE Lab, weblogs, Cuarto Poder*) just have participants about data journalism who's working with the rest of the newsroom (p.281).

Since 2015, some other media outlets started to adopt data journalism and create data driven projects such as *El Periodico* and *El Pais*. However, not all of them established a specific data department to achieve data journalism. *El Confidencial* and *El Mundo* were working with data labs while others were working with related departments and making collaborations such as the *International*

Consortium of Investigative Journalists (ICIJ) (Ferreras Rodriguez, 2016, p.270). According to the literature about data journalism in Spain (Ferreras Rodríguez, 2016; La-Rosa and Sandoval-Martin, 2016; Appelgren and Salaverria, 2018; Grassler, 2018; Arias et al., 2018), the main obstacle against the progress of data journalism is economical problems, doubt about return on investment, lack of technical and educational skills and traditional structures of Spanish newsrooms.

2.3.2. Access and Use of Data

Spain was one of the most problematic countries to establish a challenging environment for data journalism in terms of media habits and laws in the context of Spanish Transparency Law that was accepted in 2013 (La-Rosa and Sandoval-Martin, 2016). Before this, the law about accessing public information was prepared in 2012 but it was not implemented until Act 19/2013, of 9 December, on Transparency, Access to Public Information, and Good Governance has passed (Appelgren and Salaverria, 2018, p.988). The new law provided not only the data of public administrations but also all data which is related to government and public body (Article 2) with the rule of not being anonymous and request the information with determined procedure (Article 17, Article 19)[32] The main topics of law were: "to guarantee the right to access information for all citizens", "to enforce transparency of all public administrations" and "to supervise the observation of fair governance practices" (Appelgren and Salaverria, 2018, p.988). Implementing the Transparency Law, Portal of Transparency launched in the website 'transparencia.gob.es'. However, Raúl Sánchez mentioned a problem that still exists as: "there is not yet a culture of transparency among officials and senior public sector officials" (Arias, Sánchez-García and Redondo, 2018, p.283). According to the State of Press Freedom in Spain Report by International Press Institute mentions the inadequacy of the transparency law in 5 points as:

> "The law fails to recognise that the right of access to information is a fundamental right. The law does not cover all public institutions. The term "information" is inadequately defined. The law establishes a double negative administrative silence. The Transparency Council, tasked with overseeing compliance with the law, is not an independent body. "(2015, p.23).

The transparency law was not equal to each public body. The information that has to be transparent was only administrative and should have been just from public institutions. In addition, requesting information was a problematic process also. Related bodies who had to give information didn't have an obligation to answer the request. If there is an unanswered request, it has been accepted as denied without any explanation (2015. p.23). This deficiency was also a point to discuss while talking about transparency.

La-Rosa and Sandoval-Martin(2016) found in their research that there is a positive relationship between Transparency Law and development of data journalism in Spain. However, according to the interviews in the research transparency portal was not sufficient enough for data journalism and was taking too much time to obtain data, so it was not officially helping. Also the same research pointed two main obstacles against obtaining data for journalistic practices in Spain as “the delay in answering requests of information that they choose to respond” and “refusals to answer the many requests for public information” (La-Rosa and Sandoval-Martin, 2016, p.1216).

2.3.3. Open Data Initiatives

Civio Foundation in their words: “is an independent, non-profit organization based in Spain which monitors public authorities, reports to all citizens and lobbies to achieve true and effective transparency within our institutions”.

Civio Foundation was launched in 2011 to “bring an end to opacity in public affairs, informing citizens and using innovation to freely access the information that matters”[33]. Civio Foundation is heard with their two important projects named as “Where do my taxes go?”[34] and “tuderechoasaber.es”[35]. “Where do my taxes go?” is mainly fed from the general state budget data provided by the Ministry of Finance and Public Administration. The data extracted and shared with society through a website and included visualisations. “tuderechoasaber.es” which means “your right to know” progressed between 2012 and 2015. The importance of the project is that “tuderechoasaber.es” was the first website to request data from

public bodies even before the Portal of Transparency launched. Civio Foundation currently has 5 active projects: “Medicamentalia” “Pardonometer” “Who's paid for the work?” “Spain in flames” and “Who rules?”.

Maldita is also a data platform that works on fact-checking, database search, verification techniques and content creating since 2018. In their words Maldita has 3 aims: “Monitor and control political discourse and promote transparency in public and private institutions”, “verify and fight against misinformation” and “promote media literacy and technological tools in order to create an aware community that can defend itself from disinformation and lies in all areas”.[36] Newtral is also another initiative mainly based on production but also fact-checking since 2018 with the founder Ana Pastor. Newtral consists of journalists and fact-checking team updates and verifies data every day. Data verification occurs in three different filters and divided into 4 categories in the end which are “true”, ”truth to media”, ”deceiving” and ”false” according to the explanation on their website.[37] Maldita and Newtral shows in the past months that they started to win their battle against fake contents by signing a collaboration agreement with Facebook to evaluate and verify the content that is published and reduce the amount of sharing according to the results.[38]

2.4. Sports Data Journalism

2.4.1. Evolution of Sports Data Journalism

As already mentioned, data journalism is a journalistic approach that needs to deal with data, statistics and design to achieve its goal. In this regard, sports and data journalism perfectly fit each other because sports offers unlimited data in every branch to understand and analyze the game for both audience, media and the professionals in this business. However, there is still a complex relationship between sports and data in terms of obtaining data and gaining skills to analyze and visualise that in a proper way. Generally national newspapers publish a game story with basic data such as times, passes, points, goals, fouls etc, in other words, lack of context and deeper meaning. Minto(2016) argues that most of the sports news don't have statistical analysis, they just have "classical use of numbers to fill space". Also data journalist John Burn-Murdoch from *the Financial Times* explains the importance of data in sports journalism with these words:

> "The current situation of digital news distribution dictates that the media often have to tell the story without the user even visiting their website. During an event like the Olympics, this need becomes more acute because many people follow them through the internet to keep track of the dozens of events held there each day. A clear graph is a great opportunity to make the information stand out within such a large amount of data, and it can be fully understood in the same moment" (Rojas Torrijos and Rivera Hernandez, 2016).

In addition, Minto also examines the availability of sports data for journalists. Mair(2017) also claims that sports data is a totally different business than sports journalism. There are two ways to obtain data for sports which are "associations and sports governing bodies" and "private data companies". Most of the associations and sports governing bodies have open data (within limits) but on the other hand, sports data is a growing business and companies such as *Opta,*

Stats and *Sportradar* make sophisticated datasets to sell to teams and media. This puts a financial requirement to create good sports data stories[39].

Sports journalism has always been an excellent area to perform data driven practices. In this regards, first sports data journalism experiences started in English speaking media with baseball in the USA for the need to analyze data to understand the game than it was spread to basketball, football and lately other branches thanks to the increasing popularity to sports organizations in both national and international level with the huge progress of broadcasting (Rojas Torrijos, 2014). Before the main leap of sports data journalism there were some publications which were catching societes' attention about sports data journalism such as Moneyball by Michael Lewis (2003) and Soccernomics by Simon Kuper and Stefan Szymanski (2009) (Mair, 2017).

Before newsrooms, some blogs undertook the duty to present data to society through the internet such as *GoalImpact, WhoScored* and *Spielverlagerung*. These blogs' approaches were not journalistic, but informative. *WhoScored* was established in 2008 and started to publish game statistics of teams and players. It has a huge database and offers comparisons of data to users. Few years later *Spielverlagerung* was established in 2011 and focused mostly on football. Style of *Spielverlagerung* was more close to journalism in terms of use of infographics and analyzing game tactics. Lastly, *GoalImpact* was established in 2012 but it was totally different from *Spielverlagerung* because of the approach of the blog. *GoalImpact* was offering players data individually and their effect on their teams. There were less journalistic and more statistical approaches. Among these, *WhoScored* and *GoalImpact* was used by other media channels too for mostly obtaining data while *Spielverlagerung* was used for journalistic practices (Horky and Pelka, 2017).

The very first examples of sports data journalism in newsrooms created by *the New York Times, the Guardian, the Economics* and *the Washington Post* during the Winter Olympics and World Cup in 2014 (Rojas Torrijos and Rivera Hernandez, 2016) (Image 5 and 6).

Image 5. Data article about World Cup goals, the Economics[40]

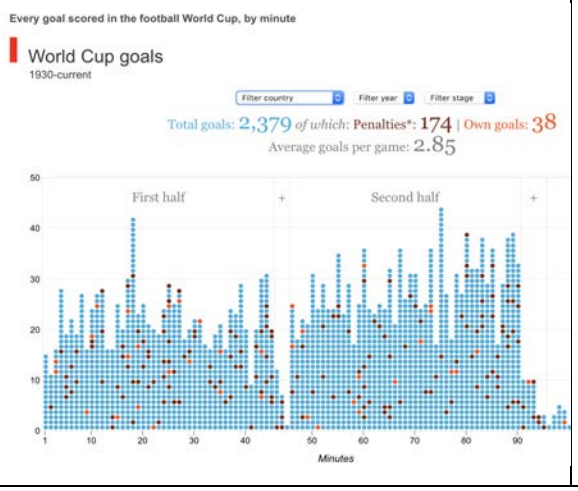
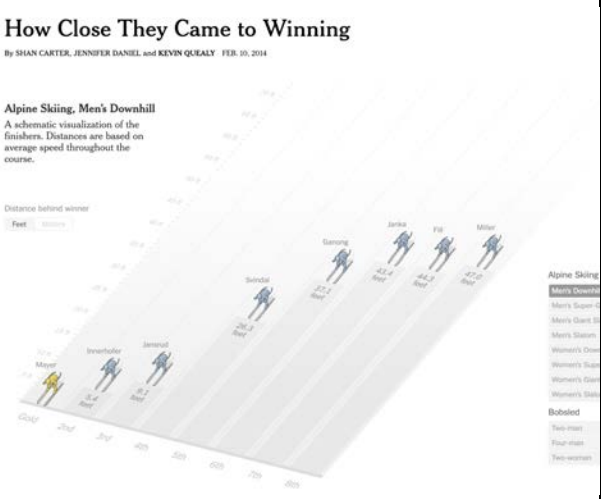


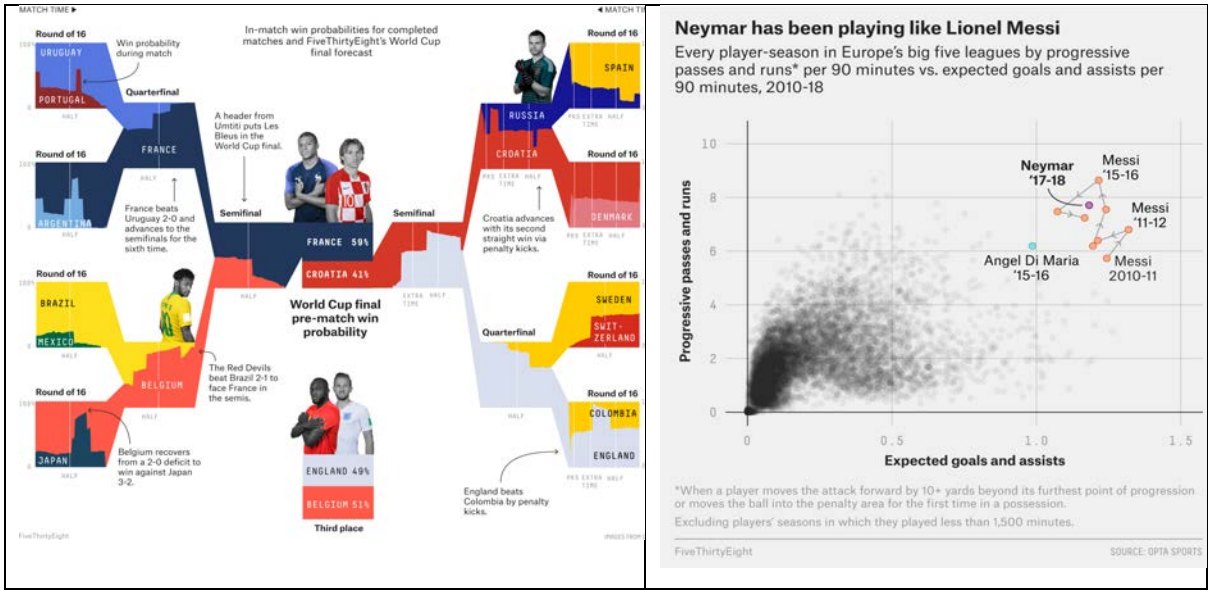
Image 6. Data article about Olympics, the New York Times[41]



The Winter Olympics and World Cup in 2014 opened a way to establish new startups and data departments in the newsrooms during the same year. *Vox* was created by Ezra Klein who is the former editor of *the Washington Post*, Melissa Bell and Matthew Yglesias with the motto of "we live in a world of too much information and too little context. Too much noise and too little insight"[42]. The same year *the New York Times* created a new section called '*The Upshot*' to present data journalism pieces including sports to its readers. Following years witnessed the development of *FiveThirtyEight* and *Grantland.com* which have a significant meaning in terms of progress in sports data journalism. *FiveThirtyEight* (Image 7) is a personal project of Nate Silver while the website belonged to *the New York Times* (2010), *ESPN* (from 2013) and lately *ABC News* (since 2018) and won numerous awards until today. While they belong to *ESPN*, Nate Silver published an article on the website and explained the history and goals of *FiveThirtyEight* as:

> "FiveThirtyEight is a data journalism organization…Our methods are not meant to replace traditional or conventional journalism… Conventional news organizations on the whole are lacking in data journalism skills, in my view… There is both a need for more data journalism and an opportunity to build a business out of it. That opportunity has required us to think deeply about the strengths and weaknesses of conventional approaches to journalism… It's time for us to start making the news a little nerdier."[43]

Image 7. Data article examples, FiveThirthyEight[44] , [45]



European countries such as Italy, Portugal, France, Spain, Germany influenced from successful examples and increased attention towards data journalism in American and British sports media and started to give space to sports data journalism.

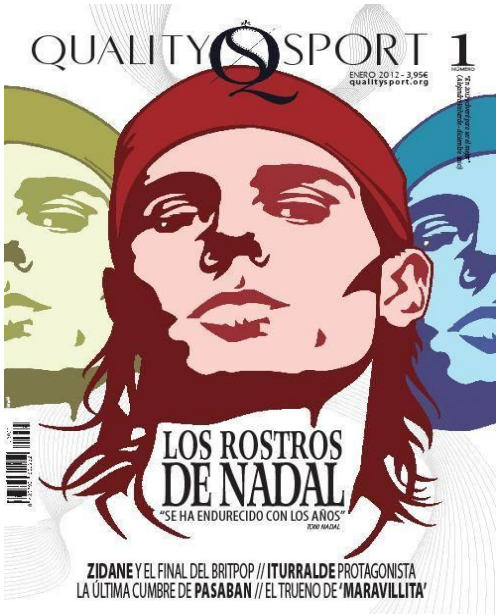
As a result, it's getting more important to analyze how sports newsrooms act as an innovation laboratory which exploring new digital narratives to meet the new requirements of readers, who increasingly demand more visual, interactive and multimedia pieces, which are accessible in any medium and place, and of comfortable reading through dynamic formats (that combine horizontal reading, in slides, with vertical, in scroll), videos, infographics and data visualisations (Rojas Torrijos, 2015).

2.4.2. Sports Data Journalism in Spain

Through the increased relationship between technology and journalism, Spanish newspapers had also adopted some of those new technologies. Changing habits of Spanish consumers and transformation of journalistic practices all around the world changed Spanish media as well. Between 2008 and 2015 60 digital media initiative including *El Confidencial, El Español* and *ABC* (Rojas Torrijos and

Rivera Hernandez, 2016, p.252) was created by journalists which consists of "reports, interviews, longform, interactive computer graphics, based on data journalism or transmedia" (Rojas Torrijos, 2015, p.34). Data integrated sports journalism started with '*munideporte.com*' which is a general publication about sports in Spain in 2011 and then '*Quality Sport'* which is a publication mostly about women's football for tablets in 2012 (Labarga-Adán, González-Díez, Pérez-Cuadrado, 2018, p.452) (Image 8). *Quality Sport* has a different importance besides all these. *Quality Sport* was an initiative which was launched by communication students from University of Navarra as their graduation project and published until 2013 since some of founders transferred to *Marca* to publish *Marca Plus* which will be explained later (Rojas Torrijos, 2015, p.35).

Image 8. The first issue of Quality Sport in January 2012



According to the research of Manfredi Sánchez, Rojas Torrijos, and Herranz de La Casa(2015) there were 21 digital media outlet (few of them mentioned as *Eleven Foot, Minuto 116, juegosriojaneiro2016.com, Pasaporte Olímpico, Avance Deportivo, diariodelaroja.com, proyectopremier.com, radiogoles.es, deportesevilla.tv, La Jugada Financiera, Metadeporte, gipuzkoasport.com, Sportics*) in sports which led the road for next publications later. These digital outlets were mainly about Olympics, women's football, minority sports, foreign leagues, basketball and of course, football.

AS Color which was a digital tablet version that is free for subscribers, followed these initiatives but with one special characteristic. *AS Color* was printed in the beginning of 1970s as a newspaper with color and turned to journalism with its digital version after almost 40 years (Labarga-Adán, González-Díez, Pérez-Cuadrado, 2018, p.452) (Image 9). Alfredo Relaño who is a former director of *AS* mentioned the importance of *AS Color* as:

> "It was a great success of the Montiel family, which still has 25% of the newspaper's shares. So the sports newspapers did not go out on Tuesdays, so they thought they would create a magazine to fill that It was a very innovative publication and had great acceptance, especially since it was in color, something very unusual in an era when everything was black and white."[46]

In addition to these, journalist Vicente Carreño from *AS* wrote in his piece about the new digital version of *AS Color* and said:

> "Alfredo Relaño has had the magnificent idea of resuscitating that magazine for modernity, and has put it at once on the internet, in the tablets that some of the old guard looked at with suspicion, like strange and magical cachivaches. To seduce us, it has brought us to our myths, legends of the seventies, characters that made us happy with their successes and those whom we continue to admire a long time later. The project shows that the old is compatible with the new. AS Color returns to innovate and stay" (May 31, 2012).[47]

Image 9. The first issue of the new AS Color in May 2012

Elite Sport also offered digital content to its readers on a monthly basis about sports in general in 2014 and the first issue was about Basketball World Cup and Sailing Championship[48](Image 10). In 2015, *Elite Sport* collaborated with *El Economista* and took its place on their digital platform.[49] Also in 2016, *Elite Sport* collaborated with *Public* and made their content available for *Public* readers for free to reach more readers because "The Public newspaper is one of the reference digital media in the journalistic sector, with 11.2 million unique users, as certified by the Office of Justification of the Diffusion (OJD) in its control of the month of October (2016). Successful figures are also shown in the number of page views (45,035,948), visits (22,342,646) and single daily users (600,518)".[50]

Image 10. Covers of some issues by Elite Sport

Sport launched its digital version which was published on a monthly basis for tablets in 2014 and entered the digital journalism world (Rojas Torrijos, 2015, p.36). The same research also points that there is a diversity in *Sport* according to the first three issues, when football is the main sport in magazines. "Of the 11 main articles published so far by this magazine, 4 have dealt with football and 7 on other modalities. Of these, interviews or reports have been about basketball, motorcycling, motoring, athletics, handball or water polo" (2015, p.41).

Besides all these publications, *Marca* had a different place with a proof of its success. *Marca Plus* launched in 2014 with a team from *Quality Sport* as

mentioned earlier. The application was put on the list by Apple as one of the best applications for iPad and also won “Best Sport Magazine Award” in Digital Magazine Awards three times in 2015, 2016 and 2017. *Marca Plus* is one of the great bets of Unidad Editorial for the new technologies, having achieved, with 83 numbers in its first three years, an exceptional positioning in the digital market: an average of 225,000 downloads per number and more than fourteen million downloads since its launch” (Labarga-Adán, González-Díez, Pérez-Cuadrado, 2018, p.453). Also the same researchers points that “195,000 downloads by number and more than 13 million downloads since its release until March 2018” (Labarga-Adán, González-Díez, Pérez-Cuadrado, 2019, p.58). *Marca Plus* was based on audiovisual content, data, gamification and photojournalism(Image 11). According to the findings of Rojas Torrijos(2015), *Marca Plus* mainly divided into 5 different parts. In the cover there were images about the content and in the second part there were interviews, multimedia pieces, infographic and game. Third part consisted of infographic, profile illustration, interview, historical story; fourth part was opinion, interview and game and fifth was mainly data visualisations and culture & sport combination (p.40). *Marca Plus* was achieving all data journalism practices in the context of data visualisation and reader engagement with games. Nacho Labarga explains the importance of *Marca Plus* as: “Marca, thanks to the bravery of its leaders, has once again proved to be at the forefront being the first powerful medium to launch a completely multimedia, innovative and multisport product. Then Sport has joined with its magazine and surely sooner than later it will be other means of the competition or new ones that are encouraged”[51]

Image 11. Covers of Marca Plus

Recent years have witnessed the digitalization of sports media in Spain. After *Marca, AS* and *Sport*, other newspapers turned their websites to more

interactive and data-oriented news outlets such as *Mundo Deportivo* and from national newspapers *El Pais, Lavanguardia, El Periódico* etc.

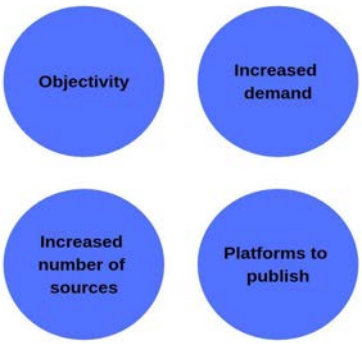
Manfredi Sanchez, Rojas Torrijos, Herranz de la Casa(2015) explains 9 facts that digitized sport journalism had exposed both particularly in Spain and also in general (p.75-86). Firstly, It supported entrepreneurship and new initiatives and as a result large numbers of new digital news outlets have launched and in addition these growing environments had supported creativity and encouraged journalists and traditional newsrooms to broaden their horizons about using new technologies as well.

> "This amount of new sports media highlights that, indeed, it is an area conducive to innovation and creation of differentiated projects. It also shows two great trends that reinforce the idea of audience niche: on the one hand, the commitment to the hyperlocal (geographical segmentation) and, on the other, thematic superspecialization (football, international, municipal sport or field hockey) or the combined offer of information with other types of services (p.77).

Secondly, digitalization in the sector has revealed new ways of storytelling in the context of visualisations that means graphical representations, illustrations, interactive visualisations and various types of multimedia elements (Manfredi Sanchez, Rojas Torrijos, Herranz de la Casa, 2015, p.78). Third, journalists had learned the details of telling a story with numbers. Sports is a great area to collect lots of data but the main step is using the relevant data and serving in a right way to the reader. Fourth, the significance of video was understood by newsrooms. Digital sites had adopted videochronization and animated videos and also interactive videos to engage with the reader. Fifth, the sports journalism industry experienced longform through digitalization and it directly affected reader experience. In sixth, the transformation of genres in newsrooms because of the habits of new online users as: "mobile users have led the media to reformulate the extension and the defining elements of the classical genres (shortening of texts, greater audiovisual and infographic presence and hypertext that generates interaction)". Seventh, a term called "infotainment" emerged due to these technological changes. The content served to the audience not only in an

informative format but also in an entertainment style with gamification. Through this, reader engagement has also provided. Eighth, increased usage of mobile devices support the media environment to create content for mobile users who want to reach the content from anywhere at any time. In this context, sports media concentrated on mobile apps and social media to reach its reader 7/24. Ninth, Twitter also supported new ways of storytelling with its feature "microblogging". Microblogging forced the sports media to tell a story with just 140 characters or limited multimedia (Manfredi Sanchez, Rojas Torrijos, Herranz de la Casa).

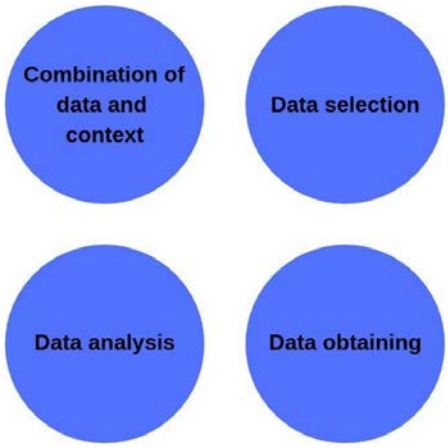
2.4.3. Advantages and Disadvantages of Data Journalism in Sports



While sports data offers new experiences to newsrooms there are still obstacles and advantages about use of data in sports journalism. Horky and Pelka(2017) analyzed these advantages and disadvantages in their article "Data Visualisation in Sports Journalism". According to the research, there are mainly 4 topics that can be analyzed as advantages while 4 topics are disadvantages.

Advantages

Today's world offers newsrooms to obtain data from numerous sources. This helps create data journalism pieces in a fast and easy way. Easily accessible data offers a free environment to newsrooms to create data news because journalists started to analyze even the most complicated games or information through data. Data helps journalists to create more objective articles because the data that they obtain has already a story in itself. Journalists can trust their observations too but the possibility of wrong interpretation will be higher than the exact data. It's so obvious that data increases the quality of the news in terms of visualisations that need less space to share big data than text, and presenting objective news because of the journalists reliability on data. Increased demand from readers is



also a huge advantage for sports data journalists. While people are living in a technology age and have a chance to reach information from everywhere thanks to numerous platforms to share, data news keeps their interest alive and helps newsrooms to be strong in competition with other media platforms.

Disadvantages

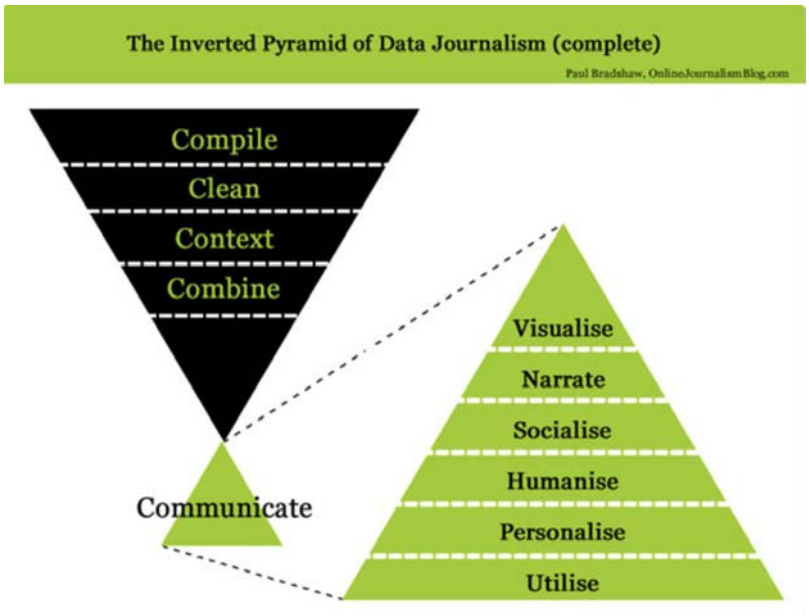
However, there are still disadvantages, or dangers in other words, about use of data in sports. Creating a story based on data is a tricky approach because it can be both successful and irrelevant at the same time. Journalists who´s not capable of analysis and visualisations of data may cause adequate news in terms of the text and the data in the end. Also there is still lack of experience about choosing the right data for the story. Customizing and cleaning data need background information and technical experience to create an objective and necessary data news. Related experience with the topic is an absolute need for data analysis. However, there are still too many newsrooms without a specific sports data department. When journalists achieve obtaining and cleaning the data, the main struggle comes as the analysis part. Specific to sports journalism, when there is lack of information about the topic it will be harder to analyze correctly and create adequate content. Finally, between all advantages and disadvantages there is still one main topic. The data which is used for sports journalism is also created by people may not be error-free. Journalists who use the data directly may inform society wrongly and cause damage to the newsroom that they belong. In the light of all of these, sports data created a huge opportunity to newsrooms but it came with its dangers. Use of sports data, actually in general, should be considered as a win or lose game according to the reasons that already explained in this chapter.

2.5. Characteristics and Techniques of Data Journalism

Achieving data journalism has some requirements in the background like identifying a strategy, knowing where to find data, how to clean and prepare and how to visualise the data in a correct way to tell the story. According to Simon Rogers(2013), integrating the reader with the accessible data is also a key element before data story; this means open data is an essential content of data journalism. Rogers(2013) outlines 10 important items of “open data journalism” in his book ‘*Facts Are Sacred*’ and mainly points to the significance of cleaning and selecting the right data and then personalizing. When this step is achieved, a journalist should know how to visualise selected data. Lastly, engaging the reader with the story is possible with publishing the data in a proper format for readers (Rogers, 2013, p.308). This means making the data accessible is important as visualisation. These recommendations are inspired by Meyer’s suggestions about dealing with the data that was mentioned in the first chapter. Acquiring the available data set, which also forms the first stage of data journalism follows by querying and clearing this data.

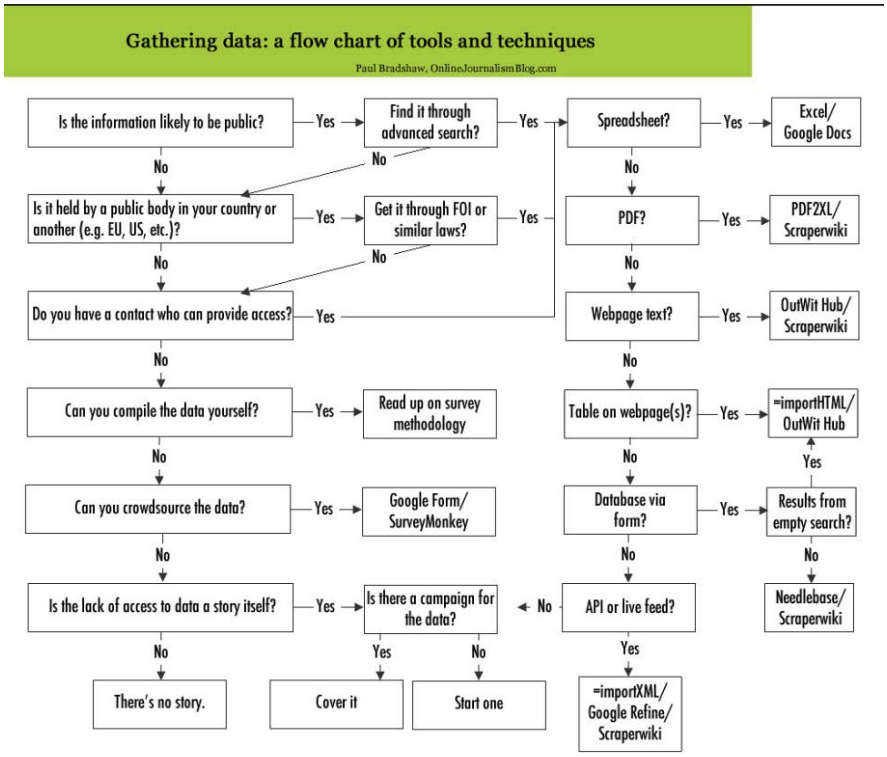
Mirko Lorenz mentioned the process of data driven stories at the 7th Conference on Innovation Journalism in 5 main stages. The very first step is “digging into the (big) data and the need to gather and clean it”. Followed by, “information should be mined and filtered to understand it and find patterns or anomalies”, “the visualisation process begins in which an adequate visual solution in a graphical or multimedia presentation has to be chosen”, “the product needs to be connected to the classic storytelling to appeal to the audience and ultimately” and “media needs to be created, that provides a certain value for the audience” (Schulze, 2015, p.13).

Image 12. The Inverted Pyramid of Data Journalism[52]



Another detailed model about the data journalism process is created by Paul Bradshaw(2011) and accepted as one of the main models in this field (Image 12). Bradshaw(2011) proposed to journalists 5 main stages to achieve data journalism as "compile, clean, context, combine and communicate". "Compile" is the first and one of the most fundamental stages of data journalism if a journalist needs data to answer the question or has already data to find the story in it. Compile means collecting the data, in other words collecting information as the base of the project. A journalist compiles data from different sources. Meyer(1991) also explains databases in "*Precision Journalism*" and mentions that a journalist can collect information from archival databases. These archival databases can be separated as online and offline databases. Online databases are mainly "for public access with a fee and software system" while offline databases are more "public or private agency's own record-keeping" (Meyer, 1991). Bradshaw(2011) also mentions the way to obtain data in various forms. Data can be provided to a journalist directly from the related organization, or can be found via search engines from government websites. In addition, a journalist can convert a document to an analyzable format to take data in it. Some media organizations invented their programs to achieve data collection such as *ProPublica*'s Tabula to extract data from PDF (Cairo, 2017, p.156). Lastly, a journalist can compile his/her own data with surveys, interviews, forms etc. Bradshaw also visualised the question "how to gather data?" (Image 13) in his blog as:

Image 13. Table of gathering data



Collected data may contain errors because all databases are also human-created and the reliability of a story based on trustworthy datasets. In this stage, a journalist needs to clean the data and correct the mistakes in the dataset to make it usable. Data "cleaning" can be done in two ways which are correcting or removing the errors and transforming the data into a usable format for the story. In that point, "journalists must have the ability to rule out bad data from good data. Besides having to make this distinction, a journalist has to develop some technical skills in relation to the mastery of spreadsheet software that can help the work" (Grassler, 2018, p.87).

"Context" stage is essential in answering the question with collected & cleaned data. If the question is clear, then the data needs to work on too. In other words, the context stage is where a journalist identifies the methodology of the project. A journalist creates the story in the "combine" stage. Linking related datasets, analyzing them and finding the answer of the question create the story. It's the last step before the "communication" stage.

Bradshaw(2011) also claims there are 6 sub-stages under the "communication" stage that are visualise, narrate, socialize, humanise,

personalize and utilise. Visualising data is the main way to communicate and it has some advantages that “makes that effort worthwhile, however: it can make communication incredibly effective. And it can provide a method of distributing your content which cannot be matched by the other types of communication” but it has also a disadvantage as “people often do not spend much time looking at it” (Bradshaw, 2011). A story can be outstanding but the main struggle is to “narrate” it with a proper way to make people understand and relate the numbers and the story, in the context of “reducing the amount to an understandable, manageable quantity such as the amount per person” (Schulze, 2015, p.38). The Internet provides an environment to exhibit data journalism to readers in the context of “social communication”. Mutual participation in data journalism collects data via crowdsourcing which refers to “the practice of seeking information by reaching out to the masses, to see who comes forward” (Michalski, 2016, p.26) and create collaborations with readers as well. In this context, data journalism readers are not only consumers but also participants. The role of the data journalist is to catch people’s interests and tell them a story. Therefore, a journalist “humanizes” the numbers and makes the story relevant to reach its readers. Through computer generated technologies, a journalist can easily illustrate the story and present it to readers. Interactivity of data journalism projects gives people to choose and control the information that they want to take and, in other words “personalization”. Bradshaw(2011) gives an example to personalization with “geographical personalisation”. For example, users can provide the necessary personal information (zip code, city etc.) to the website and receive information about that place. In addition, through completing the form of interests readers can only reach relevant stories, without any distraction. This also provides organizations to compile more data about the users and identify them. “Utilization” stage of communication refers to creating tools to differentiate and utilize that data and also tools that are updated and user friendly for readers. It shows similarity with personalization however, it doesn’t need personalization.[53]

2.5.1. Visualising Data

Data visualisation is an important step in data journalism. It has some principles to perform and when these principles are not achieved, it may confuse the reader and give wrong information. Choosing the correct visualisation, colors

and fonts create more strong data driven pieces. Lisa Charlotte Rost(2018) mentions the importance of color choices in data visualisations in her post in Datawrapper Blog[54] and claims that gradient colors are the best choice for patterns but “the more colors in a chart represent your data, the harder it becomes to read it quickly” (Image 14).

Image 14. Color choices for data visualisations, Datawrapper

Rost(2018) also suggests using light and dark colors according to the degree of the value. Color choice is also affected by cultural background like representing male and female. For example, representing a value about males in reddish tones or pinkish tones confuses readers so the safest choice is using the public recognized colors. *The Washington Post*’s visual journalist Kennedy Elliot also mentions about the use of the right color according to human perception. There are foods, drinks, brands which are linked with some colors and accepted from human perception (Elliot, 2016).[55] Color blind people should also be taken into consideration. In the light of these, a journalist considers all the aspects while visualising the data (Rost, 2018) (Image 15).

Image 15. Color choices for data visualisations, Datawrapper

In addition to these, type of visualisation specifies the comprehensibility of data visualisations. Maps and charts are accepted the most common visual elements for data journalism articles because of effectivity and easiness. “Maps matter as often they are the most visible aspect of data journalism. Cartographic visualisation representing information in a spatial domain is seemingly everywhere in data journalism” (Hermida and Young, 2019, p.77). Maps also allows journalists to represent geographical information and creating connections with data for the story (Hermida and Young, 2019, p.79). Charts, in other words ‘the old reliables of the field’ (Hermida and Young, 2019, p.78) are seen as the other common visual technique for data journalism articles. Charts are also suitable for daily data journalism projects because of its accessibility, and suitability of different types of data and stories (Stalph, 2017, p.15). Hermida and Young (2019) explained the significance of charts as “to uphold and reinforce journalistic values of objectivity and impartiality” (p.79). Loosen, Reimer and Silva-Schmidt (2017) found that the most used visualisations are simple static charts (62.6%), maps (48.0%) and tables (33.5%) Data Journalism Award Nominees between 2013-2015. According to the same research maps are used for geographical contents and tables for numerical data or comparisons (p.17). Use of tables in data visualisations is proper for 3 cases which are giving specific information or specific data that needs to be read, when there are precise numbers, and in comparisons (Rost, 2019).[56] Also 3D visualisations should be taken into consideration in the context of beneficialness. 3D visualisations add more visual quality to data visualisations but they’re also confusing and not a proper way to present the information (Chiasson, Gregory, et al. 2014, p.223).

Cairo’s Visualisation Wheel (2013) is another significant point to take into consider for data visualisation. Visualisation Wheel works in two ways as choosing the right features for a visualisation based on complex data and deeper analysis and more accessible and simple data for more slight analysis. There were 6 dimensions for each type of data and analysis. Cairo (2013) explained these dimensions as abstraction, functionality, density, multidimensional, originality, novelty for complex data and deeper analysis and figuration, lightness, unidimensional, familiarity,redundancy for more simple data and slight analysis (p.50).

The story loses its meaning and wastes everything when there's no appropriate visualisation. "Good visual presentations tend to enhance the message of the visualisation. If a figure contains jarring colors, imbalanced visual elements, or other features that distract, then the viewer will find it harder to inspect the figure and interpret it correctly" (Wilke, 2019). Choosing the right visual representation, deciding how to present the data, deciding the colors combine and create the principles of data visualisation because data journalism combines technology, data, and aesthetics inside with harmony.

Interactivity is accepted as another key element in data visualisation process. Especially in more advanced data articles, interactivity is a way to support storytelling, combine narratives and engage with readers. Segel and Heer (2010) categorized data driven stories in 2 genres as 'author-driven' and 'reader-driven'. Author-driven refers to articles with "linear ordering of scenes, heavy messaging, no interactivity" and reader-driven refers to articles with "no prescribed ordering, no messaging, free interactivity" (p.1146). Interactivity could cause manipulation by reader and a possible loss of the journalists' message. The choose of genre should have based on the complexity of data and the story (Segel and Heer, 2010, p.1146). In this point, similar types of interactivities were seen in the literature. Veglis and Bratsas (2017) explained the levels of interactivity as transmissional, consultational, and conversational. According to Veglis and Bratsas (2017) and Loosen, Reimer and Silva-Schmidt (2017), these levels were containing playing, pausing, zooms, buttons for transmissional interactivity, timelines, menu, index, and filtering for consultational interactivity, and personalisation, inputs for conversational interactivity.

3. Method

This research aimed to analyze sports data journalism practices in Spain with quantitative and qualitative approaches through content analysis and interviews. As already mentioned in the introduction, methods were designed for 3 main research objectives as:

Research Objective 1: To identify technical features of articles.
Research Objective 2: To analyze changes in journalistic practice, production process of articles.
Research Objective 3: To identify internal and external effects that shaped data journalism.

Quantitative analysis aimed to explain the characteristics of data journalism articles published on the newspapers' websites while qualitative analysis aimed to present perspectives of the participants, and answer the questions that content analysis could not answer. Difficulty to answer 'why?' through content analysis opened a way to discuss these questions in qualitative analysis as Bryman(2012) explained as "sometimes, users of content analysis have been able to shed some light on 'why?' questions raised by their investigations by conducting additional data-collection exercises. Such exercises might include qualitative content analysis and/or interviews with journalists and others" (p.307). Combining two methods presented the development of Spanish data journalism at a broader level.

3.1. Quantitative Analysis

Content analysis was used as the quantitative method of the research because of its advantages as Bryman(2012) explained. According to Bryman(2012), content analysis was transparent and it was possible to set out the coding scheme and sampling protocols so that repetitive use of the method and follow-up research were possible. This was also allowing an objective form of analysis to be referred to as content analysis. It was a high availability process. It

could be applicable to a broad range of unstructured textual knowledge of various kinds. Although content analysis was often connected to mass media analysis, it had a much wider applicability than this (p.304).

Published data journalism articles in websites of *Marca, Mundo Deportivo, Diario AS, El Mundo, El Periodico*, and *El Pais* between January 2017 and December 2019 were analyzed according to the proposed codebook. Because of sports data journalism's relatively late arrival to Spain (Rojas Torrijos, 2015), analyzed time period was selected based on the number of published articles and related literature about Spanish data journalism. According to the the qualitative analysis, more people started to work on data journalism in recent years and the selected time period also opened a way to work on the progress of data journalism in Spain and adaptation process in newsrooms. 1068 data journalism articles were found in the websites of selected newspapers between 2017 and 2019 and these articles were analyzed under the topics of creators, data sources, visualisation types, interactivity and article layouts (Table 1). Content analysis presented the trends in Spanish data journalism and also showed the changing narratives in time. Both design principles and contents of the articles were analyzed based on the codebook explained below.

Table 1. Research Sample

Year	Marca	Mundo Deportivo	Diario AS	El Mundo	El Periodico	El Pais	Total
	n	n	n	n	n	n	n
2017	125	2	164	10	25	53	379
2018	70	29	184	39	24	87	433
2019	39	20	116	35	27	19	256
Total	234	51	464	84	76	159	1068

3.1.1. Design of the Codebook

The codebook was determined in the light of the literature review. The structure of the codebook was studied from Loosen, Reimer and Silva-Schmidt(2017), Appelgren(2017), Tandoc Jr. and Oh(2017), Zhang and

Feng(2018), Stalph(2017) and Veglis and Bratsas(2017). Veglis and Bratsas(2017) explained data journalism as:

> "The process of extracting useful information from data, writing articles based on the information and embedding visualisations (interacting in some cases) in the articles that help readers to understand the significance of the story or allow them to pinpoint data that relate to them" (p.111).

In addition, Rogers(2013) explained the data journalism in his book, *Facts are Sacred*, and pointed that an advanced visualisation was not necessary for data journalism:

> "Data journalism is not graphics or visualisations. It's about telling the story in the best way possible. Sometimes that will be a visualisation or a map. But sometimes it's a news story. Sometimes, just publishing the number is enough" (p.22).

As already mentioned, elements for content analysis were studied from the related literature about data journalism and adapted to this research. Analysing the number of people involved in articles were significant to identify the structure of the newsrooms and collaborations between sections (Loosen, Reimer and Silva-Schmidt, 2017; Stalph, 2017). It was also a way to study the differences in creative process between daily articles and big projects. Analysing the data used for the articles were seen as one of the main elements in the literature. Analysis of data sources and accessibility of data was used to refer the transparency and level of data use in the newsrooms (Stalph, 2017; Tandoc Jr. and Oh, 2017). Also, Gray et al.(2012) explained the importance of mentioning data sources used in the articles in *Data Journalism Handbook* and claimed that citing data sources as a quality criteria for articles. Analysis of topics was determinant to see dominated topics in Spanish data journalism, staying popularity of topics and/or changing trends in time (Loosen, Reimer and Silva-Schmidt, 2017; Stalph, 2017).

Content analysis elements regarding to story property were studied from Stalph(2017) and Zhang and Feng(2018), and adapted to the selected articles of this research. Data journalism articles were analyzed under 6 determined topic as

Zhang and Feng(2018) suggested and ‘prediction’ and ‘other’ were added in the list based on the analyzed articles. Comparison was coded for articles that present compared values, topics, and events which aims to find differences or similarities. Connection and flow was coded for articles that tries to find relation between values, topics, and events. Changes over time was coded for articles that present a change in values in time and changing trends which covers a period of time. Statistics was coded for articles which show statistical information or raw data without including any comparison or connection. Prediction was coded for articles which presents probability and calculations for future based on current data. Other as a story property was identified as photo-based explanations, listings, drawings, animations and accepted as data journalism based on the explanations of Veglis and Bratsas(2017) and Rogers(2013). It was also observed that these types of articles were published in the selected newspapers’ websites under the infographics and data section and called data journalism.

Number of visualisation and visualisation type were identified as variables in content analysis to analyze data journalism styles of newspapers and their methods to tell the story (Loosen, Reimer and Silva-Schmidt, 2017). These variables were significant to understand the use of interactivity, and the level of performing data journalism based on the visual features of articles (Appelgren, 2017). Form of interactivity were studied from Loosen, Reimer and Silva-Schmidt(2017), Appelgren(2017), Veglis and Bratsas(2017), and Stalph(2017). However, the variables under ‘form of interactivity’ were adapted from Veglis and Bratsas(2017), and Stalph(2017). According to these two studies 3 variables were determined and coded for articles which are ‘transmissional’, ‘consultational’, and ‘conversational’ as Veglis and Bratsas(2017) performed. These variables showed similarity with the study of Stalph(2017) with ‘low’, ‘medium’, and ‘high’ level of interactivity. Based on these studies transmissional (low) level of interactivity was coded for articles with a low level of interaction that includes playing and pausing, zooms, buttons, or mouseovers. Consultational (medium) level of interactivity referred more interactive than transmissional but still not involving the reader entirely. Consultational level of interactivity was coded for articles with timelines, menu choices, index, filtering. Conversational (high) level of interactivity identified as involving the reader entirely with personalization. In this level of interactivity, readers had a chance to input some information, data, or change the visualisation

based on their choice or predictions. Ratio of text and multimedia was studied from Stalph(2017) and it was significant to present the chosen features for articles by newspapers and the way to tell stories. Articles coded based on the amount of text and visualisation without adding cover visuals of articles.

The codebook consisted of different sections to identify the characteristics of data journalism articles in detail. The identification was made by medium, date, and title and followed by the number of creators which provided a solid answer to involved newsroom departments in articles. It was important to address data sources to support the arguments in the qualitative section. In this context, data sources of the articles, and accessibility of the sources were analyzed. Analysis of the topics and story properties of the research sample presented the trending topics and techniques in Spanish data journalism in the analyzed time period. It was also important to identify the design principles of the articles to draw a conclusion about the current level of sports data journalism in Spanish newsrooms. In order to achieve that, visualisation number, visualisation type, form of interactivity and the level of ratio of text and multimedia were analyzed.

3.1.2. The Codebook

Medium, date, title: the name of the newspaper, date of the article, title of the article.

Number of creators: 0. Not mentioned; 1. 1 creator; 2. More than 1 creator.

Data source: 0. Not mentioned; 1. Mentioned.

Name of the data source: If the article mentioned a private or public data source, or use of transparency portal.
0. Not mentioned; 1. Mentioned.

Accessibility of data: If the article has a link to access the data
0. Not accessible; 1. Accessible.

Topic: 1. Football; 2. Basketball; 3. Tennis; 4. Motorsports; 5. Cycling; 6. Other.

Story property:

1. Comparison: differences or similarities between values;
2. Connection and flow: relations or correlations between data and two or more values;
3. Changes over time: changes in a value in a period of time or displaying changing trends in time;
4. Statistics: statistical information of a value without connections and comparisons;
5. Prediction: predictions of a value based on current data and past changes;
6. Other: photo-based explanations, mapping, listings, drawings, animations.

Number of visualisations: 1. 1 visualisation; 2. 2 or 3 visualisations; 3. More than 3 visualisations.

Visualisation type: 1. Static; 2. Interactive.

Form of interactivity:

0. No interactive functions;
1. Transmissional interactivity: playing / pausing, zooming, mouseovers, buttons;
2. Consultational interactivity: timeline sliders, menu items, filtering;
3. Conversational interactivity: personalization, inputs.

Ratio of text and multimedia: 1. Mostly text; 2. Mostly multimedia; 3. Balanced use of text and multimedia; 4. Just multimedia.

3.2. Qualitative Analysis

Ritchie and Lewis(2003) explained the use of qualitative methods as:

> "to address research questions that require explanation or understanding of social phenomena and their contexts. They are particularly well suited to exploring issues that hold some complexity and to studying processes that occur over time" (p.5).

Based on the literature, interview method was seen as the primary method to analyze the adaptation of data journalism in newsrooms, current situation and needs of newsrooms, and also production process of articles and the method was studied and adapted to this research in order to present the current level of Spanish data journalism (Fink and Anderson, 2015; Wright and Doyle, 2018). Interview method was used as the qualitative analysis of the research to answer questions which content analysis did not correspond to. Qualitative analysis was conducted to present a descriptive approach to understand Spanish data journalism in detail based on the interviewees' experiences, point of views, and expectations as Ritchie and Lewis(2003) explained:

> "They (individual interviews) provide an opportunity for detailed investigation of people's personal perspectives, for in-depth understanding of the personal context within which the research phenomena are located, and for very detailed subject coverage" (p.36).

The research sample for qualitative analysis was determined as 15 participants including journalists, data journalists, and infographic artists from 3 national and 3 sports newspapers in Spain to identify the data journalism practices in Spain in detail. The purpose of the interviews is to open a space for interviewees to discuss their opinions about the topic and to examine themes and issues related to the research. Interviews were conducted face-to-face in the headquarters of *Marca, Diario AS, El Mundo, El Pais*, and *El Confidencial* in Madrid and the headquarter of *Mundo Deportivo* in Barcelona in January 2020. Interviews took approximately 45-75 minutes each and interviewees answered 37 predetermined questions in both English and Spanish. Before the interviews, the interviewees' permissions were asked to take audio recordings. The interviews took place for 13 hours in total and the interviews were recorded using an audio recorder. The contents of the data obtained from the interviews were transcribed in a computer environment, and then the contents of the interview were collected under the interview questions that were previously created. Then, the opinions of the participants regarding the 6 themes determined within the scope of the study were analyzed together.

Male-dominant journalistic environment was observed in the selected newsrooms' data and infographics departments. 12 interviewees from 6 newspapers were male and only 3 interviewees were female. Interviewees also pointed to the importance of formation in Spanish newsrooms. Only 1 interviewee had a different formation except communication, journalism, and graphic design. Half of the interviewees had a master degree or extra training, while other interviewees had bachelor education (Table 2).

Table 2. Profiles of interviewees

	Gender	Organization	Title	Education
Jesus Escudero	M	El Confidencial	Data Journalist	BA in Journalism, Universidad Pontificia de Salamanca. Master in Investigative Journalism, Data, and Visualisation, Universidad Rey Juan Carlos.
Dario Ojeda	M	El Confidencial	Journalist	BA in Journalism, Universidad Complutense de Madrid. Course in Data Journalism, Escuela de Periodismo El País.
Marta Ley	F	El Mundo	Data Journalist	BA in Journalism and Audiovisual Communication, Universidad Rey Juan Carlos. Master in Investigative Journalism, Data, and Visualisation, Universidad Rey Juan Carlos.
Paula Guisado	F	El Mundo	Data Journalist	BA in Journalism and Audiovisual Communication, Universidad Europea de Madrid. Master in Investigative Journalism, Data, and Visualisation, Universidad Rey Juan Carlos.
Daniele Grasso	M	El Pais	Data Journalist	BA in Spanish and Russian Philology, Università degli Studi di Milano. Master in Investigative Journalism, Data, and Visualisation, Universidad Rey Juan Carlos.
Carlos Forjanes	M	Diario AS	Journalist	BA in Journalism, Universidad Complutense de Madrid.
Fernando Robato	M	Diario AS	Infographic Artist	BA in Communication Sciences, Universidad Catolica de Santiago del Estero.
Ruben Gimeno	M	Marca	Infographic Artist	BA in Journalism, Universidad San Pablo-CEU. Course in Digital Journalism, UNED.
Tomas Alhambra	M	Marca	Infographic Artist	BA in Design, Universidad Complutense de Madrid.

Miguel Angel Carbonero	M	Marca	Infographic Artist	BA in Audiovisual Communication, Universidad de Salamanca.
Miguel Angel Lara	M	Marca	Journalist	BA in Journalism, Universidad Complutense de Madrid.
Lorenzo Lara	M	Marca	Data Journalist	BA in Journalism, Universidad San Pablo-CEU. Master in Investigative Journalism, Data, and Visualisation, Universidad Rey Juan Carlos.
Ferran Morales	M	Mundo Deportivo	Infographic Artist	BA in Graphic Design, Llotja Escola Superior de Disseny i Art.
Roger Guillamet	M	Mundo Deportivo	Infographic Artist	BA in Audiovisual Communication, Universitat Ramon Llull.
Vanesa Mauri	F	Mundo Deportivo	Infographic Artist	BA in Graphic Design, Escuela Superior de Imagen y Diseño (IDEP).

3.2.1. Themes of Questions

15 interviewees from selected newspapers answered 37 predetermined questions in 6 themes as the production process in Spanish newspapers, access to data in Spain, being a data journalist in Spain, current environment in Spanish newspapers after integrating data journalism, reader engagement in data journalism, and the future of data journalism in Spain. 6 themes were divided into sub-topics to achieve a deep analysis of the interviews.

Interviewees explained the decision-making process and the workflow in the newsrooms, tools and guidelines in sports data journalism, challenges in the production of sports data journalism, characteristics of a good sports data article, and advantages and disadvantages of creating sports data journalism articles in the first part. In the second part, interviewees pointed to data access in Spain and explained their data sources, challenges in working with data, and their opinions about the transparency of information in Spain. In the third part, investment in data journalism in Spanish newsrooms and expected skills from data journalists were discussed by interviewees. In the fourth part, the current situation of newspapers was explained and interviewees pointed to their working conditions, current needs, and newsrooms' economic motivations. In the fifth part, changes in reader engagement with data journalism was explained, and lastly interviewees discussed the future of data journalism in Spain. Results of the qualitative analysis

shed light on various issues in Spanish journalistic environment and opened the issues about being a journalist in Spain up for discussion.

SECTION II: QUANTITATIVE ANALYSIS

4. Quantitative Analysis of *Marca, Mundo Deportivo, Diario AS, El Mundo, El Periodico, El Pais*

4.1. Sports data journalism articles in *Marca* (2017-2019)

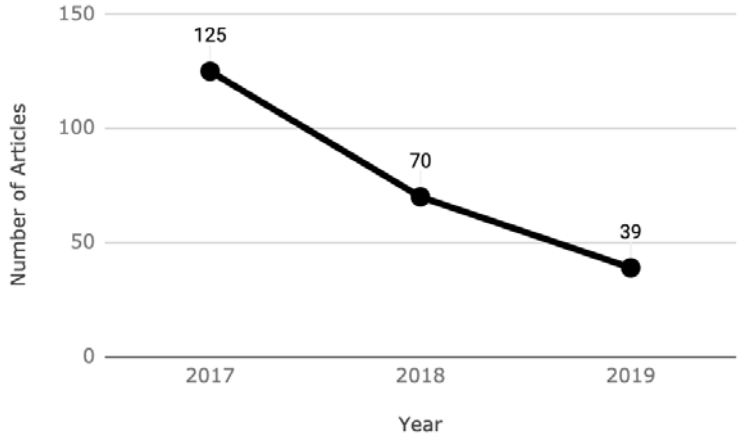
This section analyzes the sports data journalism articles in *Marca* between 2017-2019. *Marca* published 234 articles (Table 3) with visualisations on its website during the selected years.

Table 3. Analysis of data journalism articles, *Marca* (2017-2019)

2017		2018		2019		Total	
n	%	n	%	n	%	n	%
125	53,42	70	29,91	39	16,67	234	100

In 2017 125 data journalism articles (53.42%), in 2018 70 data journalism articles (29.91%) and in 2019 39 data journalism articles (16.67%) were published. Data journalism articles in *Marca* decreased (Figure 1) in the analyzed period (2017-2019). It was observed that the number of articles with more than 1 author decreased in time while the interactivity of the articles were increasing. The analysis presented the reason for the decrease in the number of published data journalism articles as high interactive articles created by less author. Despite the global sports organizations held in 2018 and 2019 such as Wimbledon, Tour de France, Basketball World Cup, Winter Olympics, Football World Cup the number of published data journalism articles decreased to 70 in 2018 and 39 in 2019.

Figure 1. Changes in data journalism articles per year, *Marca*(2017-2019)



4.1.1. Analysis of topics and story properties

The analysis of the topics clearly showed the dominance of football in the data journalistic perspective of *Marca* with 207 articles which is 88.46% of total (Table 4).

Table 4. Analysis of data journalism articles by topic per year, *Marca* (2017-2019)

	2017		2018		2019		Total	
Topic	n	%	n	%	n	%	n	%
Football	110	88,0	64	91,43	33	84,62	207	88,46
Basketball	1	0,80	1	1,43	1	2,56	3	1,28
Tennis	4	3,20	0	0	0	0	4	1,71
Motorsports	6	4,80	4	5,71	3	7,70	13	5,55
Cycling	3	2,40	0	0	1	2,56	4	1,71
Other	1	0,80	1	1,43	1	2,56	3	1,28
Total	125	100	70	100	39	100	234	100

In the dominance of football, other sports found less space in the website in terms of data journalistic creations. Motorsports articles followed football with 5.55% which is 13 of total articles with a significant difference. Cycling and tennis shared the equal statistics (1.71%) and published only 8 times (4 times each) in 2017, 2018, and 2019. Basketball was published 3 times (1 news for each year) in 3 years, despite when Spain got bronze medal in Eurobasket 2017.

Other sports such as boxing, surf, golf, athletics published only 3 times in 3 years which is 1.28% of total. Results of the analysis of *Marca* stated that the interest of readers in sports which is clearly football (Figure 2). The analysis presented the increasing importance of other sports except football in time. *Marca* started to publish data journalism articles about other sports branches a bit more each year.

Figure 2. Data journalism articles by topic, *Marca* (2017-2019)

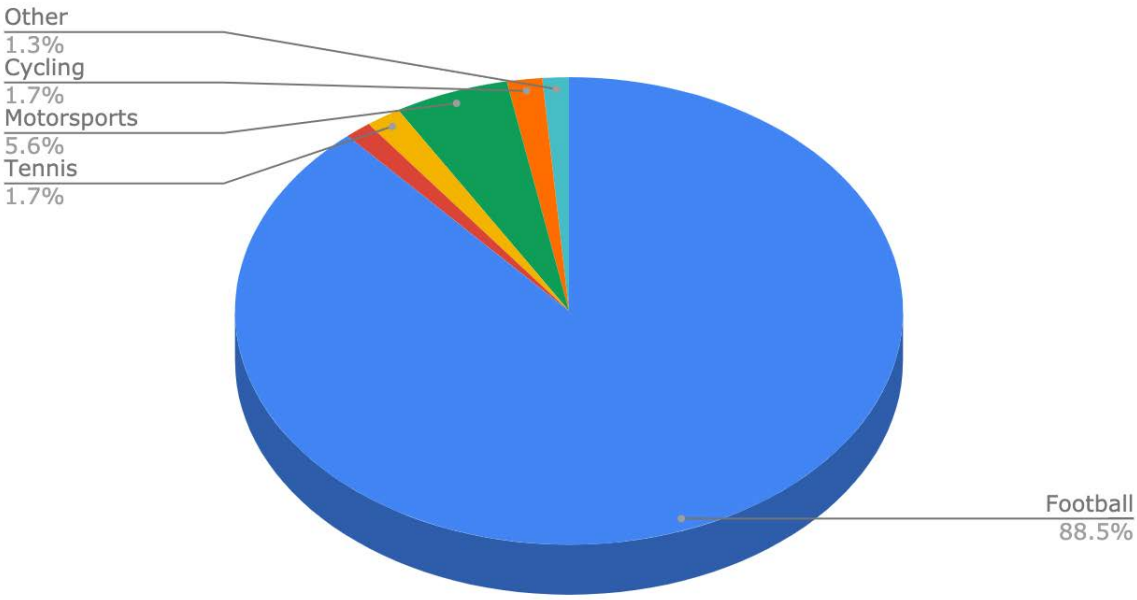


Table 5 corresponds to the story property of 234 data journalism articles in *Marca* in the analyzed time period. In relation to the dominance of football, the most dominant story properties which were used for these articles were *comparison* with 50.85% and *statistics* 15.81%. Comparison based data journalism was generally seen in articles about football and tennis. Story property analysis of 234 articles presented that the comparison technique was mostly used for personal statistics of players to identify their overall season success to get an edge over other players in the same team or league and also pre-game comparisons such as tennis finals, football derbies to give an option for prediction to readers (Image 16). Comparison based articles mostly observed in FC Barcelona and Real Madrid articles, especially about Lionel Messi vs Cristiano Ronaldo. *Marca* used various visualisations except the proposed story properties for its data journalism articles. *Other* category came second in popularity with 18.80% which includes maps, photo-based explanatory visualisations, listings and illustrations (Table 5) (Image 21).

Marca published 37 *statistics* based data journalism articles which is 15.81% of total and it is observed in various branches of sports (Table 5). Statistics based data journalism articles were created mostly for post-game

articles to draw an overall image of the game including heatmaps, attack zones, point zones and so on for readers. In 2017, 26 data journalism articles were statistics based with 20.8%. However, use of statistics changed in years. A significant decrease was observed in the analysis of statistics based articles. In 2018, 8 articles were statistics based with 11.43% while 2019 had only 3 articles with 7.69% which has statistics as story property. The analysis showed the dominance of statistics based data journalism articles mostly seen in the football section and rarely in tennis (Image 19).

Table 5. Analysis of the story properties found, *Marca* (2017-2019)

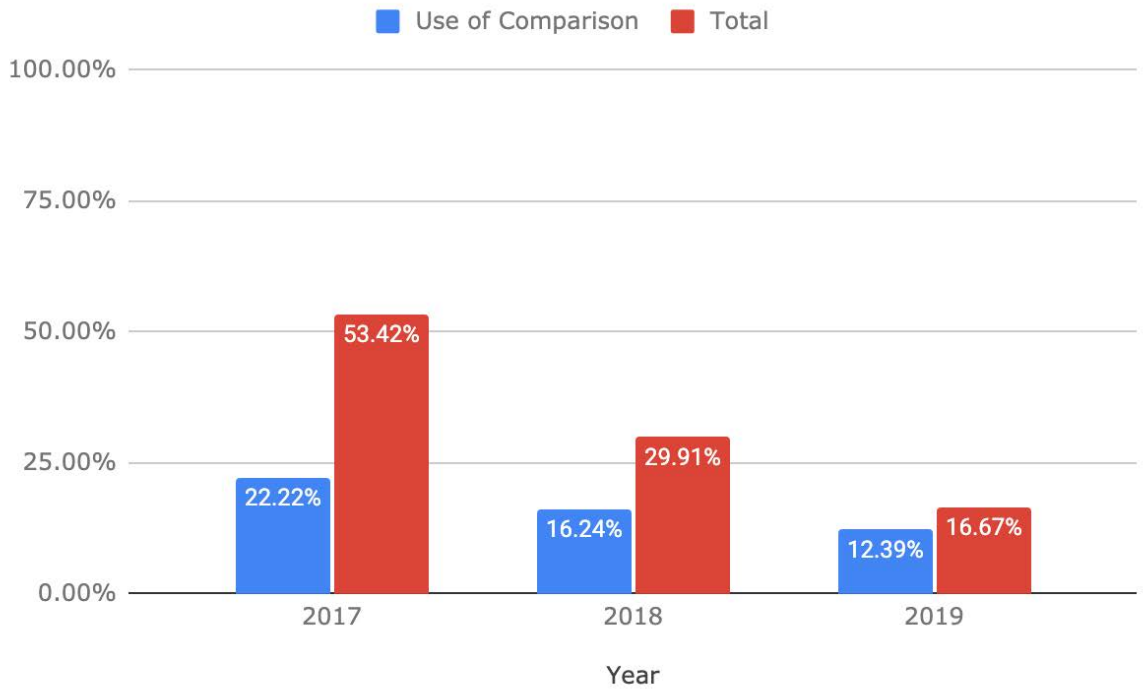
	2017		2018		2019		Total	
Story Property	n	%	n	%	n	%	n	%
Comparison	52	41,6	38	54,29	29	74,36	119	50,85
Connection & Flow	5	4,0	3	4,28	0	0,0	8	3,42
Change Over Time	16	12,8	4	5,71	2	5,13	22	9,4
Statistics	26	20,8	8	11,43	3	7,69	37	15,81
Predictions	1	0,8	1	1,43	2	5,13	4	1,71
Other	25	20,0	16	22,86	3	7,69	44	18,8
Total	125	100	70	100	39	100	234	100

22 of the articles (9.40%) were created using changes over time (Table 5). Data journalism articles which were based on changes over time were mostly observed in player articles which shows players' success, statistics, trophies, medals and injuries and tries to present the state of affairs in their career. Rather like statistics articles, the use of change over time as story property had also a similar decrease in time. 16 articles with 12.8% had change over time features in 2017 while 2018 had 4 with 5.71% and 2019 had only 2 with 5.13%. The change over time as story property was generally observed in big stories such as trophy histories of the clubs, Olympics, remarkable games and career peaks. One of the most clear examples of change over time is observed in the article about the presidency of Florentino Perez in Real Madrid (Image 18).

The least preferred story properties were connection & flow with 3.42% and prediction with 1.71% in total. In 2017, connection & flow was not a preferred style in general and lost its place in time. In 2017 5 articles (4%), in 2018 3 articles (4.28%) and had connection & flow as story property (Image 17). However in 2019, *Marca* didn't publish any data journalism article with this property. These articles had the same style and offered a personalized interactivity to the reader. *Marca* named these stories as "calculadora" and asked its readers to predict results and share the visualisation in social media with the related hashtag (Image 20).

Comparison technique was the most common one in 2017 and followed by statistics and "other" which includes maps, photo-based stories, listings and illustrations. One of the examples of "other" as story property can be seen in Image 21. Other as story property observed mostly in informative articles with maps with tournament information and dates, map of the transportation options for big events.

Figure 3. Evolution of the change in comparison technique as story property by year, *Marca* (2017-2019)



Analysis of story property described changing trends in time. Use of other story properties were decreasing (connection & flow, changes over time, statistics, predictions, other) except comparison. The rate of comparison based data journalism articles increased according to the year's total article every year.

41.6% of 2017, 54.29% of 2018 and 74.36% of 2019 articles used comparison as story property (Table 5). While the total amount of articles published in a year was decreasing, the interest to create comparison based articles had a significant increase (Figure 3).

Image 16. Example of comparison technique, “Las diez claves del Real Madrid-Atlético” 02/05/2017, *Marca*

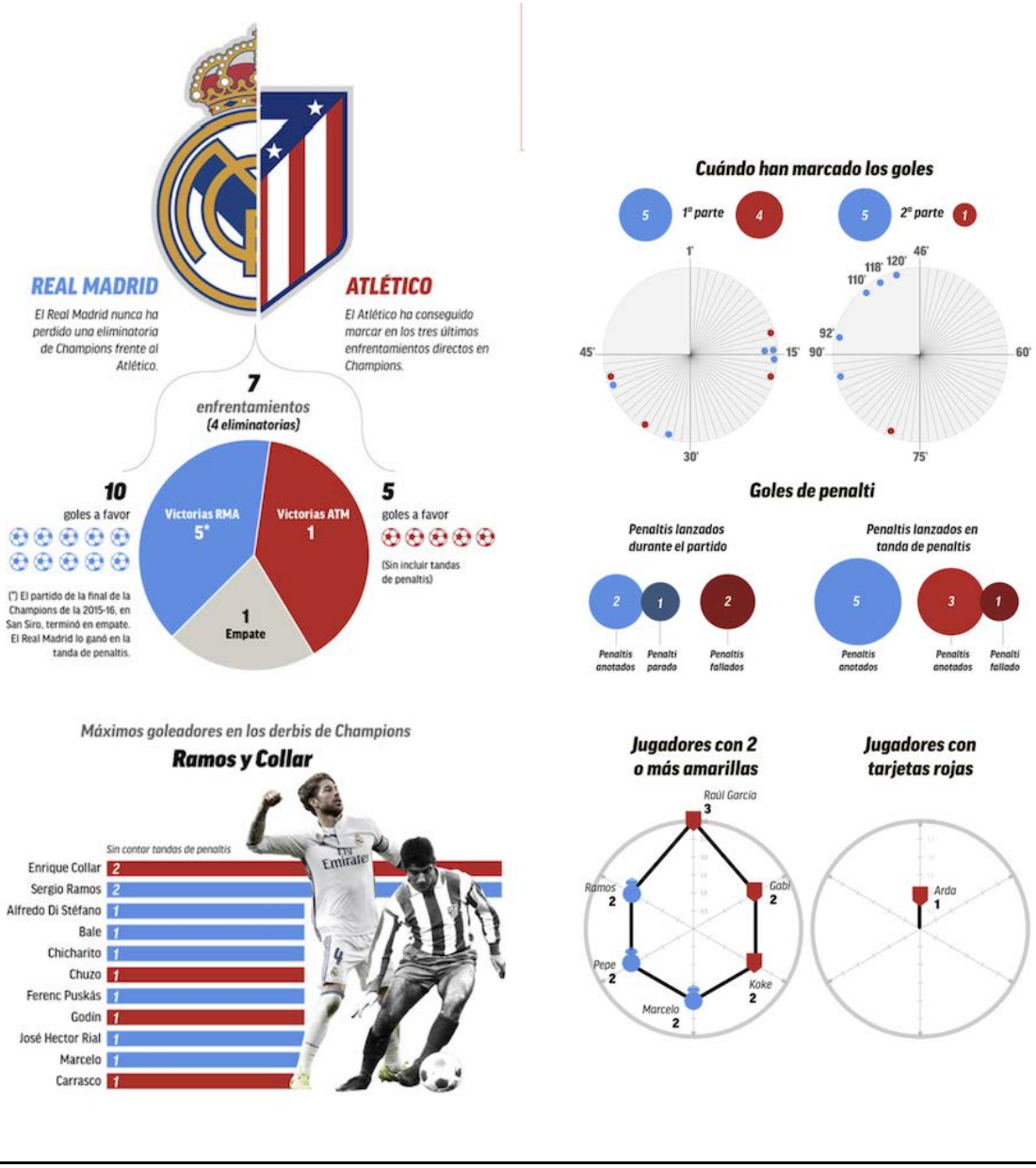


Image 17. Example of connection and flow technique, “Los siete seleccionadores de Messi” 12/04/2017, *Marca*

Image 18. Example of changes over time technique, “Florentino Perez: 19 titulos y mas de 1.300 millones en ficha” 19/06/2017, *Marca*

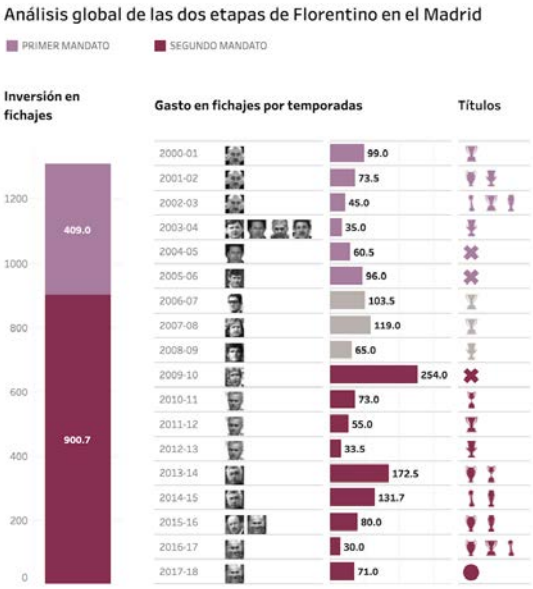


Image 19. Example of statistics technique, “Rafa Nadal es el rey de finales” 29/12/2017, *Marca*

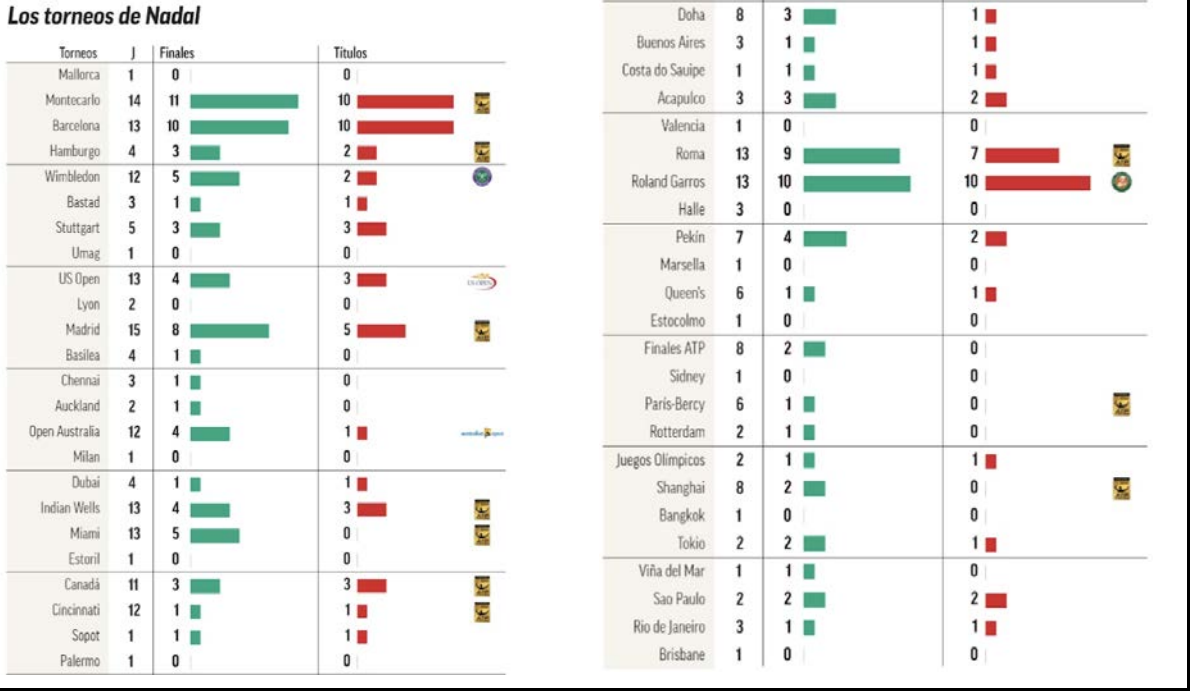


Image 20. Example of predictions technique, “Calculadora de La Liga 2017” 27/04/2017, *Marca*

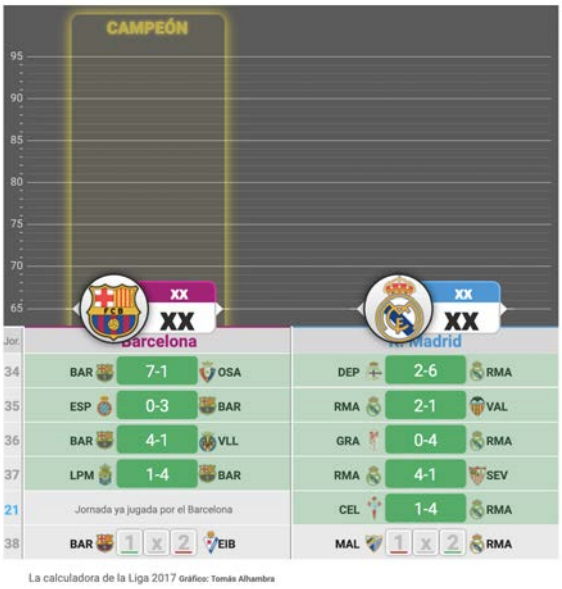
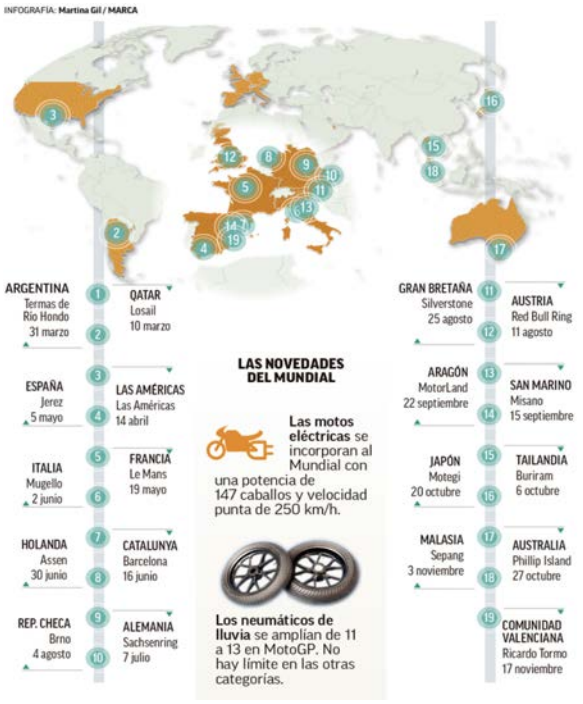


Image 21. Example of mapping as “other”, “El mejor Mundial de la historia” 04/03/2019, *Marca*



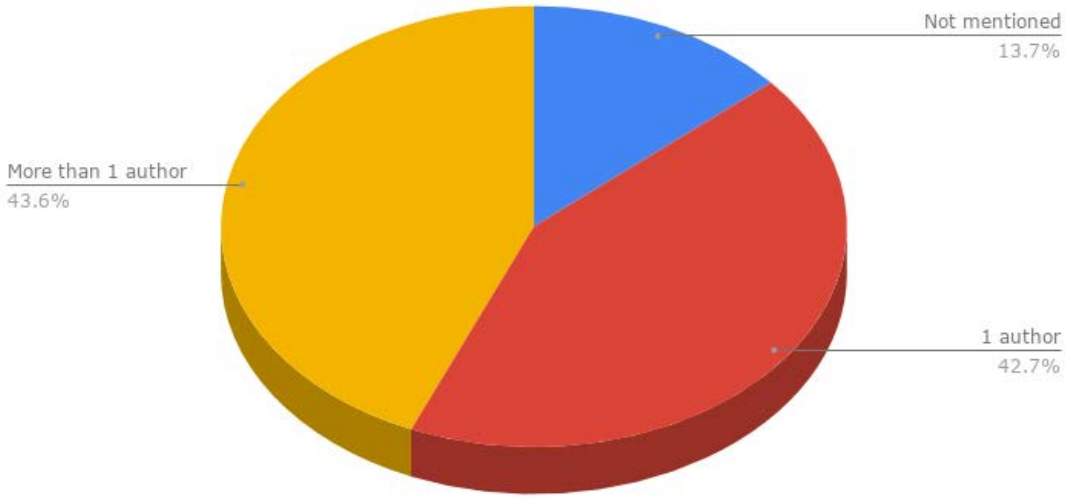
4.1.2. Analysis of number of creators, data sources, accessibility of data

It was observed that 42.74% of the data journalism articles were created by 1 person who was actually the graphic designer. Analysis presented that the graphic designer who made the infographic is also the writer of the article and the data collector in the articles with 1 author. The articles created by more than 1 person was observed as 43.59% and which includes generally 1 author and 1 graphic designer and in some cases 2 graphic designers (Figure 4).

Table 6. Analysis of the number of creators per year, *Marca* (2017-2019)

	2017		2018		2019		Total	
Number of creators	n	%	n	%	n	%	n	%
Not mentioned	6	4,8	6	8,57	20	51,28	32	13,67
1 author	59	47,2	32	45,71	9	23,08	100	42,74
More than 1 authors	60	48,0	32	45,71	10	25,64	102	43,59
Total	125	100	70	100	39	100	234	100

Figure 4. Analysis of the number of creators, *Marca* (2017-2019)



13.67% of the data journalism articles in total had no information about the designer or writer (Figure 4). The analysis clearly showed that most of the articles mentioned writer and/or graphic designer in 2017 and 2018 (Table 6). However, the habit of mentioning the creator changed in 2019 and almost half of the articles didn't give this information to readers. It's observed that the articles which don't mention the creator, have the information as "Redacción:Marca" or "Infografía:Marca".

Analysis of data sources showed that 62.39% of the data journalism articles which is 146 of 234 had no information about the data source of the visualisation (Table 7). Information about the use of data sources collected from interviews in *Marca* on 24/01/2020 and interviewees stated that *Marca* has an agreement with Opta, also from websites which publish free data such as Transfermarkt, websites of the teams, annual reports of federations, organizations and teams. Interviewees also pointed to the data team of *Marca* who created a private database for the newspaper. To the contrary of the richness of the data sources, only 37.61% of data journalism articles in the selected period published the information about data sources.

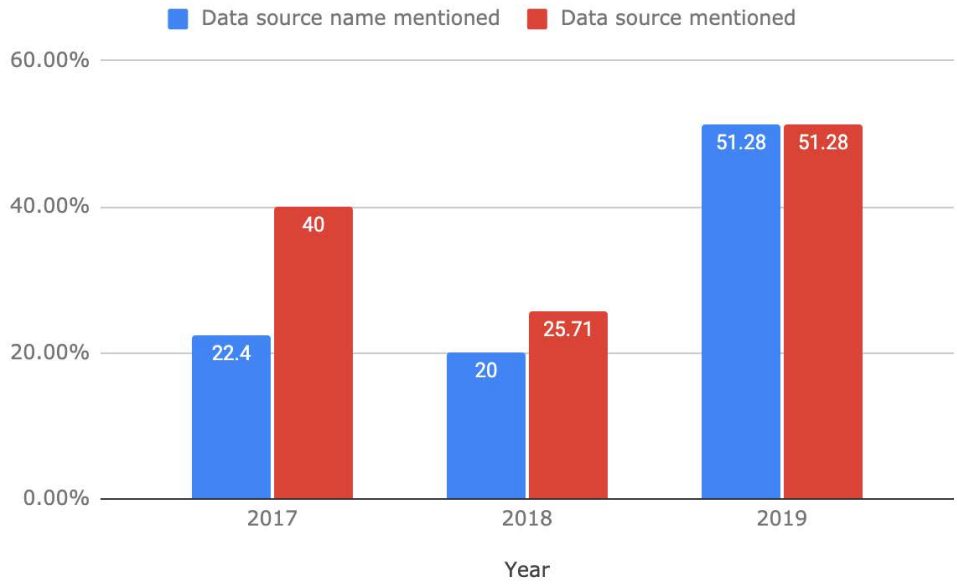
Table 7. Analysis of the data sources per year, *Marca* (2017-2019)

	2017		2018		2019		Total	
Data source	n	%	n	%	n	%	n	%
Not mentioned	75	60,0	52	74,29	19	48,72	146	62,39
Mentioned	50	40,0	18	25,71	20	51,28	88	37,61
Total	125	100	70	100	39	100	234	100

Analysis of data sources in data journalism articles proved that the policy of mentioning the data source changed in the analyzed period. In 2017 60% and in 2018 74.29% of the data journalism articles mentioned data sources while the year of 2019 had a decrease to 48.72%.

According to the analysis of data sources, mentioning the name of the data sources changed in time between 2017 and 2019. In 2017, 50 data journalism articles had information about the data source and 28 of these had the name of the data source which is 56%. In 2018, 18 data journalism articles had information about the data source and 14 of these had the name of the data source which is 77.8%. In 2019, 20 data journalism articles had information about the data source and 10 of these had the name of the data source which is 50% (Figure 5).

Figure 5. Evolution of the mentioning data source by year, *Marca* (2017-2019)



The analysis proved the deficiency of accessible data. Only 1 (0.8%) data journalism article gave access to the data in 2017 and which was about Real Madrid vs Juventus final for Champions League and led the reader to Google Trends to

show the most searched keywords for the final. In 2018 the number of data journalism articles with accessible data were 6 (8.57%) and in 2019 the number of data journalism articles with accessible data were 4 (10.26%) (Table 8). Analysis presented that the articles with an access to data mostly lead the reader to Tableau which is a visualisation tool page of the visualisation. Readers had a chance to open the link through the visualisation and download the data from Tableau Workbook (Image 22). Only 2 of the articles had a direct link to the data. Articles with direct accessible data also offered Tableau Workbook to readers to play with visualisations or read the data without downloading. (Image 23).

Table 8. Analysis of the accessibility of the data sources per year, *Marca* (2017-2019)

	2017		2018		2019		Total	
Accessibility of data	n	%	n	%	n	%	n	%
Not accessible	124	99,2	64	91,43	35	89,74	223	95,3
Accessible	1	0,8	6	8,57	4	10,26	11	4,7
Total	125	100	70	100	39	100	234	100

Image 22. Example of an accessible data through Tableau, *Marca*

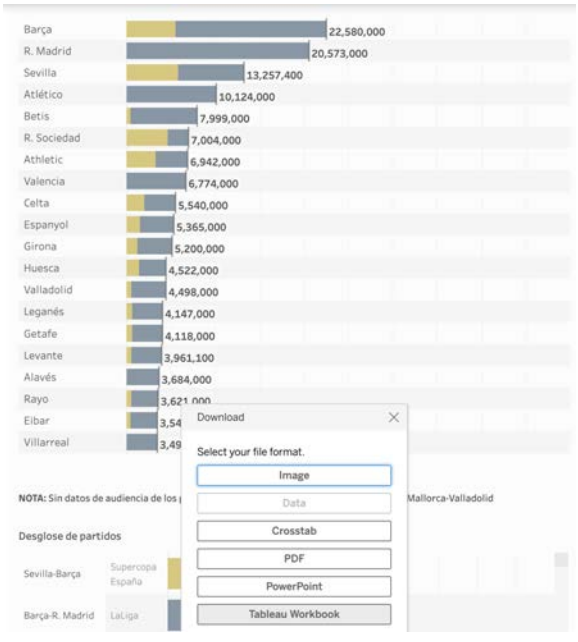
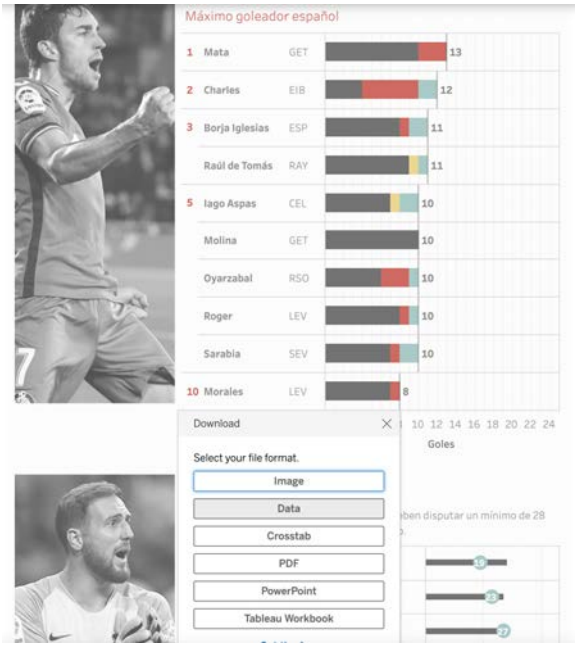


Image 23. Example of an directly accessible data, *Marca*



4.1.3. Analysis of number of visualisations, visualisation types, form of interactivity and ratio of text and multimedia

Marca published 120 articles with 1 visualisation (51.29%), 38 articles with 2 to 3 visualisations (16.24%), and 76 articles with more than 3 visualisations (32.47%) out of a total 234 between 2017 and 2019 (Figure 6).

Table 9. Analysis of the number of visualisations per year, *Marca* (2017-2019)

	2017		2018		2019		Total	
Number of visualisations	n	%	n	%	n	%	n	%
1 visualisation	69	55,2	39	55,71	12	30,77	120	51,29
2-3 visualisations	20	16,0	12	17,14	6	15,38	38	16,24
More than 3 visualisations	36	28,8	19	27,14	21	53,85	76	32,47
Total	125	100	70	100	39	100	234	100

Analysis of the number of visualisations showed that the style of the articles show an alteration in time (Table 9). In 2017 and 2018 *Marca* mostly published 1 visualisation per article. 55.2% of the data journalism articles had only 1 visualisation, 16% of the articles had 2 to 3 visualisations, and 28.8% of the articles had more than 3 visualisations in 2017. These rates didn't show a significant difference in 2018. According to the analysis, 55.71% of the data journalism articles had one visualisation, 17.14% of the articles had 2 to 3 visualisations and 27,14% of the articles had more than 3 visualisations in 2018. Analysis of the number of visualisations proved that *Marca* changed the style of the data journalism articles in 2019 and mostly used more than 3 visualisations per article. According to the yearly calculation seen in Table 7, and also in Figure 6, using 2 to 3 visualisations in one data journalism article was the least preferred style while using 1 visualisation per article was the most used style with more than 50% in total.

Figure 6. Analysis of the number of visualisations, *Marca* (2017-2019)

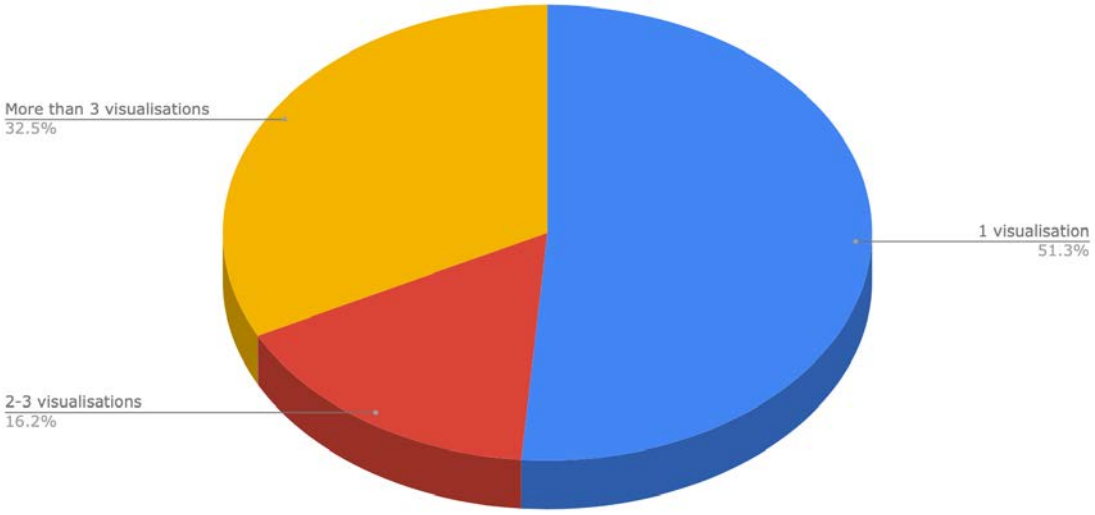


Image 24. Example of 1 visualisation, "Butarque, el estadio con mayor porcentaje de ocupación de la Liga" 23/05/2017, *Marca*

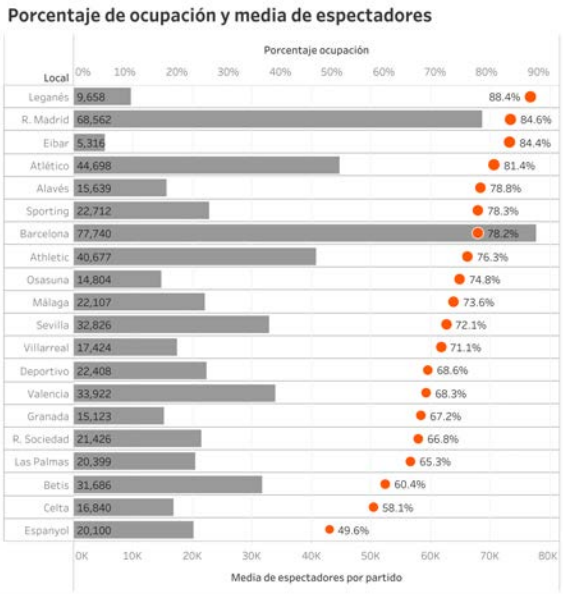


Image 25. Example of 2-3 visualisations, "La valla menos vencida" 16/05/2017, *Marca*

Image 26. Example of more than 3 visualisations, "Aduriz, camino de la leyenda" 27/03/2017, *Marca*

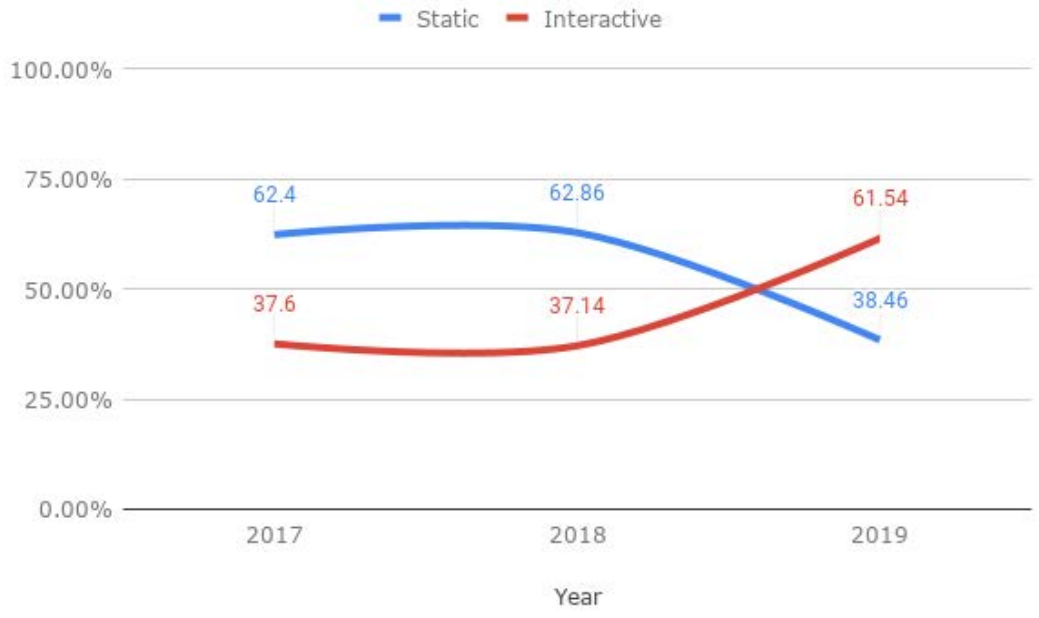
58.55% of the data journalism articles between the analyzed period were static and didn't allow readers to interact with the visualisations while 41.45% of the articles had interactive visualisations. The year of 2017 and 2018 *Marca* chose more static articles. In 2017, 62.4% of the data journalism articles and in 2018 62.86% of the data journalism articles had static visualisations while the rates of articles with interactive visualisations were 37.6% in 2017 and 37.14% in 2018 (Table 10).

Table 10. Analysis of the visualisation type per year, *Marca* (2017-2019)

	2017		2018		2019		Total	
Visualisation type	n	%	n	%	n	%	n	%
Static	78	62,4	44	62,86	15	61,54	137	58,55
Interactive	47	37,6	26	37,14	24	38,46	97	41,45
Total	125	100	70	100	39	100	234	100

Analysis of the data journalism articles in 2019 stated the changed perspective of *Marca* in terms of interactivity. The analysis presented that 38.46% of the articles had static visualisations and 61.54% of the articles had interactive visualisations. The articles which have both static and interactive visualisations have been analyzed as interactive.

Figure 7. Evolution of the static and interactive visualisations, *Marca* (2017-2019)



Marca published the least number of data journalism articles in 2019 but it was observed that the articles had more visualisations and more interactivity. The rates of static and interactive visualisations became reversed in 2019 (Figure 7). The analysis showed that interactive visualisations were just created for football articles in 2019. It's observed that the majority of the articles in 2019 were "Premios Marca" which are the articles about comparison of players' statistics to choose the best ones of the week. Observation presented that "Premios Marca" articles includes more than 3 visulisations each and consultational (medium level) interactivity for each visualisation. It's predicted that the number of published data journalism articles decreased in 2019 because of the time consumption and needed effort to create "Premios Marca" articles.

Table 11. Analysis of the level of interactivity per year, *Marca* (2017-2019)

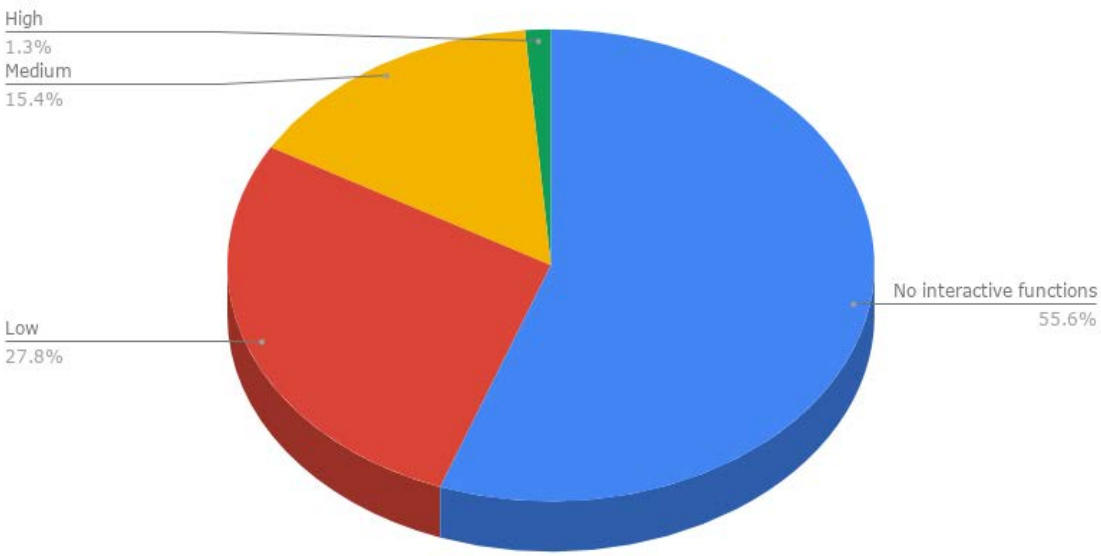
	2017		2018		2019		Total	
Level of interactivity	n	%	n	%	n	%	n	%
No interactive functions	75	60,0	42	60,0	13	33,33	130	55,56
Transmissional	43	34,4	15	21,43	7	17,95	65	27,78
Consultational	7	5,6	12	17,14	17	43,59	36	15,38
Conversational	0	0	1	1,43	2	5,13	3	1,28
Total	125	100	70	100	39	100	234	100

Even though *Marca* changed its strategy about data journalism articles in terms of using more visualisations with higher interactivity in time, the analysis proved that the level of interactivity is not very high. It's observed that 55.56% of the total 234 articles had no interactive functions among the selected years (Table 11) (Image 27).

Transmissional (low) interactivity which offers the reader a one way communication such as playing and pausing the visualisation, buttons, mouseovers, zooming observed 65 times in 234 articles with 27.78% (Figure 8) (Image 28). Transmissional interactivity mostly observed in the articles of 2017 with 34.4% and decreased in time. In 2018, the rate of visualisations with transmissional interactivity was 21.43% while the year of 2019 had lowest, 17.95% (Table 11).

Consultational (medium) interactivity in visualisations which offer the reader a two way communication such as filtering, timeline slider, menu items observed 36 times in 234 articles with 15.38% (Figure 8) (Image 29). In 2017 5.6% and in 2018 17.14% consultational interactivity observed in analysis while the year of 2019 showed a sharp increase with 43.59% (Table 11).

Figure 8. Analysis of the level of interactivity, *Marca* (2017-2019)



Conversational (high) interactivity which lets the reader produce and input information, in other words personalisation analyzed as the least preferred with 1.28% in total (Figure 8) (Image 30). The analysis stated that conversational interactivity attracted more attention every year even though the low rate of conversational interactivity was 0% in 2017, 1.43% in 2018 and 5.13% in 2019 (Table 11).

Image 27. Example of no interactive functions, “Los Pichichis no 'ligan'” 30/05/2017, *Marca*

Image 28. Example of transmissional interactivity, “Jugadores de 94 países han logrado marcar en Primera ” 16/01/2018, *Marca*

Image 29. Example of consultational interactivity, “Los orígenes de La Liga” 17/10/2018, *Marca*

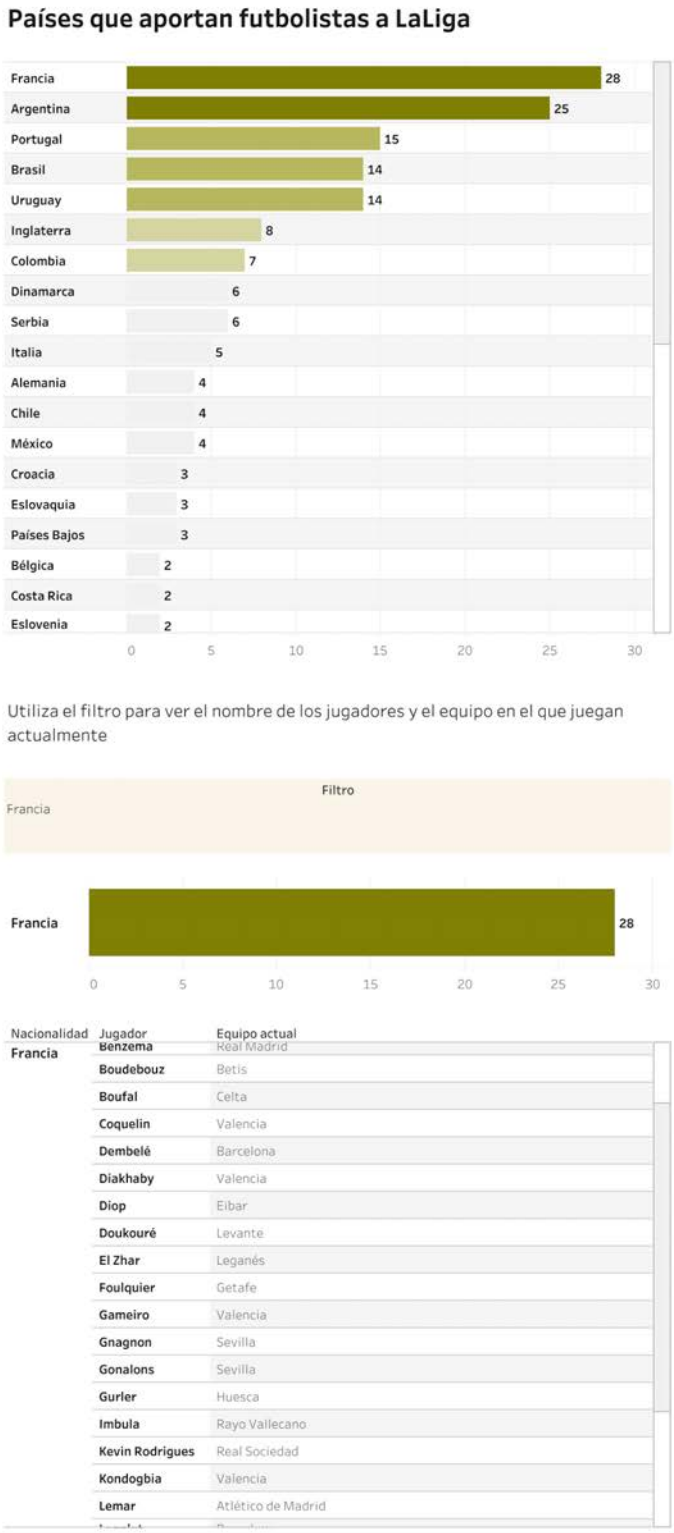
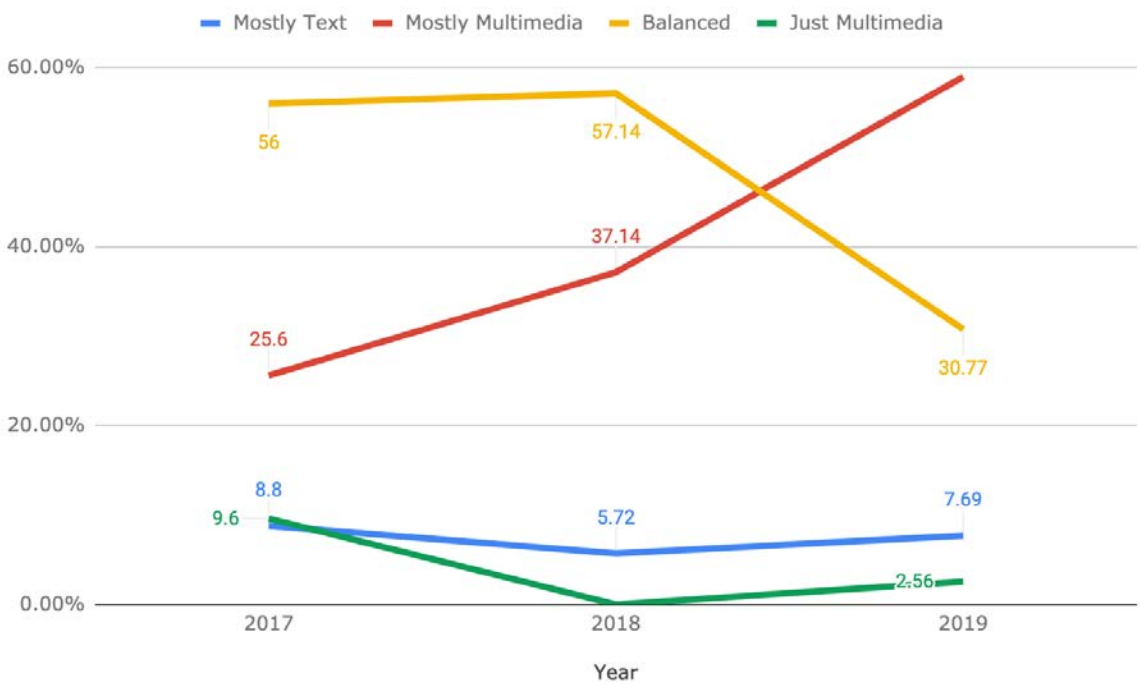


Image 30. Example of conversational interactivity, “La Calculadora de La Liga para la Champions League: ¿quién quedará cuarto?” 05/05/2019, *Marca*

Figure 9 presents the change in ratio of text and multimedia in the analyzed time period. In 2017, page layout was mostly based on balanced use of text and multimedia with 56%. 25.6% of the data journalism articles had mostly multimedia with less text. The articles which have mostly text and just multimedia preferred less. Articles with just multimedia observed of 9.6%, articles with mostly text observed of 8.8% in 2017.

In 2018, page layout was mostly based on balanced use of text and multimedia with 57.14%. In the year of 2018, the rate of multimedia use also increased. 37.14% of the data journalism articles had mostly multimedia with less text. 5.7% of the articles had mostly text while the articles with just multimedia rate was 0.

Figure 9. Evolution of the ratio of text and multimedia, Marca (2017-2019)



In 2019, page layout of data journalism articles had a significant change. On the contrary of 2017 and 2018, articles which have mostly multimedia observed of 58.98% of total in 2019 and it was followed by articles with a balanced use of text and multimedia with 30.77%. Using more text than multimedia preferred in third like 2017 and 2018 and observed of 5.72% in 2019. Articles with just multimedia were the least chosen layout with 2.56%.

Conclusion

The analysis presented that the number of data journalism articles in *Marca* between 2017 and 2019 decreased per year however the content of the articles became richer in terms of using more visualisations with a higher level of interactivity. It's predicted that long read articles which include several visualisations with consultational and conversational interactivity will be observed more in time.

4.2. Sports data journalism in *Mundo Deportivo* (2017-2019)

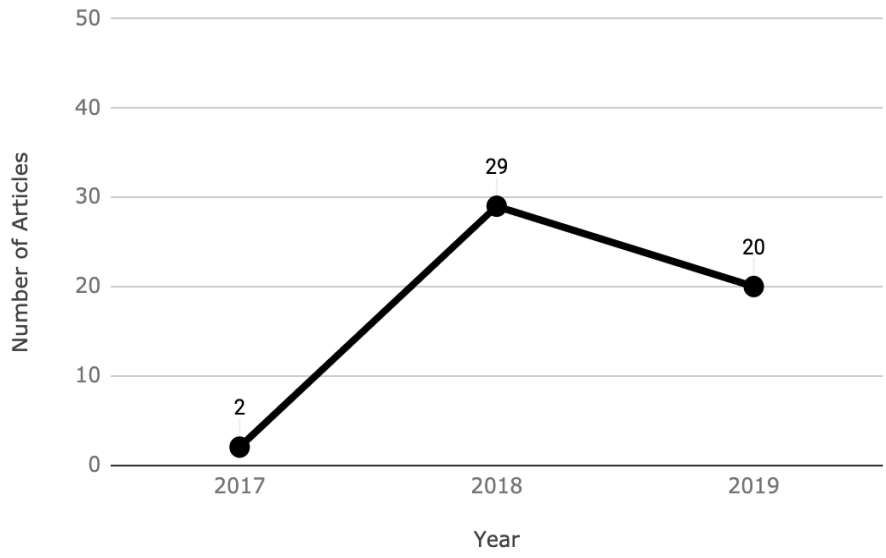
This section analyzes the sports data journalism articles in *Mundo Deportivo* between 2017-2019. *Mundo Deportivo* published 51 articles with visualisations on its website during the selected years (Table 12).

Table 12. Analysis of data journalism articles, *Mundo Deportivo* (2017-2019)

2017		2018		2019		Total	
n	%	n	%	n	%	n	%
2	3,92	29	56,87	20	39,21	51	100

In 2017 2 data journalism articles (3.92%), in 2018 29 data journalism articles (58.87%), and in 2019 20 data journalism articles (39.21%) were published. Data journalism articles in *Mundo Deportivo* didn't show a consistent increase or decrease during the selected time period. The analysis presented that data journalism articles were not preferable for *Mundo Deportivo* since 2018 while the number of published articles increased from 2 to 29 (Figure 10). It's observed that data visualisations were mostly used in global events such as Wimbledon, Tour de France, Winter Olympics, Basketball World Cup and Football World Cup in 2018. Data journalism articles showed a decrease in 2019 with 20 visualisations however the variety of the topics increased.

Figure 10. Changes in data journalism articles per year, *Mundo Deportivo* (2017-2019)



4.2.1. Analysis of topics and story properties

The analysis of the topics presented that *Mundo Deportivo* mostly chose football for data journalism articles but on the other hand importance was given to a variety of the topics (Table 13).

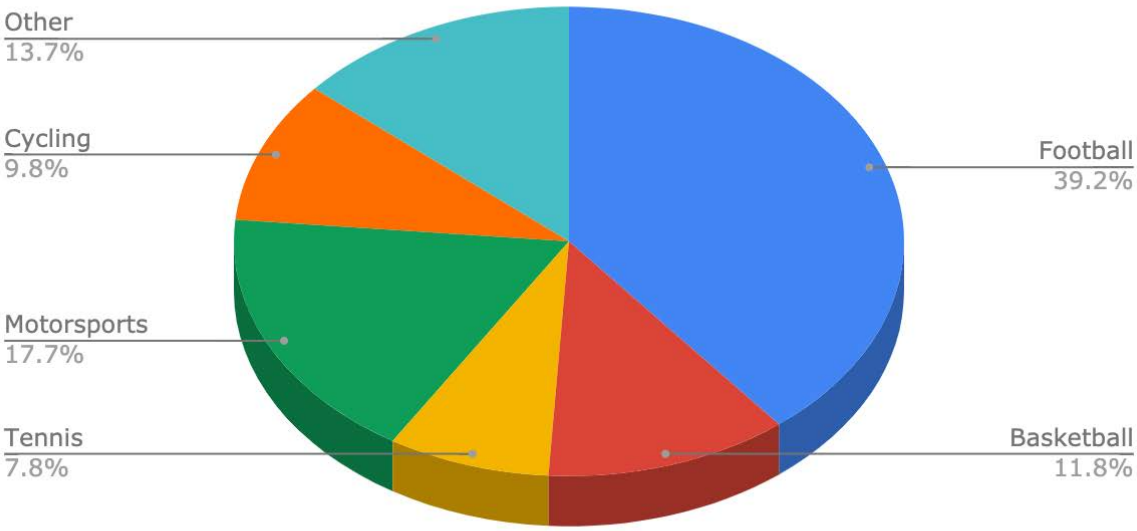
Table 13. Analysis of data journalism articles by topic per year, *Mundo Deportivo* (2017-2019)

	2017		2018		2019		Total	
Topic	n	%	n	%	n	%	n	%
Football	1	50,0	13	44,82	6	30,0	20	39,22
Basketball	1	50,0	2	6,90	3	15,0	6	11,76
Tennis	0	0	2	6,90	2	10,0	4	7,84
Motorsports	0	0	5	17,24	4	20,0	9	17,65
Cycling	0	0	2	6,90	3	15,0	5	9,80
Other	0	0	5	17,24	2	10,0	7	13,73
Total	2	100	29	100	20	100	51	100

Mundo Deportivo published 20 data journalism articles about football with 39.22% between 2017 and 2019 (Table 13). The analysis presented that motorsports articles came second in popularity with 17.65% and other topics came third with 13.73%. It's observed that *Mundo Deportivo* mostly published golf, athletics and boxing which were analyzed as "other". Basketball with 11.76%, cycling with 9.80% and tennis with %7.84 were observed less than other topics (Figure 11).

Table 11 presents the change in preferred topics and increased variety between 2017 and 2019. The analysis proved that data journalism in *Mundo Deportivo* started in September 2017 but data journalism has been integrated to the newspaper since 2018. *Mundo Deportivo* published only 2 data journalism articles in September 2017 which were football and basketball. Data journalism articles about football were dominant with 44.82% in 2018 while the 2019 had a decrease to 30%. It's observed that the reason for the increase of football and "other" articles was FIFA World Cup and Winter Olympics in 2018.

Figure 11. Data journalism articles by topic, *Mundo Deportivo* (2017-2019)



The total number of published data journalism articles and especially the rate of football articles was decreased from 2018 to 2019 but other topics started to publish more. Basketball articles increased 6.90% to 15%, tennis articles 6.90% to 10%, motorsports articles 17.24% to 20%, cycling articles 6.90% to 15%. Other topics showed a decrease in 2019 with %10 and it's observed that the reason for the decrease is less global events in 2019 such as Olympics (Table 13).

Table 14 corresponds to the story property of 51 data journalism articles in *Mundo Deportivo* in the analyzed period. According to the analysis, story properties showed a balance in total sample which means rate of use in each property. Comparison and connection & flow properties were observed most with the same rate which is 25.49% each and followed by "other" with 19.61% which includes mostly mapping and photo based explanations. Statistics based data journalism articles observed with 15.69% and change over time based articles with 7.84%. The analysis presented that the least preferred style is predictions with 5.88% (Table 14). Comparison based data journalism articles were observed majorly in football articles with player comparisons, derbies, coach comparisons. Comparison based data journalism articles mostly observed in 2018 with football articles which include comparisons of national football teams in the 2018 FIFA World Cup. Connection & flow were mostly observed in motorsports articles, specifically

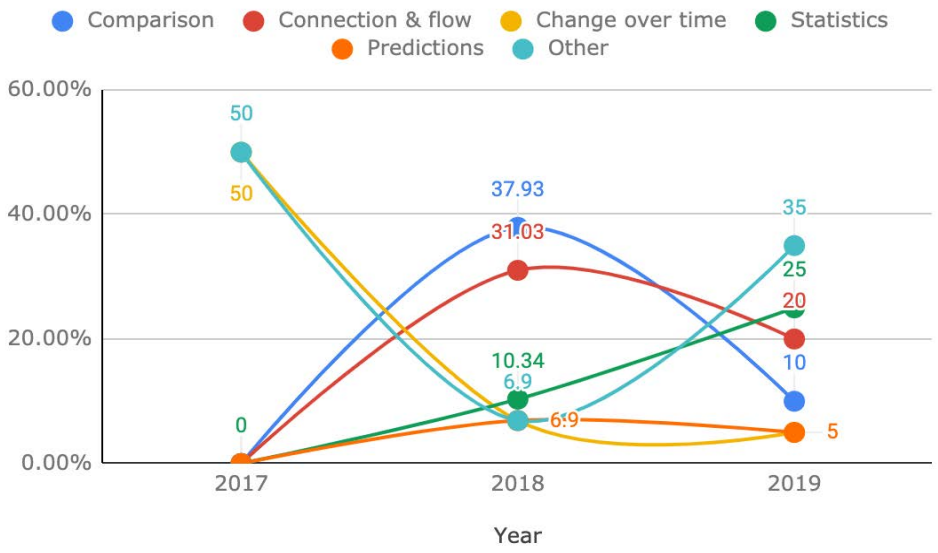
Formula 1 to explain the relation between the drivers and the brand they're representing. "Other" as story property was not observed dominantly in one topic, used balanced in all topics.

Table 14. Analysis of the story properties found, *Mundo Deportivo* (2017-2019)

	2017		2018		2019		Total	
Story Property	n	%	n	%	n	%	n	%
Comparison	0	0	11	37,93	2	10,0	13	25,49
Connection & Flow	0	0	9	31,03	4	20,0	13	25,49
Change Over Time	1	50,0	2	6,90	1	5,0	4	7,84
Statistics	0	0	3	10,34	5	25,0	8	15,69
Predictions	0	0	2	6,90	1	5,0	3	5,88
Other	1	50,0	2	6,90	7	35,0	10	19,61
Total	2	100	29	100	20	100	51	100

Figure 12 presents the evolution of the story properties per year. *Mundo Deportivo*'s story property preferences showed alterations every year. The analysis proved that *Mundo Deportivo* integrated data journalism to the newsroom in 2018 and story properties differed from 2018 to 2019 while statistics based and "other" types of properties' rate of use was increased. A decrease of the rate of use in comparison, connection & flow, change over time and prediction based articles were observed. Comparison (Image 31) based data journalism articles were published 11 times in 2018 with 37.93% and decreased to 10% with 2 articles in 2019. Connection & flow (Image 32) articles were published 9 times in 2018 with 31.03 and decreased to 20% with just 4 articles in 2019. The articles including change over time were not much preferable in all years which include 2 times in 2018 with 6.90% and once in 5% in 2019. However, It's observed that "Historia grafica de la Liga ACB / Endesa" (06/09/2017) which was a change over time based article was the first data journalism article of *Mundo Deportivo* in September 2017. Prediction (Image 35) based data journalism articles which share the same rates with change over time articles were observed 2 times in 2018 with 6.90 and decreased to 5% with one article in 2019.

Figure 12. Evolution of the story properties by year, *Mundo Deportivo* (2017-2019)



On the other hand, statistics (Image 34) based data journalism articles showed an increase from 2018 to 2019. The analysis presented that statistics based articles were published 3 times in 2018 with 10.34% and were increased to 5 articles in 2019 with 25%. Other (Image 36) as story property was observed 2 times in 2018 with 6.90% and showed a sharp increase to 7 articles in 2019 with 35%. Other as story property was observed mostly in map based visuals and listings and used in balance in all topics.

Image 31. Example of comparison technique, "Palmarés: Messi vs Cristiano Ronaldo" 20/05/2018, *Mundo Deportivo*

Image 32. Example of connection and flow technique, “Toda la información de las escuderías de F-1” 21/03/2018, *Mundo Deportivo*

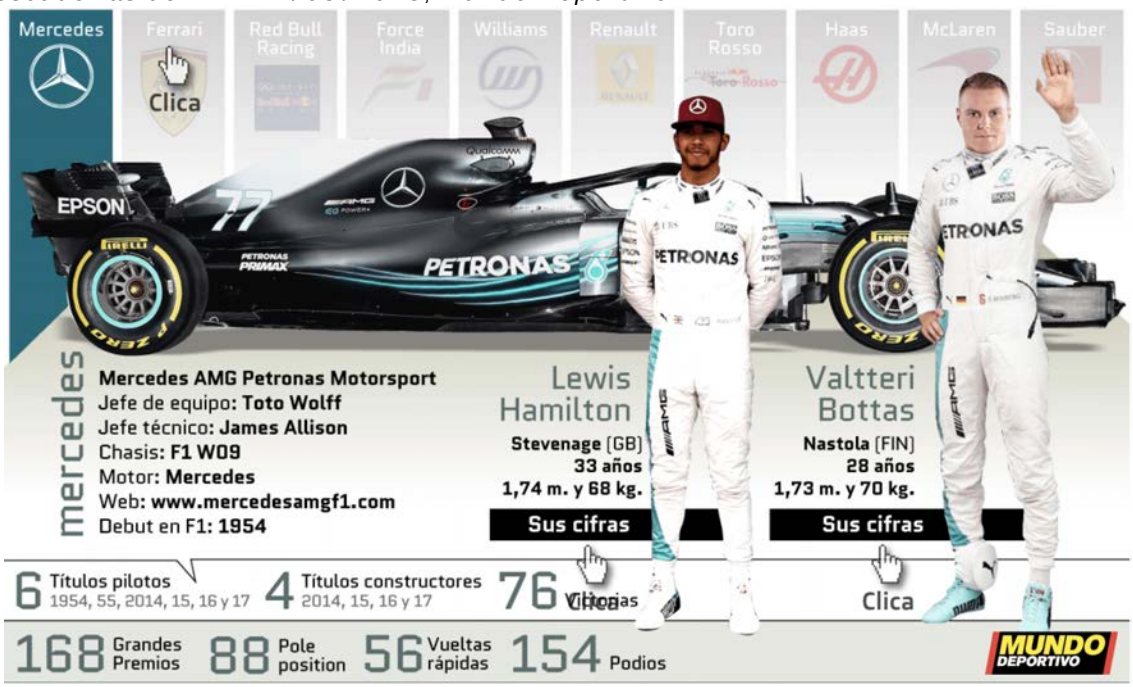


Image 33. Example of changes over time technique, “Los 19 títulos de Grand Slam de Rafa Nadal” 12/12/2019, *Mundo Deportivo*

Image 34. Example of statistics technique, “Rafa Nadal inicia hoy con suspense su octava etapa como nº 1 mundial” 06/11/2019, *Mundo Deportivo*

Image 35. Example of predictions technique, “Realiza tu pronóstico del Mundial de Rusia 2018” 30/06/2018, *Mundo Deportivo*

Image 36. Example of other, “Guía interactiva del Mundial de baloncesto de China 2019” 30/08/2019, *Mundo Deportivo*

4.2.2. Analysis of number of creators, data sources, accessibility of data

The analysis presented the dominance of articles with one author with 58.82% which is 30 of 51 total articles. It’s observed that articles with one author consist of 1 graphic designer responsible for all visualisations, data collection and writing which means that data journalism articles with one author are not written by a journalist but a graphic designer. Data journalism articles with more than 1 author were observed 13 times in total with 25.49%. More than 1 author was observed in more complex stories such as the analysis of the whole season, or more complex statistics based articles. It's observed that articles with more than 1 author were created majorly by 3 persons who are 1 graphic designer, 1 data collector and 1 journalist. Articles with no information of creators were observed 8 times in total with 15.69% (Figure 13).

Table 15 corresponds to the analysis of the number of creators per year. According to the analysis, articles with no information of creators were shown alterations in time. In 2017 there were no articles without the creator information. In 2018, 6 articles out of 29 had no information of creators which is 20.69% and this number was decreased to 2 articles in 2019 with 10%.

Table 15. Analysis of the number of creators per year, *Mundo Deportivo* (2017-2019)

	2017		2018		2019		Total	
Number of creators	n	%	n	%	n	%	n	%
Not mentioned	0	0	6	20,69	2	10,0	8	15,69
1 author	1	50,0	12	41,38	17	85,0	30	58,82
More than 1 authors	1	50,0	11	37,93	1	5,0	13	25,49
Total	2	100	29	100	20	100	51	100

Articles with one author were decreased to 50% to 41.38% from 2017 to 2018 however presented a significant increase in 2019 with 85%. In 2019, 17 data journalism articles of total 20 articles were consisted of 1 author. The analysis presented that articles with more than one author were decreased consistently between 2017 and 2019. In 2018 11 data journalism articles had more than 1 author with 37.93% while in 2018 had only 1 article with 5% (Table 15). It's observed that all articles with the information of creators were mentioned the name of the creators.

Figure 13. Analysis of the number of creators, *Mundo Deportivo* (2017-2019)

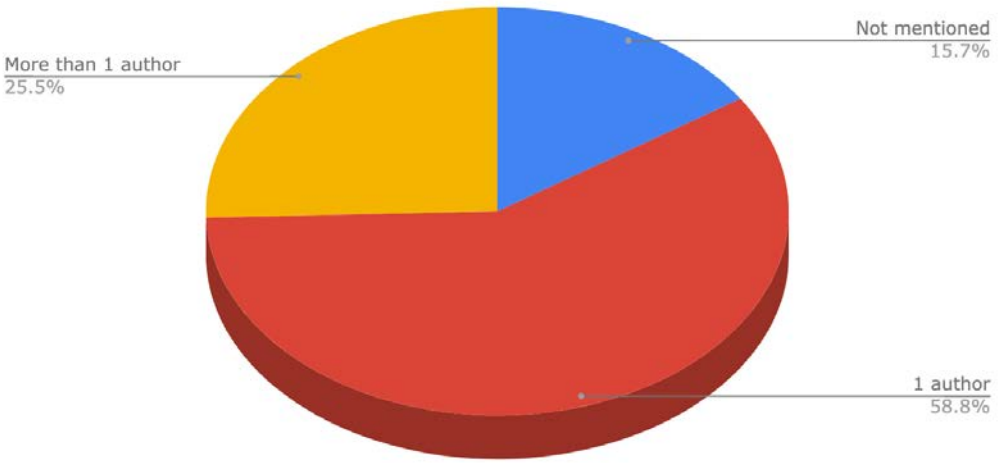


Table 16 corresponds to the data sources of 51 data journalism articles in *Mundo Deportivo* in the analyzed time period. Analysis presented that 98.04% of the articles were not mentioned data source while only 1 article (1.96%) had data

source information. In 2017 and 2019 none of the articles mentioned data sources (Table 16). The only article which mentioned the data source was observed in 2018 in a basketball article about the career of Juan Carlos Navarro (Image 37). In addition, the analysis presented that none of the articles in the total sample offered an option to access data (Table 17).

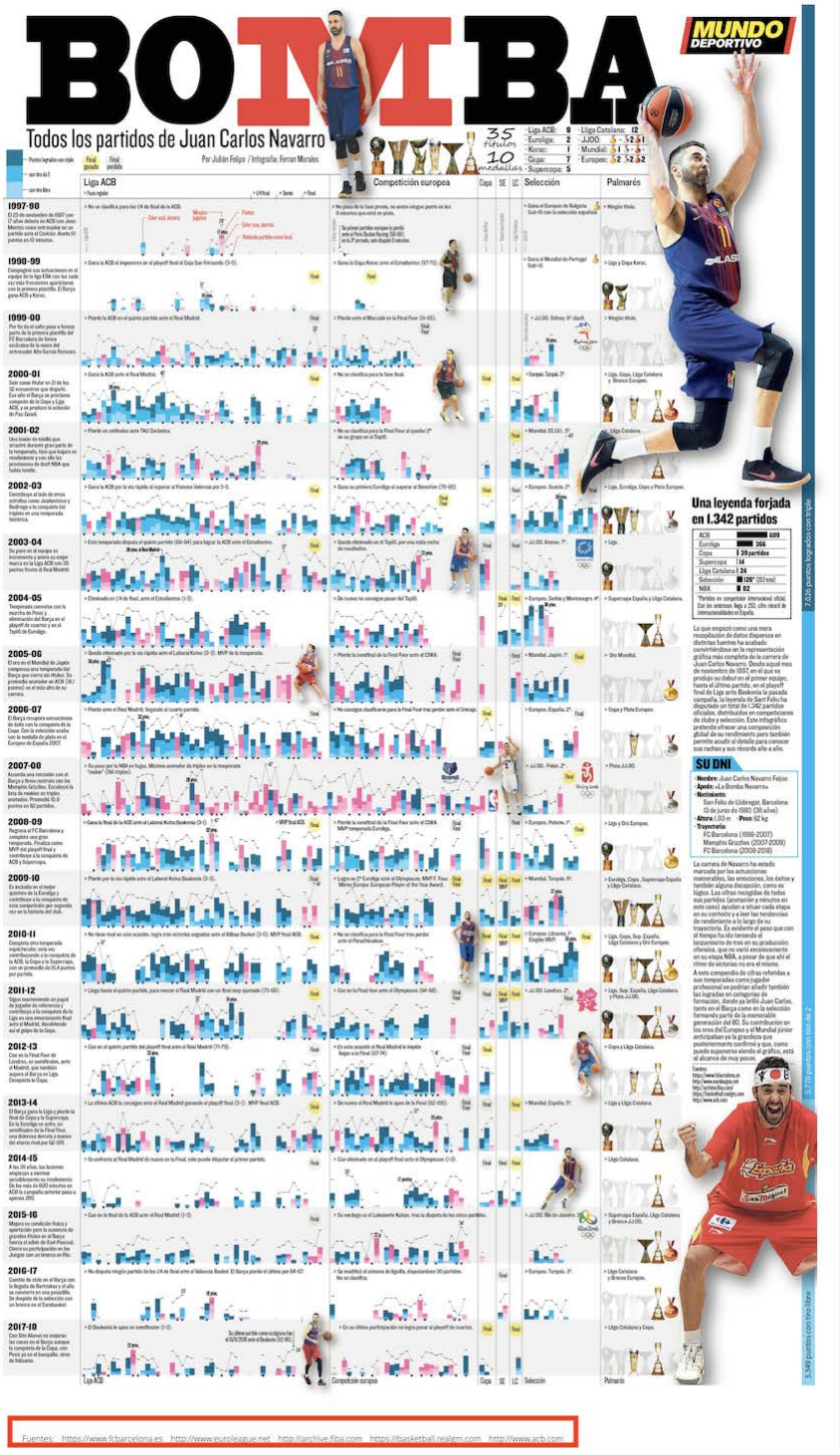
Table 16. Analysis of the data sources per year, *Mundo Deportivo* (2017-2019)

	2017		2018		2019		Total	
Data source	n	%	n	%	n	%	n	%
Not mentioned	2	100,0	28	96,55	20	100,0	50	98,04
Mentioned	0	0	1	3,45	0	0	1	1,96
Total	2	100	29	100	20	100	51	100

Table 17. Analysis of the accessibility of the data sources per year, *Mundo Deportivo* (2017-2019)

	2017		2018		2019		Total	
Accessibility of data	n	%	n	%	n	%	n	%
Not accessible	2	100,0	29	100,0	20	100,0	51	100,0
Accessible	0	0	0	0	0	0	0	0
Total	2	100	29	100	20	100	51	100

Image 37. Mentioning data source in *Mundo Deportivo*, "Todos los partidos de Juan Carlos Navarro" 24/11/2018



4.2.3. Analysis of number of visualisations, visualisation types, form of interactivity and ratio of text and multimedia

Data journalism articles with more than 3 visualisations were mostly observed in the analyzed period of *Mundo Deportivo*. 34 articles which is 66.67% of total consisted of more than 3 visualisations (Image 40). 12 of the articles which is 23.53% of total had only 1 visualisation while 5 articles with 9.80% had 2-3 visualisations (Figure 14) (Image 38) (Image 39).

Table 18. Analysis of the number of visualisations per year, *Mundo Deportivo* (2017-2019)

	2017		2018		2019		Total	
Number of visualisations	n	%	n	%	n	%	n	%
1 visualisation	1	50,0	4	13,79	7	35,0	12	23,53
2-3 visualisations	0	0	5	17,24	0	0	5	9,80
More than 3 visualisations	1	50,0	20	68,97	13	65,0	34	66,67
Total	2	100	29	100	20	100	51	100

The analysis presented that the rate of use of more than 3 visualisations was consistently popular in *Mundo Deportivo*'s data journalism style. More than 3 visualisations observed in 1 article with 50% in 2017, 20 articles with 68.97% in 2018 and 13 articles with 65% in 2019. 2-3 visualisations showed an alteration in time with 0 in 2017, 17.24% in 2018 and 0 in 2019. 2-3 visualisations were observed only in 2018 with 5 articles. 1 visualisation was observed in 1 article with 50% in 2017, 4 articles with 13.79% in 2018 and 7 articles with 35% in 2019 (Table 18). Analysis showed that *Mundo Deportivo* was publishing more visual articles however more simple article style with 1 visualisation also became preferable in 2019.

It's observed that data journalism articles with 1 visualisation were used mostly in statistics and comparison based football articles with 41.67%. Articles with more than 3 visualisations were observed in football, less than the rate of 1 visualisation, and motorsports articles. More than 3 visualisations were used in football articles 38.24% and in motorsports articles 20.59%.

Figure 14. Analysis of the number of visualisations, *Mundo Deportivo* (2017-2019)

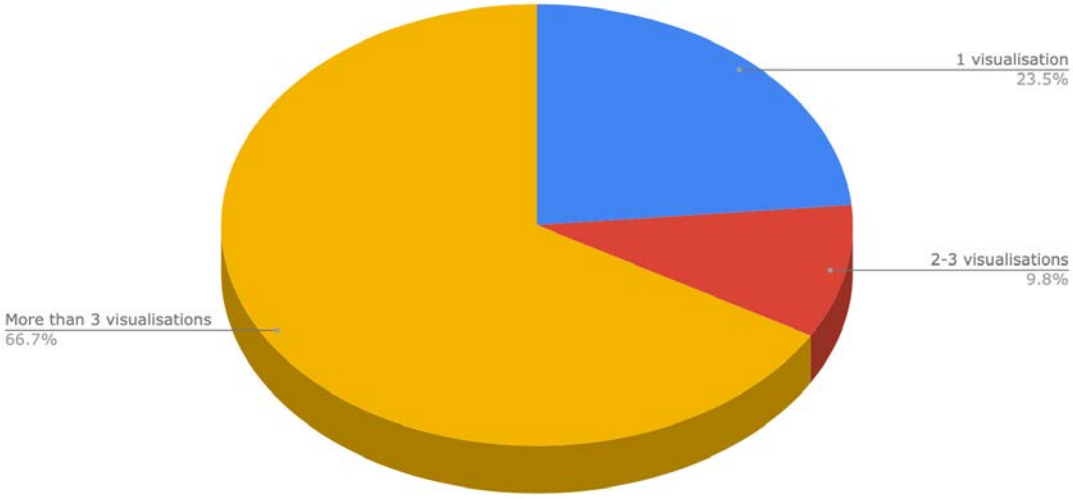


Image 38. Example of 1 visualisation, "Las faltas de Messi, al detalle" 09/12/2019, *Mundo Deportivo*

Image 39. Example of 2-3 visualisations, "Fernando Alonso, una vida de F1" 03/12/2018, *Mundo Deportivo*

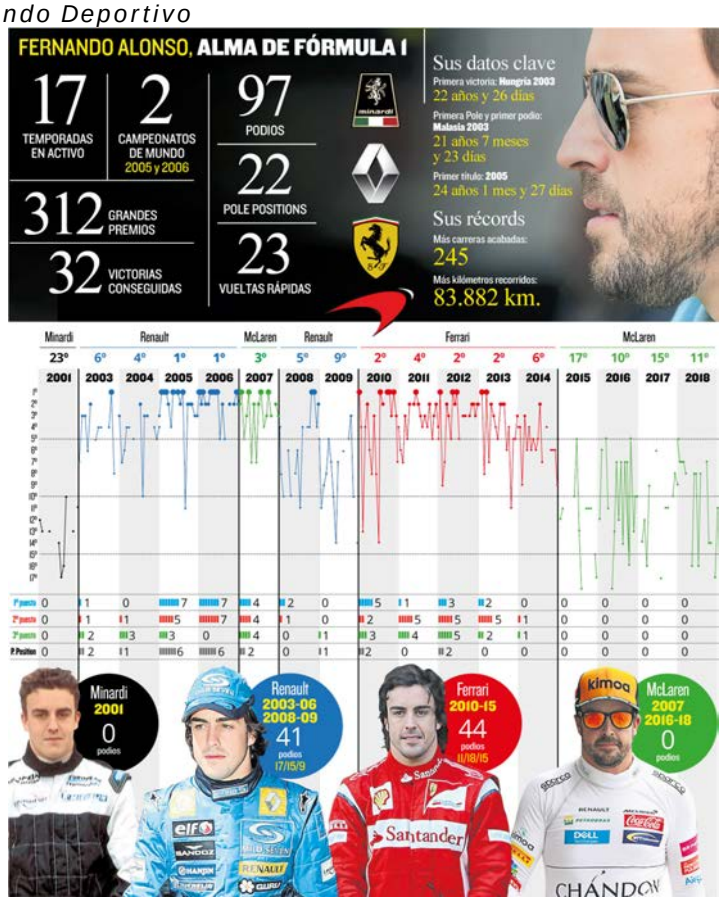
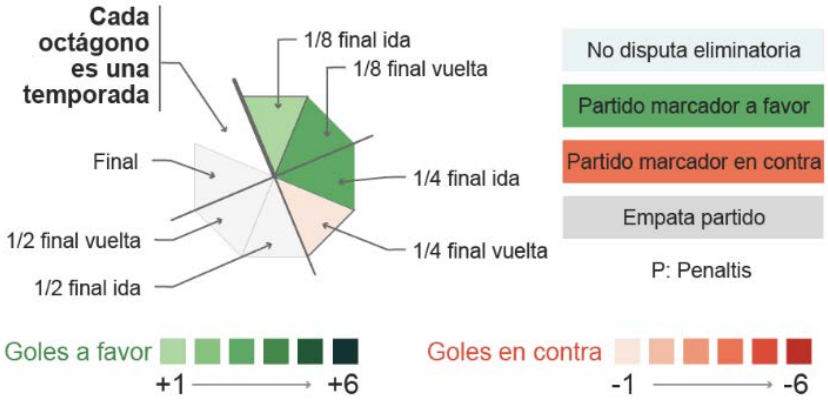
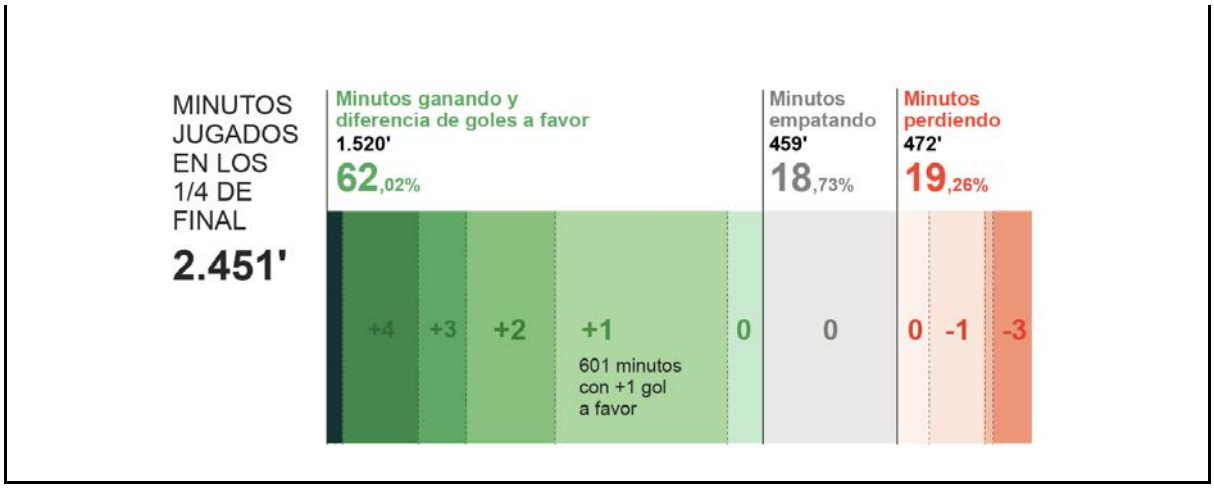
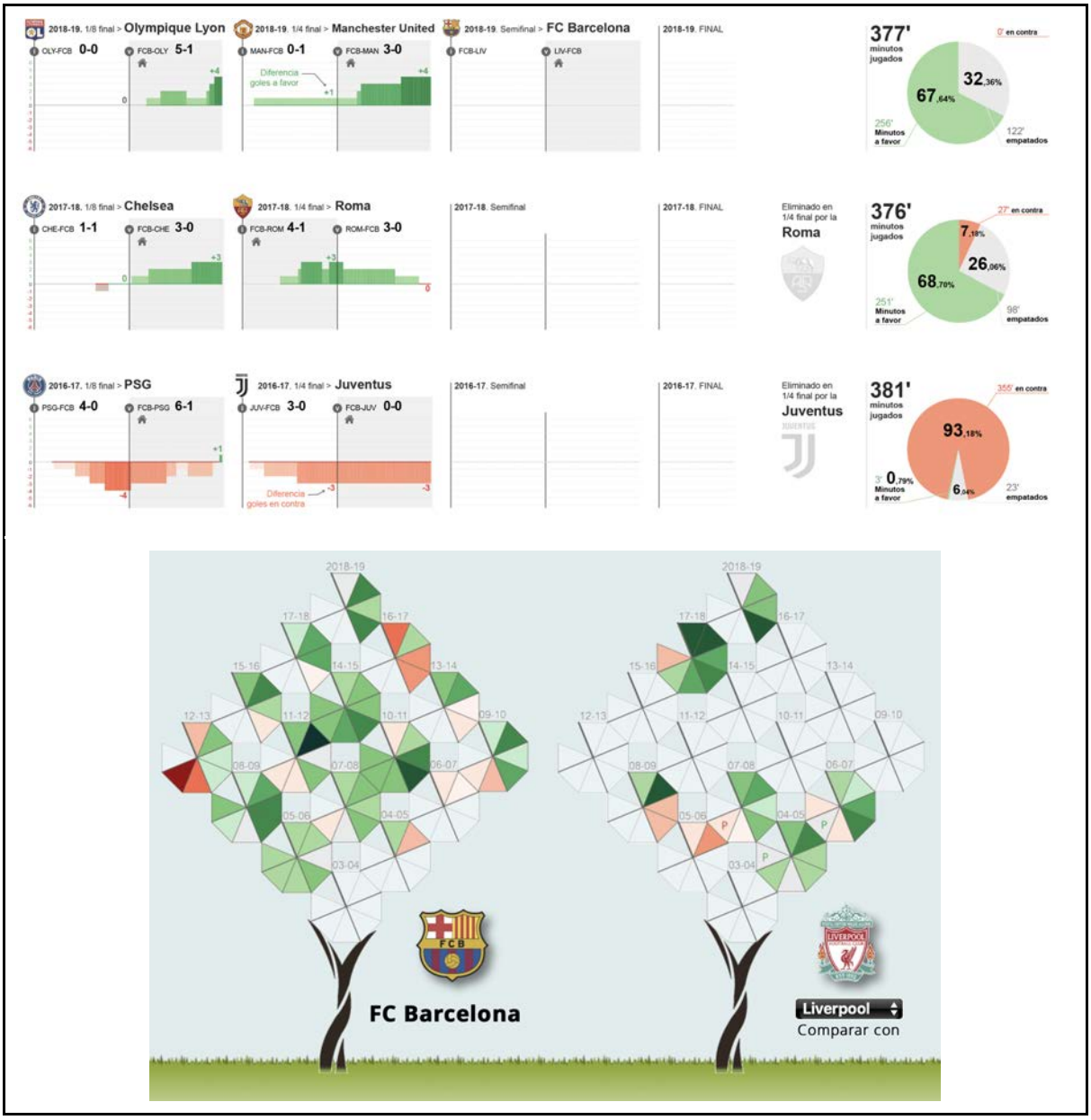


Image 40. Example of more than 3 visualisations, "Análisis de las fases finales de la Champions League" 09/12/2019, *Mundo Deportivo*




MINUTOS JUGADOS EN LOS 1/4 DE FINAL
2.451'
Minutos ganando y diferencia de goles a favor
1.520'
62,02%
Minutos empatando
459'
18,73%
Minutos perdiendo
472'
19,26%
+4
+3
+2
+1
601 minutos con +1 gol a favor
0
0
0
-1
-3


2018-19. 1/8 final > Olympique Lyon
OLY-FCB 0-0
FCB-OLY 5-1
2018-19. 1/4 final > Manchester United
MAN-FCB 0-1
FCB-MAN 3-0
Diferencia goles a favor
2018-19. Semifinal > FC Barcelona
FCB-LIV
LIV-FCB
2018-19. FINAL
377' minutos jugados
0' en contra
32,36%
67,64%
256' Minutos a favor
122' empatados
2017-18. 1/8 final > Chelsea
CHE-FCB 1-1
FCB-CHE 3-0
2017-18. 1/4 final > Roma
FCB-ROM 4-1
ROM-FCB 3-0
2017-18. Semifinal
2017-18. FINAL
Eliminado en 1/4 final por la Roma
376' minutos jugados
27' en contra
7,18%
26,06%
68,70%
251' Minutos a favor
98' empatados
2016-17. 1/8 final > PSG
PSG-FCB 4-0
FCB-PSG 6-1
2016-17. 1/4 final > Juventus
JUV-FCB 3-0
FCB-JUV 0-0
Diferencia goles en contra
2016-17. Semifinal
2016-17. FINAL
Eliminado en 1/4 final por la Juventus
381' minutos jugados
355' en contra
93,18%
3' 0,79%
Minutos a favor
6,04%
23' empatados
2018-19
17-18
16-17
15-16
14-15
13-14
12-13
11-12
10-11
09-10
08-09
07-08
06-07
05-06
04-05
03-04
FC Barcelona
Liverpool
Comparar con

56.86% of the data journalism articles between the analyzed period were static and didn't allow readers to interact with the visualisation while 43.14% of the articles had interactive visualisations (Table 19). In 2017, 2 published data journalism articles had static visualisations. Interactivity in visualisations started to be used in 2018 and interactive visualisations were observed in 16 articles with 55.17% while static visualisations were observed in 13 articles with 44.83%. Preferability rate of static and interactive visualisations showed an alteration in 2019. *Mundo Deportivo* published 14 articles including static visualisations with 70% while the interactive ones 6 articles with 30% (Figure 15).

Table 19. Analysis of the visualisation type per year, *Mundo Deportivo* (2017-2019)

	2017		2018		2019		Total	
Visualisation type	n	%	n	%	n	%	n	%
Static	2	100,0	13	44,83	14	70,0	29	56,86
Interactive	0	0	16	55,17	6	30,0	22	43,14
Total	2	100	29	100	20	100	51	100

It's observed that interactive visualisations were used mostly in football articles with 63.64%, especially in the articles about 2018 FIFA World Cup. Groups, comparisons of the teams and standings were the most frequent used subjects for interactive visualisations.

Figure 15. Evolution of the static and interactive visualisations, *Mundo Deportivo* (2017-2019)

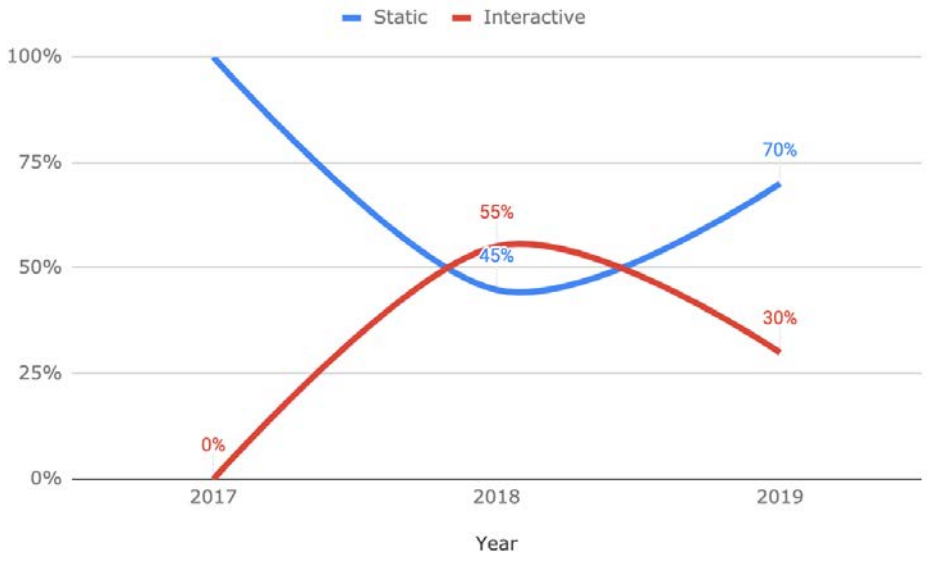


Figure 16 corresponds to the level of interactivity in the data journalism articles of *Mundo Deportivo* in the analyzed period. 49.02% of the analyzed articles presented consultational (medium) interactivity which offers to reader filtering, timeline slider, menu items. Followed by transmissional (low) interactivity which includes buttons, mouseovers, zooms with 29.41% was observed (Image 42). Conversational (high) interactivity was observed in only 3 articles with 5.88%. The analysis presented that 15.69% of the articles had no interactive functions (Figure 16) (Image 44).

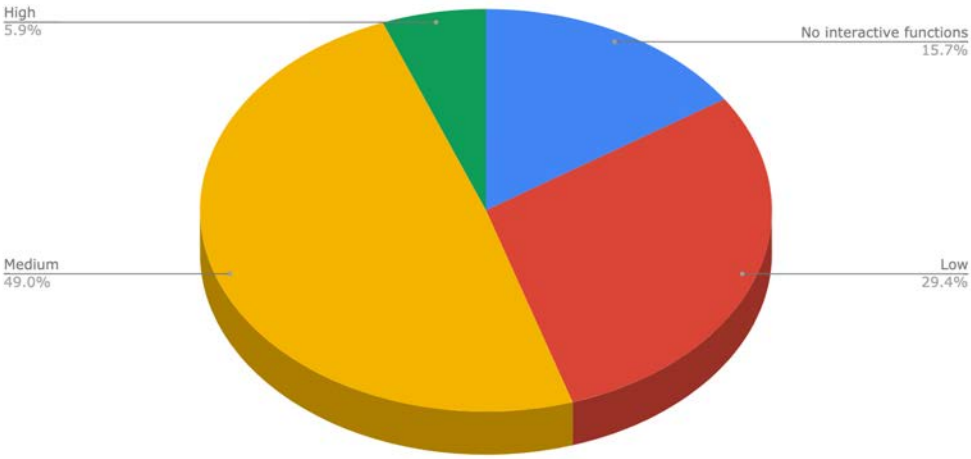
Table 20. Analysis of the level of interactivity per year, *Mundo Deportivo* (2017-2019)

	2017		2018		2019		Total	
Level of interactivity	n	%	n	%	n	%	n	%
No interactive functions	1	50,0	5	17,24	2	10,0	8	15,69
Transmissional	1	50,0	11	37,93	3	15,0	15	29,41
Consultational	0	0	11	37,93	14	70,0	25	49,02
Conversational	0	0	2	6,9	1	5,0	3	5,88
Total	2	100	29	100	20	100	51	100

The analysis presented that while articles with no interactive functions decreased in time, the interactivity style was changing. Transmissional interactivity used firstly in “Así es el nuevo estadio del Atleti” in 17/09/2017. In 2018, 37.93% of the articles (11 articles) had transmissional interactivity and this rate decreased to 15% (3 articles) in 2019 (Table 20).

Consultational interactivity was not observed in 2017. The analysis presented that consultational interactivity was used 11 times with 37.93% in 2017 like transmissional interactivity. However, use of consultational interactivity showed a sharp increase in 2019 with 70% (14 articles) (Table 20).

Figure 16. Analysis of the level of interactivity, *Mundo Deportivo* (2017-2019)



Conversational interactivity which lets the reader produce and input information, in other words personalisation was seen as the least preferred style. The analysis stated that there was no conversational interactivity in 2017. In 2018 2 articles with 6.9% and in 2019 1 article with 5% had conversational interactivity (Table 20). It's observed that, total 3 articles with conversational interactivity were about football (Image 44).

Even though the visuals were mostly static, the level of interactivity of the articles were seen considerably high. It's observed that the visuals were static however they were integrated to a booklet style menu, sliding menu or buttons to choose visuals. This provided a well structured page layout and space to offer more visualisations in less space (Image 43).

Image 41. Example of no interactive functions, “Todos los números de Iniesta” 27/04/2018, *Mundo Deportivo*

Image 42. Example of transmissional interactivity, “Reinhold Messner y Krzysztof Wielicki” 24/09/2018, *Mundo Deportivo*

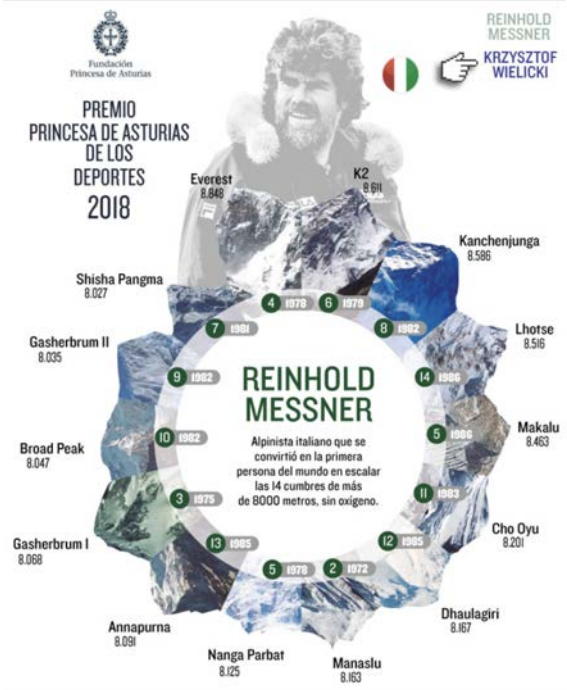


Image 43. Example of consultational interactivity, “Toda la información de las escuderías de F1” 21/03/2018, *Mundo Deportivo*

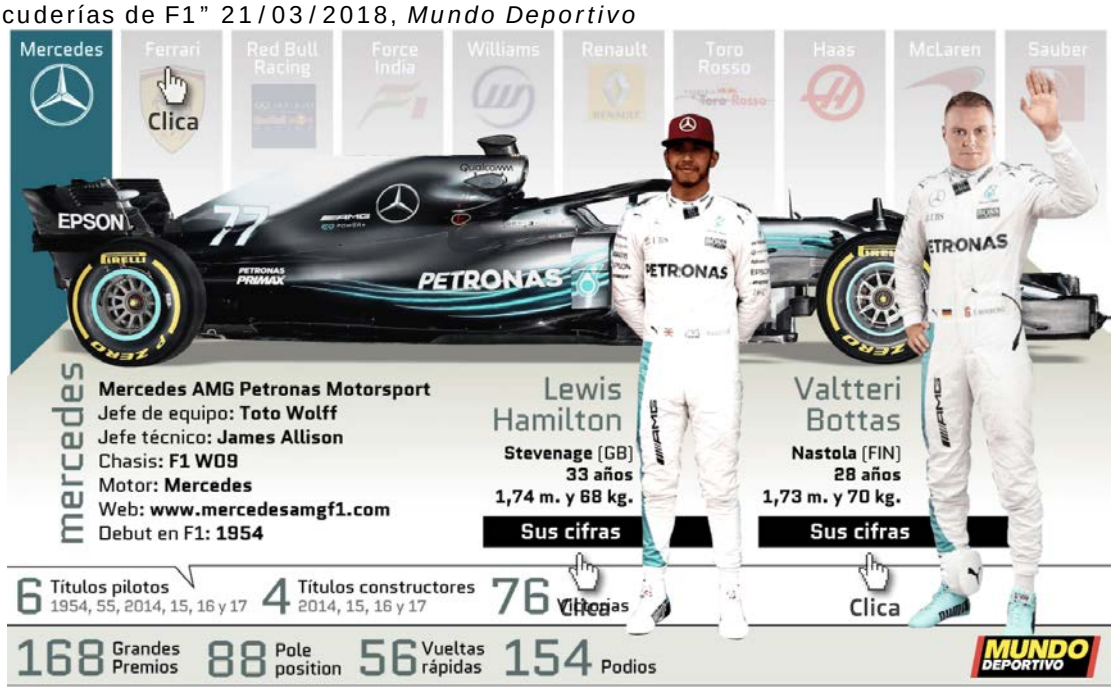
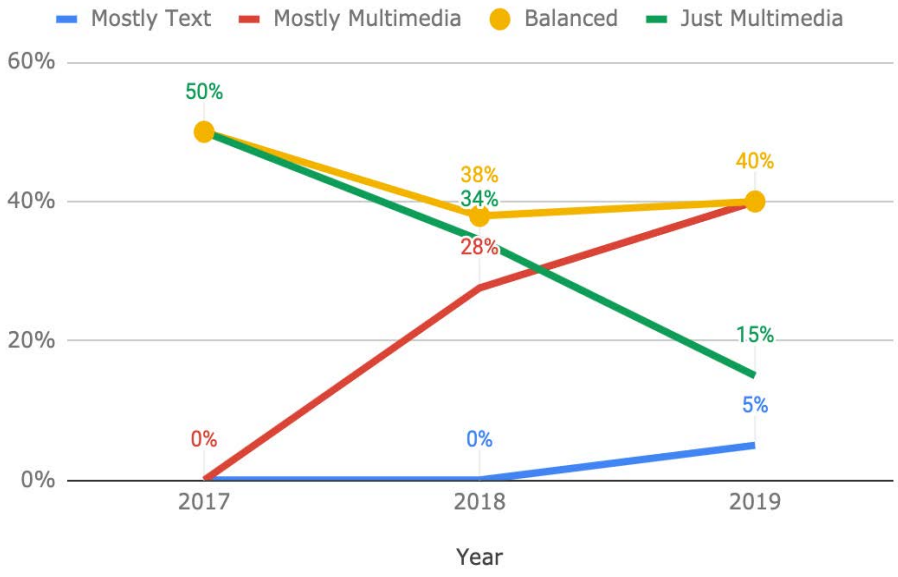


Image 44. Example of conversational interactivity, “¿Qué once debe poner Zidane en el Clásico?” 18/12/2019, *Mundo Deportivo*

Figure 17 presents the change in ratio of text and multimedia in the analyzed time period. 2 data journalism articles of 2017 showed the same rate. One of the articles presented a balanced ratio of text and multimedia while the other article had just multimedia. It's observed that balanced and just multimedia articles showed a decrease in 2018. In 2018, 37.93% of the articles had balanced text and multimedia, 34.48% of the articles had just multimedia and 27.59% of the articles had mostly multimedia. Articles with mostly text were not observed in 2018.

Figure 17. Evolution of the ratio of text and multimedia, *Mundo Deportivo* (2017-2019)



In 2019, text became more important in stories while the rate of just multimedia articles were decreasing to 15%, articles with mostly text were started to publish and seen as 5%. Articles with mostly multimedia and balanced text and multimedia observed in equal rates which is 40% (Figure 17).

Conclusion

The analysis presented that data journalism in *Mundo Deportivo* was majorly based on comparison in football articles but topics and story properties varied in time. These articles mostly consisted of more than 1 visualisations and became more static in the analyzed time period. However, lack of data sources was observed in the analysis. Data journalism style of *Mundo Deportivo* was seen as communicative according to the interactivity level of articles.

4.3. Sports data journalism in *Diario AS* (2017-2019)

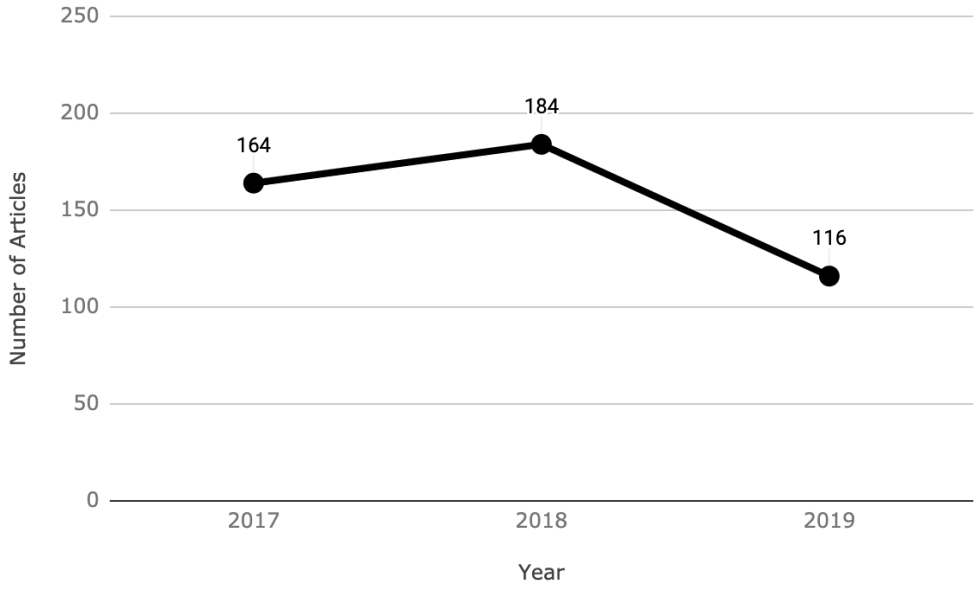
This section analyzes the sports data journalism articles in *Diario AS* between 2017-2019. *Diario AS* published 464 articles with visualisations on its website during the selected years (Table 21).

Table 21. Analysis of data journalism articles, *Diario AS* (2017-2019)

2017		2018		2019		Total	
n	%	n	%	n	%	n	%
164	35,34	184	39,66	116	25,0	464	100

In 2017, 164 data journalism articles (35.34%), in 2018 184 data journalism articles (39.66%), and in 2019 116 data journalism articles (25%) were published. Data journalism articles in *Diario AS* showed alterations in the analyzed period. While the number of data journalism articles increased from 2017 to 2018, a significant decrease was observed in 2019 (Figure 18). As will be analyzed in the following pages, it was predicted that the reason for this decrease was that the articles in 2019 had mostly more than 3 visualisations for detailed stories.

Figure 18. Changes in data journalism articles per year, *Diario AS* (2017-2019)



4.3.1. Analysis of topics and story properties

The analysis of the topics presented the dominance of the football articles with 56.25% of total. While more than half of the published data journalism articles were about football, other topics were observed at low rates (Figure 19).

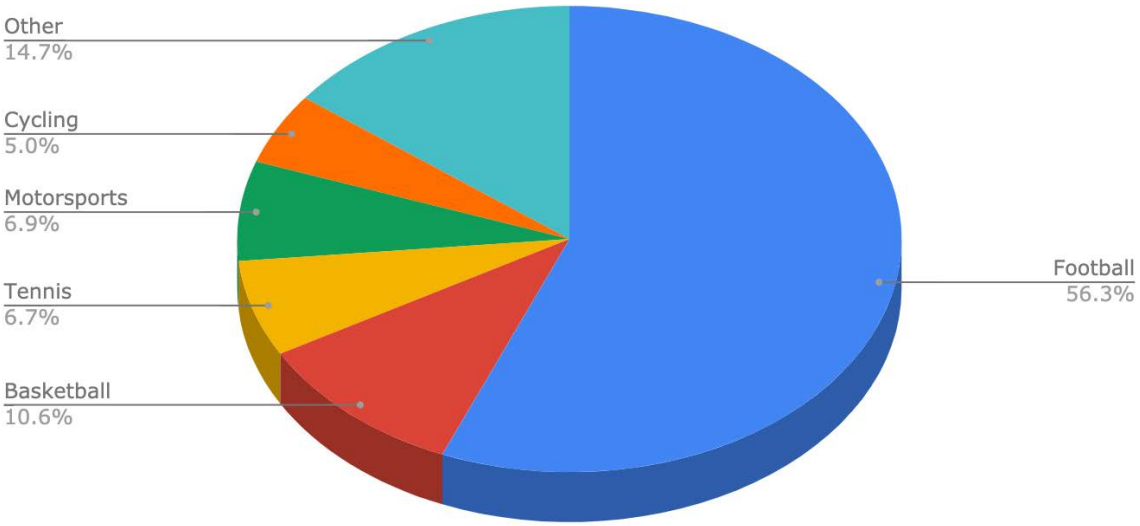
Table 22. Analysis of data journalism articles by topic per year, *Diario AS* (2017-2019)

	2017		2018		2019		Total	
Topic	n	%	n	%	n	%	n	%
Football	104	63,41	104	56,52	53	45,69	261	56,25
Basketball	13	7,93	21	11,41	15	12,93	49	10,56
Tennis	10	6,10	10	5,43	11	9,48	31	6,68
Motorsports	17	10,37	8	4,35	7	6,03	32	6,90
Cycling	7	4,27	7	3,80	9	7,76	23	4,96
Other	13	7,93	34	18,48	21	18,10	68	14,65
Total	164	100	184	100	116	100	464	100

It's observed that data journalism articles about football decreased in time, basketball articles increased regularly. Tennis, motorsports, cycling and other topics showed alterations in selected years. In 2017, data journalism articles about football were observed as 63.41%, in 2018 56.52%, and in 2019 45.69% and basketball articles were observed as 7.93% in 2017, 11.41% in 2018, and 12.93% in 2019.

Data journalism articles about tennis, motorsports and cycling showed alterations in time and decreased from 2017 to 2018 and increased from 2018 to 2019. Tennis articles were observed as 6.10% in 2017, 5.43% in 2018, and 9.48% in 2019. Motorsports articles were observed as 10.37% in 2017, 4.35% in 2018, and 6.03% in 2019. Cycling articles were observed as 4.27% in 2017, 3.80% in 2018 and 7.76% in 2019 (Table 22).

Figure 19. Data journalism articles by topic, *Diario AS* (2017-2019)



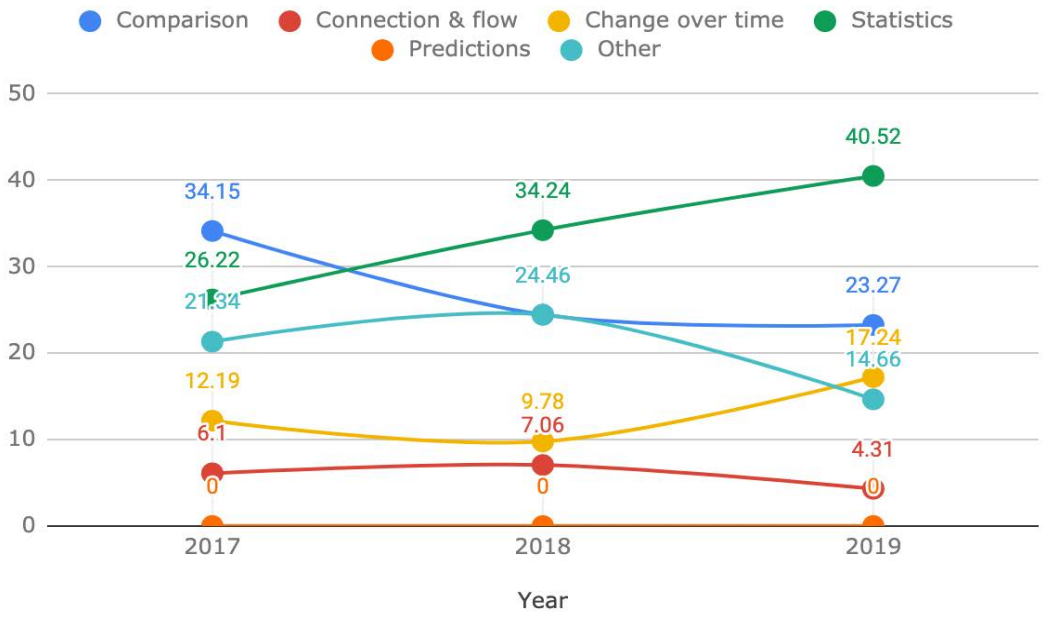
"Other" sports were seen as the second most published in the analyzed period of *Diario AS*. "Other" was observed as 7.93% in 2017, 18.48% in 2018, 18.10% in 2019, and 14.65% in total (Table 22). The analysis presented that *Diario AS* published data journalism articles in different topics as well such as boxing, golf, athletics, rugby, cricket, skiing, chess and watersports. athletics articles were observed as 33.82% in the “other” category while boxing was 17.65%, and American football & rugby were 14.71%. Chess, skiing, cricket and other sports were observed in less than 5 articles each.

Table 23 corresponds to the story property of 464 data journalism articles in *Diario AS* in the analyzed period. The most dominant story properties were observed as statistics, comparison and “other”. Statistics based data journalism articles were seen as 32.97% in total sample. Statistics based data journalism articles were observed in a regular increase with 26.22% in 2017, 34.24% in 2018, and 40.52% in 2019 (Figure 20). Statistics based data journalism articles were observed majorly in football, basketball and tennis to show players’ career evolution in detail (Image 48). Statistics based player articles mostly were about the players of FC Barcelona, Real Madrid and Atletico Madrid and tennis players’ career statistics such as Rafael Nadal and Novak Djokovic.

Table 23. Analysis of the story properties found, *Diario AS* (2017-2019)

	2017		2018		2019		Total	
Story Property	n	%	n	%	n	%	n	%
Comparison	56	34,15	45	24,46	27	23,27	128	27,59
Connection & Flow	10	6,10	13	7,06	5	4,31	28	6,03
Change Over Time	20	12,19	18	9,78	20	17,24	58	12,50
Statistics	43	26,22	63	34,24	47	40,52	153	32,97
Predictions	0	0	0	0	0	0	0	0
Other	35	21,34	45	24,46	17	14,66	97	20,91
Total	164	100	184	100	116	100	464	100

Figure 20. Evolution of the story properties by year, *Diario AS* (2017-2019)



Comparison based data journalism articles were seen as 27.59% in total 464 articles. Comparison based data journalism articles were observed in a decrease with 34.15% in 2017, 24.46% in 2018, and 23.27% in 2019 (Figure 20). Comparison based data journalism articles were observed majorly in football and motorsports to compare teams, players and motorsports pilots (Image 45). Comparison based articles mostly were about the goalkeepers and the star players of different teams in Champions League to analyze the game, or F1 pilots and the brand they're representing to.

"Other" category came third in popularity and were seen as 20.91% in total 464 articles. Articles in other styles were observed as 21.34% in 2017, 24.46% in 2018, and 14.66% in 2019 (Figure 20). "Other" as story property was observed in all topics in balance and the articles were about maps for game days, listings for standings, and photo based explanations of stadiums, international events (Image 49).

Change over time based data journalism articles were seen as 12.50% in total 464 articles. Change over time based data journalism articles were observed as 12.19% in 2017, 9.78% in 2018, and 17.24% in 2019 (Figure 20). Connection & flow based data journalism articles were observed as 6.10% in 2017, 7.06% in 2018, 4.31% in 2019, and 6.03% in total. Change over time and connection & flow properties were not observed in specific topics, used balanced in all topics (Image 47) (Image 46). Prediction based data journalism articles were not observed in the analyzed period.

Image 45. Example of comparison technique, "Gráfico: ¿qué equipos fallan más penaltis en Europa?" 14/02/2017, *Diario AS*

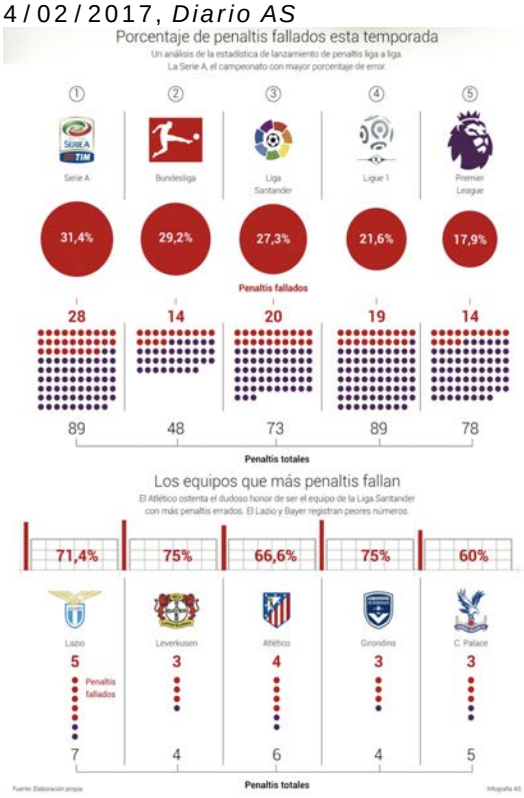


Image 46. Example of connection and flow technique, “El dibujo del memorable golazo de Iniesta al Chelsea” 21/05/2018, *Diario AS*

Image 47. Example of changes over time technique, “El fenómeno de Vinicius Junior explicado en cifras” 31/07/2018, *Diario AS*

Image 48. Example of statistics technique, “Se retira Juan Carlos Navarro: adiós a dos décadas de leyenda” 17/08/2018, *Diario AS*

Image 49. Example of "other", "Doha 2019: Mundiales de noche y con aire acondicionado" 05/10/2018, *Diario AS*

4.3.2. Analysis of number of creators, data sources, accessibility of data

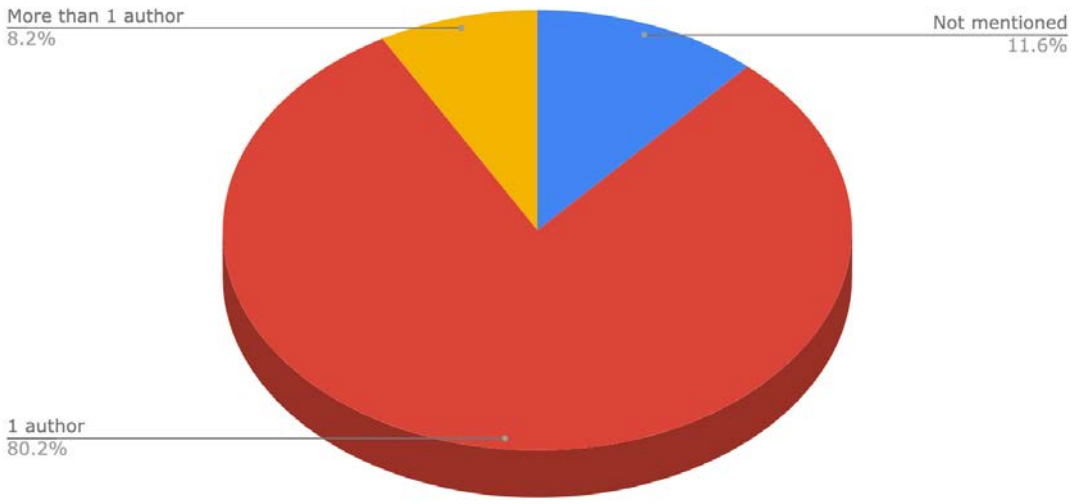
The analysis presented that data journalism articles in *Diario AS* dominantly created by 1 author who is the designer of the visual with 80.17% in total. This rate was followed by the articles which do not mention the creator with 11.64% and the articles which had more than 1 author with 8.19% (Figure 21).

Table 24. Analysis of the number of creators per year, *Diario AS* (2017-2019)

	2017		2018		2019		Total	
Number of creators	n	%	n	%	n	%	n	%
Not mentioned	25	15,24	15	8,15	14	12,07	54	11,64
1 author	124	75,61	150	81,52	98	84,48	372	80,17
More than 1 authors	15	9,15	19	10,33	4	3,45	38	8,19
Total	164	100	184	100	116	100	464	100

The analysis presented that the number of the articles with 1 author increased in time with 75.61% in 2017, 81.52% in 2018, and 84.48% in 2019. Articles with more than 1 author were observed as 9.15% in 2017, increased to 10.33% in 2018 and decreased to 3.45% in 2019. It's observed that the articles with more than 1 author have the name of the writer on the top and designer's name in the bottom of the visualisation as "Infografia: name of the designer". 15.24% of the articles had no information about the creator in 2017. This rate decreased to 8.15% in 2018 and increased to 12.07% after the decrease in more than 1 author articles in 2019 (Table 24). It's observed that the articles which have not the creator name, published the creator information as "AS Gráficos".

Figure 21. Analysis of the number of creators, *Diario AS* (2017-2019)



Analysis of the data sources proved that *Diario AS* dominantly mentioned data sources in data journalism articles with 85.13% in total. 14.87% of the

articles had not the information of data sources. In 2017, 85.37% of the articles had data source information while a decrease was observed in 2018 to 82.07%. In 2019, the rate of mentioning data source showed the highest rate with 89.66% (Table 25).

Table 25. Analysis of the data sources per year, *Diario AS* (2017-2019)

	2017		2018		2019		Total	
Data source	n	%	n	%	n	%	n	%
Not mentioned	24	14,63	33	17,93	12	10,34	69	14,87
Mentioned	140	85,37	151	82,07	104	89,66	395	85,13
Total	164	100	184	100	116	100	464	100

The analysis presented that mentioning the name of the data source showed an alteration in time. From 2017 to 2018, the rate of the articles with the data source decreased however mentioning the name of the data source increased. In 2017, 70.13% of the articles mentioned the name of the data source while 2018 as 75.55%. In 2019, both the mentioning data source and its name increased. 81.90% of the data journalism articles had the name of the data source in 2019 (Figure 22). The analysis showed that the data journalism articles published by *Diario AS* became more transparent in time but still not enough in terms of accessible data. Accessible data was not observed in total 464 articles between 2017 and 2019 (Table 26).

Figure 22. Evolution of the mentioning data source name by year, *Diario AS* (2017-2019)

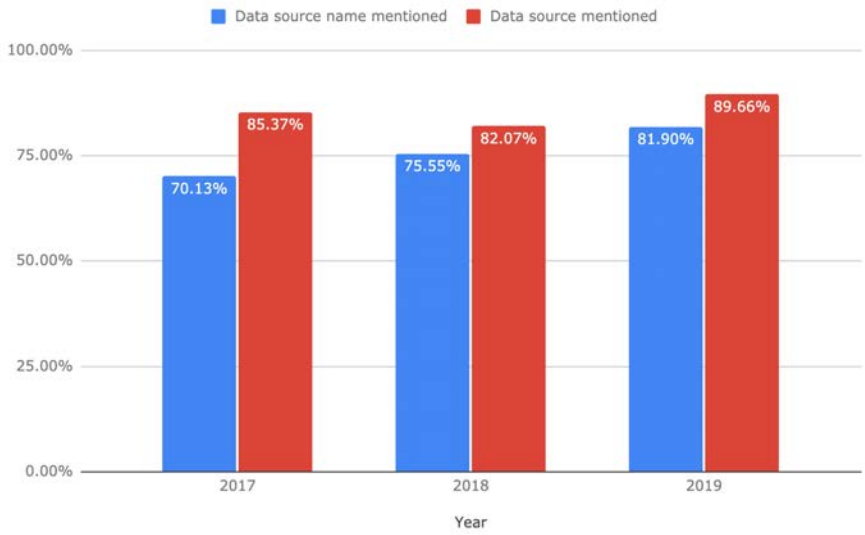
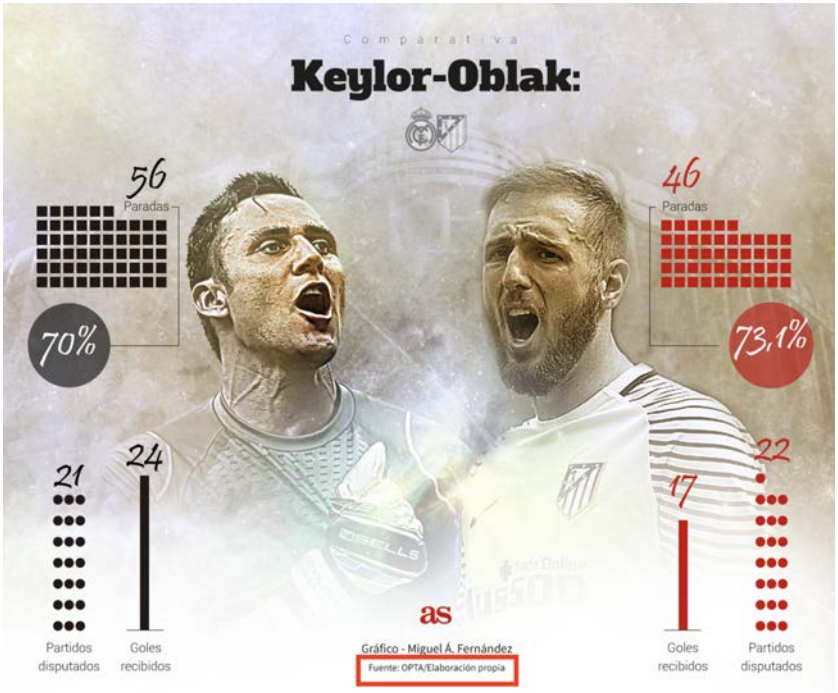


Table 26. Analysis of the accessibility of the data sources per year, *Diario AS* (2017-2019)

	2017		2018		2019		Total	
Accessibility of data	n	%	n	%	n	%	n	%
Not accessible	164	100	184	100	116	100	464	100
Accessible	0	0	0	0	0	0	0	0
Total	164	100	184	100	116	100	464	100

Image 50. Mentioning data source in Diario AS, "Oblak o Keylor: el gráfico que compara sus números" 07/04/2017



4.3.3. Analysis of number of visualisations, visualisation types, form of interactivity and ratio of text and multimedia

Balanced rates were observed in the analysis of the number of visualisations in articles. The analysis presented that 30.39% of the articles had 1 visualisation, 37.71% had 2 to 3 visualisations, and 31.90% had more than 3 visualisations (Figure 23).

Table 27. Analysis of the number of visualisations per year, *Diario AS* (2017-2019)

	2017		2018		2019		Total	
Number of visualisations	n	%	n	%	n	%	n	%
1 visualisation	73	44,51	48	26,09	20	17,24	141	30,39
2-3 visualisations	59	35,98	80	43,48	36	31,03	175	37,71
More than 3 visualisations	32	19,51	56	30,43	60	51,72	148	31,90
Total	164	100	184	100	116	100	464	100

Analysis of the number of visualisations showed alterations in the analyzed time period. A significant decrease was observed in the rate of articles with 1 visualisation with 44.51% in 2017, 26.09% in 2018, and 17.24% in 2019. Opposite to this, the rate of the articles with more than 3 visualisations were shown an increase and observed with 19.51% in 2017, 30,43% in 2018, and 51.72% in 2019. Articles with 2 to 3 visualisations were observed as 35.98% in 2017, 43.48% in 2018, and 31.03% in 2019 (Table 27). The analysis presented that *Diario AS* published more visual articles in 2018 than 2017. It's also observed that more complex stories mostly with 3 to 5 visualisations became more popular and that caused the least number of published articles in 2019 which is 116 articles. Articles with more than 3 visualisations were observed majorly in football and followed by tennis and motorsports (Image 53).

Figure 23. Analysis of the number of visualisations, *Diario AS* (2017-2019)

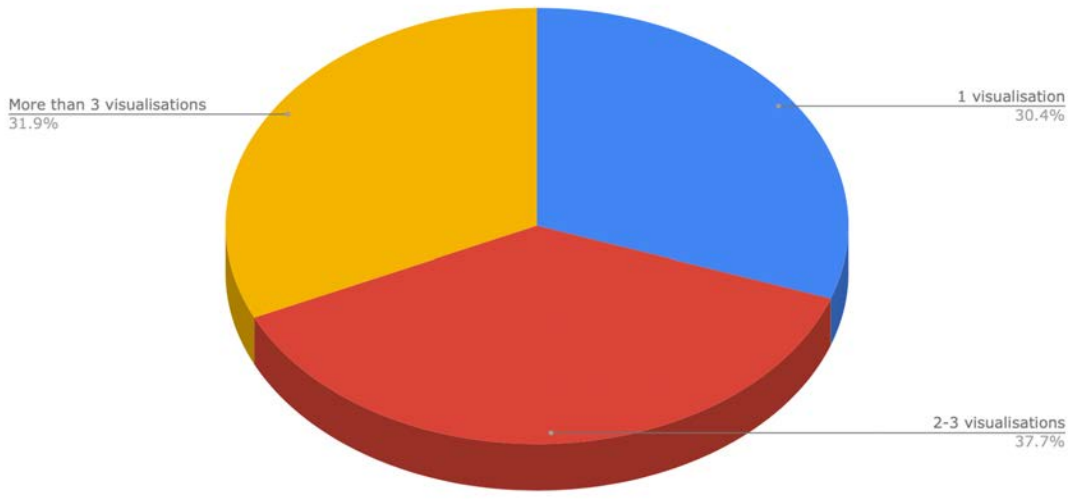


Image 51. Example of 1 visualisation, “El gráfico que evidencia el regreso de la mejor versión de Falcao” 28/02/2017, *Diario AS*

Image 52. Example of 2-3 visualisations, “Sergio Ramos llega a los 500 partidos con el Real Madrid” 10/02/2017, *Diario AS*

Image 53. Example of more than 3 visualisations, “Messi y Maradona: el gráfico que compara a los '10' de Argentina” 12/10/2017, *Diario AS*

Table 28. Analysis of the visualisation type per year, *Diario AS* (2017-2019)

	2017		2018		2019		Total	
Visualisation type	n	%	n	%	n	%	n	%
Static	164	100,0	183	99,46	116	100,0	463	99,78
Interactive	0	0	1	0,54	0	0	1	0,22
Total	164	100	184	100	116	100	464	100

The analysis presented that only 1 article in a total 464 articles was interactive with 0.22% (Table 28). 3 interactive visualisations were observed in the article about a 2018 World Cup titled “El desgaste físico de cada selección tras la segunda jornada” (25/06/2018) which is about the deployment of each team and player during the tournament (Image 55).

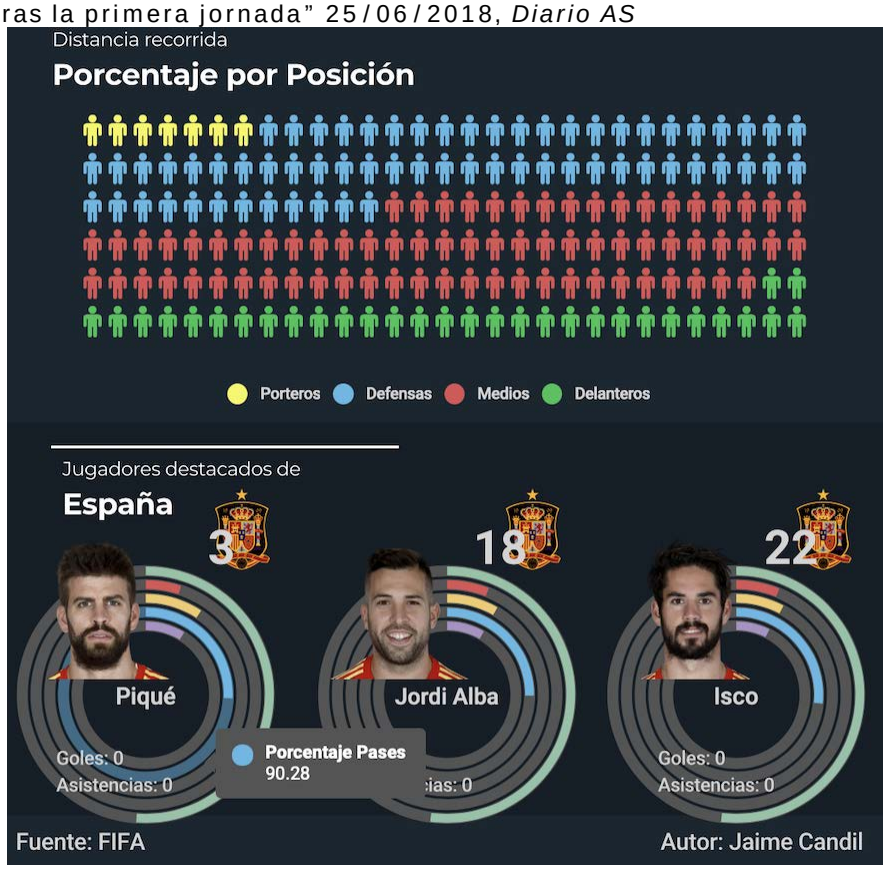
Table 29. Analysis of the level of interactivity per year, *Diario AS* (2017-2019)

	2017		2018		2019		Total	
Level of interactivity	n	%	n	%	n	%	n	%
No interactive functions	164	100	183	99,46	116	100	463	99,78
Transmissional	0	0	1	0,54	0	0	1	0,22
Consultational	0	0	0	0	0	0	0	0
Conversational	0	0	0	0	0	0	0	0
Total	164	100	184	100	116	100	464	100

Transmissional (low) interactivity was observed in the article “El desgaste físico de cada selección tras la segunda jornada” (20/06/2018) which allows user to click on buttons to see the players’ and the teams’ percentages of passes, scores etc. It’s observed that 99.78% of the articles were static and had no interactive functions (Table 29).

Image 54. Example of no interactive functions, “Los números de Di Stéfano y Cristiano, frente a frente” 03/09/2017, *Diario AS*

Image 55. Example of transmissional interactivity, “El desgaste físico de cada selección tras la primera jornada” 25/06/2018, *Diario AS*



The analysis showed the dominance of the articles with mostly multimedia with 72.63% of total. Articles with balanced text and multimedia were observed with 12.93%, articles with just multimedia with 9.70%, and articles with mostly text with 4.74%.

Figure 24. Evolution of the ratio of text and multimedia, *Diario AS* (2017-2019)

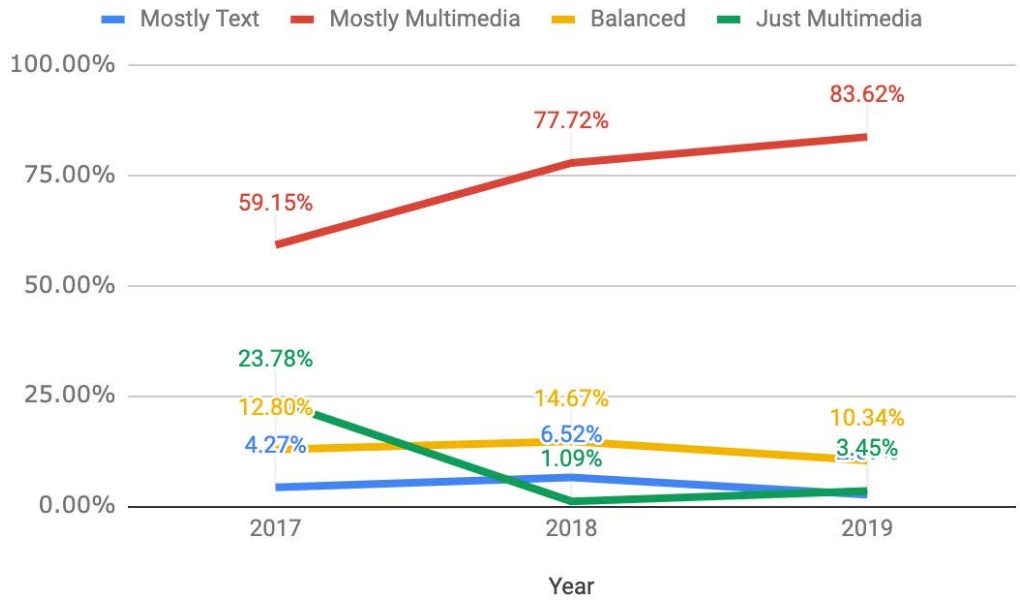


Figure 24 presents the change in the ratio of text and multimedia in the analyzed time period. Articles with mostly multimedia presented a regular increase in time. In 2017, 59.15% of the articles consisted of mostly multimedia, this rate increased to 77.72% in 2018, and 83.62% in 2019. Opposite to this, a sharp decrease was observed in articles with just multimedia. In 2017, 23.78% of the articles had just multimedia and this rate decreased to 1.09% in 2018, and then increased to 3.45% in 2019. Articles with mostly text and balanced text and multimedia showed equal alterations in time. Balanced articles were observed as 12.80% in 2017, 14.67% in 2018, and 10.34% in 2019. Articles with mostly text were observed as 4.27% in 2017, 6.52% in 2018, and 2.59% in 2019.

Conclusion

The analysis presented that *Diario AS* was published majorly football articles and the data visualisations were mostly for presenting statistics. A significant change in the style of the visualisations was not observed. *Diario AS* was intended to publish static visualisations in the articles without interactive functions. The

reason for the decreased number of the articles in 2019 was seen as the increased number of visualisations in each article but still created by 1 person.

4.4. Sports data journalism in *El Mundo* (2017-2019)

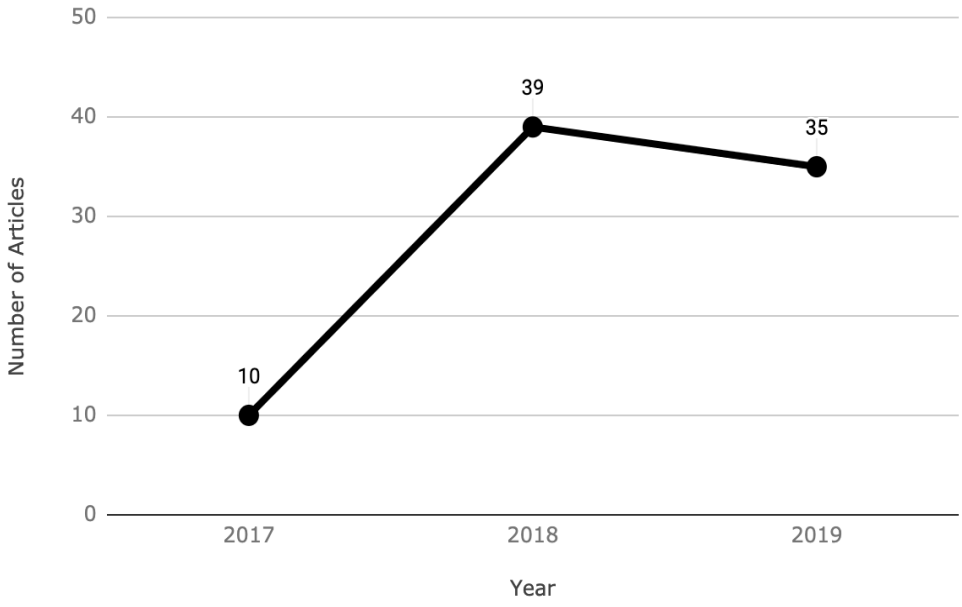
This section analyzes the sports data journalism articles in *El Mundo* between 2017-2019. *El Mundo* published 84 articles with visualisations on its website during the selected years (Table 30).

Table 30. Analysis of data journalism articles, *El Mundo* (2017-2019)

2017		2018		2019		Total	
n	%	n	%	n	%	n	%
10	11,90	39	46,43	35	41,67	84	100

In 2017, 10 sports data journalism articles (11.90%), in 2018 39 sports data journalism articles (46.43%), and in 2019 35 sports data journalism articles (41.67%) were published. Sports data journalism articles in *El Mundo* showed alterations in the analyzed period. From 2017 to 2018 a significant increase was observed in the number of published data journalism articles in *El Mundo*. From 2018 to 2019 the number of data journalism articles were on the decline (Figure 25).

Figure 25. Changes in data journalism articles per year, *El Mundo* (2017-2019)



4.4.1. Analysis of topics and story properties

The analysis presented that *El Mundo* majorly published data journalism articles about football with 50% and secondly tennis with 19.05%. Other sports were observed at low rates. Basketball articles were observed with 10.71%, “other” category was observed with 9.52%, motorsports articles were observed with 7.14%, and cycling articles were observed with 3.57% in total 84 articles (Figure 26).

Table 31. Analysis of data journalism articles by topic per year, *El Mundo* (2017-2019)

	2017		2018		2019		Total	
Topic	n	%	n	%	n	%	n	%
Football	6	60,0	24	61,54	12	34,29	42	50,0
Basketball	1	10,0	2	5,13	6	17,14	9	10,71
Tennis	2	20,0	6	15,38	8	22,86	16	19,05
Motorsports	0	0	2	5,13	4	11,43	6	7,14
Cycling	0	0	1	2,56	2	5,71	3	3,57
Other	1	10,0	4	10,26	3	8,57	8	9,52
Total	10	100	39	100	35	100	84	100

It was observed that the football articles were publishing dominantly in 2017 and 2018, and showed a significant decrease in 2019 to 34.29%. Like football, sports in the “other” category showed a small increase from 2017 to 2018 which is 10% to 10.26%, and decreased to 8.57% in 2019. It was observed that the “other” category had only 2 topics which are athletics articles with 75% and handball articles with 25%. An opposite alteration was observed in basketball articles. Basketball articles were published with 10% in 2017, decreased to 5.13% in 2018, and increased again to 17.14% in 2019 (Table 31).

Motorsports and cycling articles were two sports which are finding more space in the newspaper each year. Data journalism articles about motorsports and cycling were not observed in 2017. In 2018, motorsports articles published with 5.13%, and in 2019 11.43% while cycling articles were observed with 2.56% in 2018, and 5.71% in 2019 (Table 31).

Figure 26. Data journalism articles by topic, *El Mundo* (2017-2019)

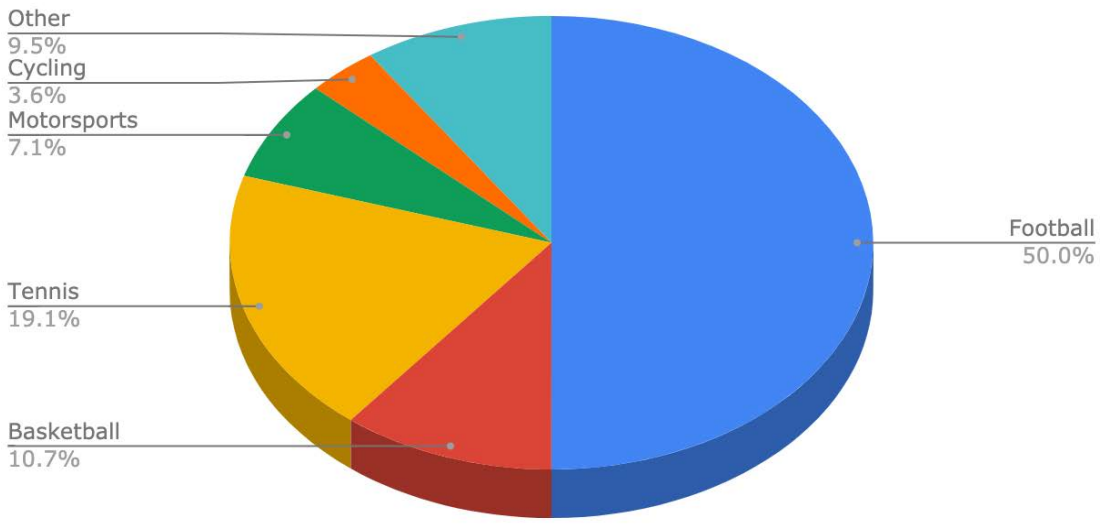


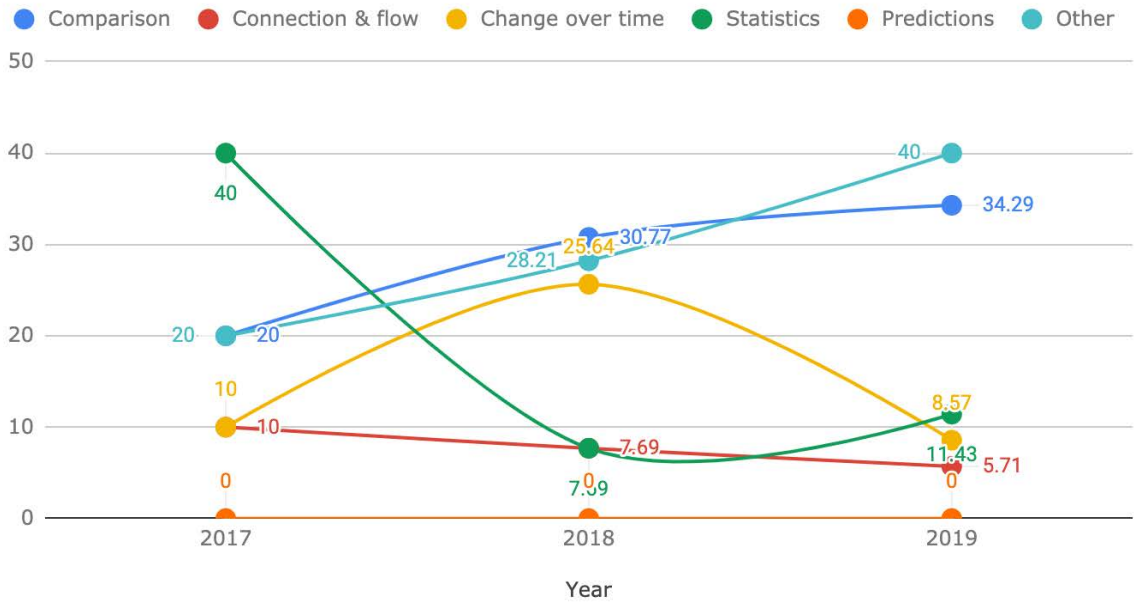
Table 32 corresponds to the story property of 84 sports data journalism articles in *El Mundo* in the analyzed time period. Story properties in the "other" category were observed most in the analysis with 32.14% of total (Image 60). The rate of the "other" category increased in time with 20% in 2017, 28.21% in 2018, and 40% in 2019 (Figure 27). The observation made as the "other" category majorly consisted of listing and photo based explanations of fixtures of leagues, drawings of injuries and key positions of the games and maps about tournaments.

Table 32. Analysis of the story properties found, *El Mundo* (2017-2019)

	2017		2018		2019		Total	
Story Property	n	%	n	%	n	%	n	%
Comparison	2	20,0	12	30,77	12	34,29	26	30,95
Connection & Flow	1	10,0	3	7,69	2	5,71	6	7,14
Change Over Time	1	10,0	10	25,64	3	8,57	14	16,67
Statistics	4	40,0	3	7,69	4	11,43	11	13,10
Predictions	0	0	0	0	0	0	0	0
Other	2	20,0	11	28,21	14	40,0	27	32,14
Total	10	100	39	100	35	100	84	100

An increase in comparison based articles were observed more each year. The analysis presented that 20% in 2017, 30.77% in 2018, and 34.29% in 2019 were comparison based data journalism articles in *El Mundo*. Comparison based data journalism articles were observed majorly in football which includes the comparisons of the national teams in 2018 World Cup, statistics of a player in different teams, season success of a team etc. (Image 59). A decrease in connection & flow articles were observed each year. The analysis presented that 10% in 2017, 7.69% in 2018, and 5.71% in 2019 were connection & flow based data journalism articles in *El Mundo* (Figure 27) (Image 57).

Figure 27. Evolution of the story properties by year, *El Mundo* (2017-2019)



Change over time and statistics based articles showed alterations in time. Change over time articles were observed with 10% in 2017, increased to 25.64% in 2018, and decreased to 8.57% in 2019. Opposite to this, statistics articles were observed with 40% in 2017, decreased sharply to 7.69% in 2018, and increased to 11.43% in 2019. Articles with predictions were not observed in the analyzed time period (Figure 27). Change over time articles were mostly observed in football, basketball, and tennis while statistics based articles were mostly about football and tennis (Image 58) (Image 59).

Image 56. Example of comparison technique, “El Real Madrid, peor en todo salvo en los pases” 21/01/2018, *El Mundo*

Image 57. Example of connection and flow technique, “La refundación del Real Madrid cuesta 1.000 millones” 07/03/2019, *El Mundo*

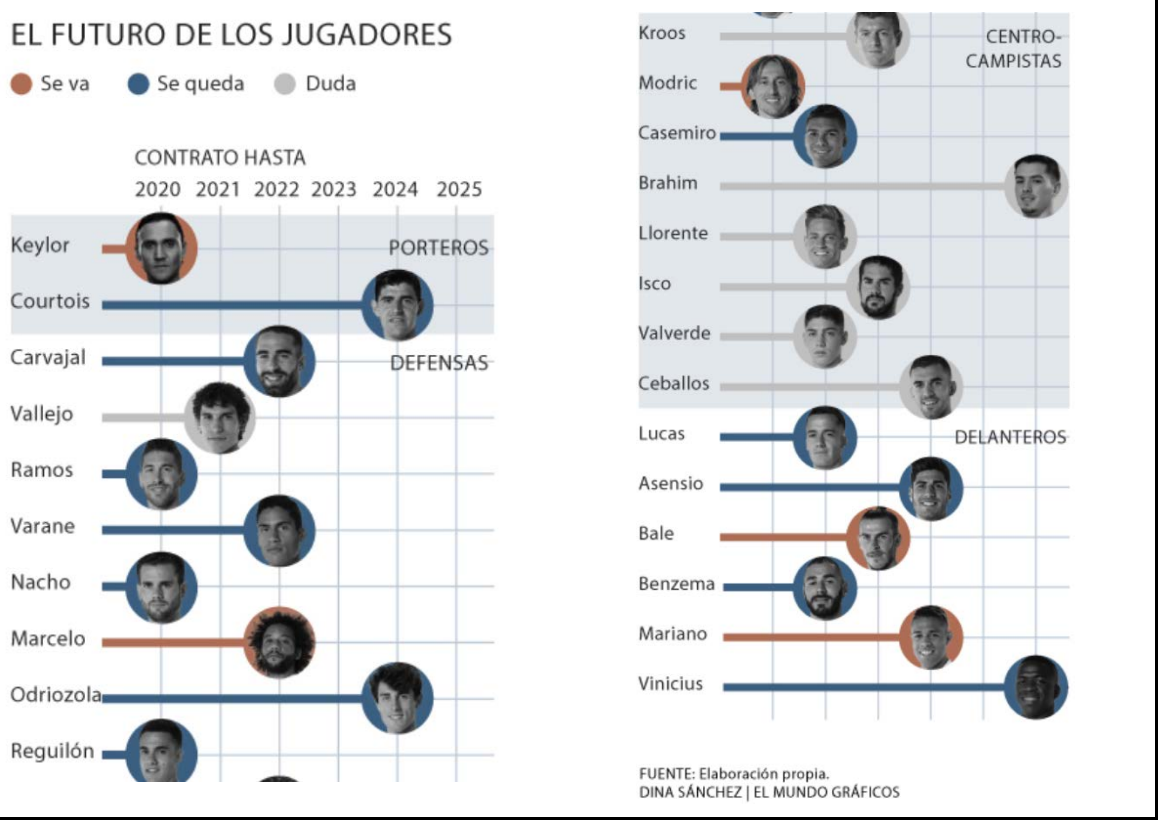


Image 58. Example of change over time technique, "Pablo Laso o cómo sobreponerse a las desgracias para ganar la Euroliga" 21/05/2018, *El Mundo*

Image 59. Example of statistics technique, "Garbiñe Muguruza toma impulso para la arcilla en Monterrey" 09/04/2019, *El Mundo*

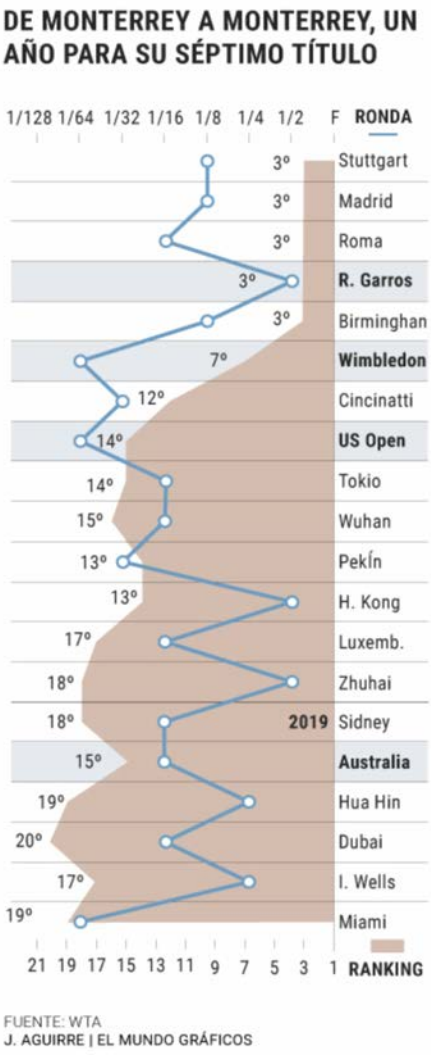


Image 60. Example of "other", "Guía rápida para comprender la nueva aventura de Alonso con Toyota en el WEC" 05/05/2018, *El Mundo*

4.4.2. Analysis of number of creators, data sources, accessibility of data

The analysis proved that all of the data journalism articles in the analyzed period had the information of the creator. Articles with 1 author were observed with 27.38% and articles with more than 1 author were observed with 72.62% in total (Figure 28). It was observed that all articles had the name of the writer while some of them were also mentioning the graphic designer, some of them were not mentioning the name of the graphic designer.

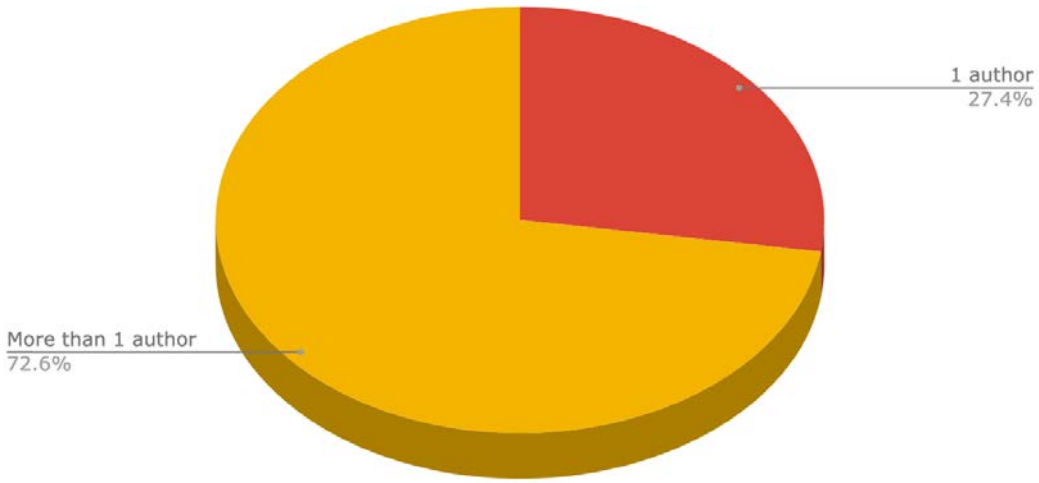
Table 33. Analysis of the number of creators per year, *El Mundo* (2017-2019)

	2017		2018		2019		Total	
Number of creators	n	%	n	%	n	%	n	%
Not mentioned	0	0	0	0	0	0	0	0
1 author	0	0	13	33,34	10	28,57	23	27,38
More than 1 authors	10	100	26	66,67	25	71,43	61	72,62
Total	10	100	39	100	35	100	84	100

While articles with 1 creator were not observed in 2017, were observed in 2018 as 33.34% and 2019 as 28.57% (Table 33). The observation showed that articles with 1 author had the full name of the writer under the title and the information of the infographic was given as “El Mundo Graficos” under the visualisation.

The articles created by more than 1 author were observed with 100% in 2017, 66.67% in 2018, and 71.43% in 2019 (Table 33). The observation showed that the articles with more than 1 author had the full name of the writer under the title and the information of the infographic was given as “full name or the initials of the graphic designer / El Mundo Gráficos” under the visualisation.

Figure 28. Analysis of the number of creators, *El Mundo* (2017-2019)



Analysis of the data sources showed that 97.62% of the sports data journalism articles which is 82 of 84 were mentioning the data source of the visualisation and only 2.38% had no information of the data source (Table 34). Lack of data source information was observed in 2 football articles about Real Madrid in 2018 titled “Las causas de la salida de Cristiano Ronaldo del Real Madrid” (11/07/2018) and “El Real Madrid de los millennial: la plantilla más joven de los grandes de Europa” (04/08/2018).

Table 34. Analysis of the data sources per year, *El Mundo* (2017-2019)

	2017		2018		2019		Total	
Data source	n	%	n	%	n	%	n	%
Not mentioned	0	0	2	5,13	0	0	2	2,38
Mentioned	10	100	37	94,87	35	100	82	97,62
Total	10	100	39	100	35	100	84	100

The analysis presented that mentioning the name of the data source showed an alteration in time. In 2017, 50% of the articles mentioned the name of the data source while. In 2018, the rate of mentioning data sources was decreased to 33.33% and increased to 51.43% in 2019 (Figure 29). It was observed that data journalism articles consisted of mostly more than 1 data source and these sources showed a variety such as both private (Opta) and public & free sources (Transfermarkt, ATP, FIFA, Dakar) (Image 61). Accessible data was not observed in total 84 articles between 2017 and 2019 (Table 35).

Figure 29. Evolution of the mentioning data source by year, *El Mundo* (2017-2019)

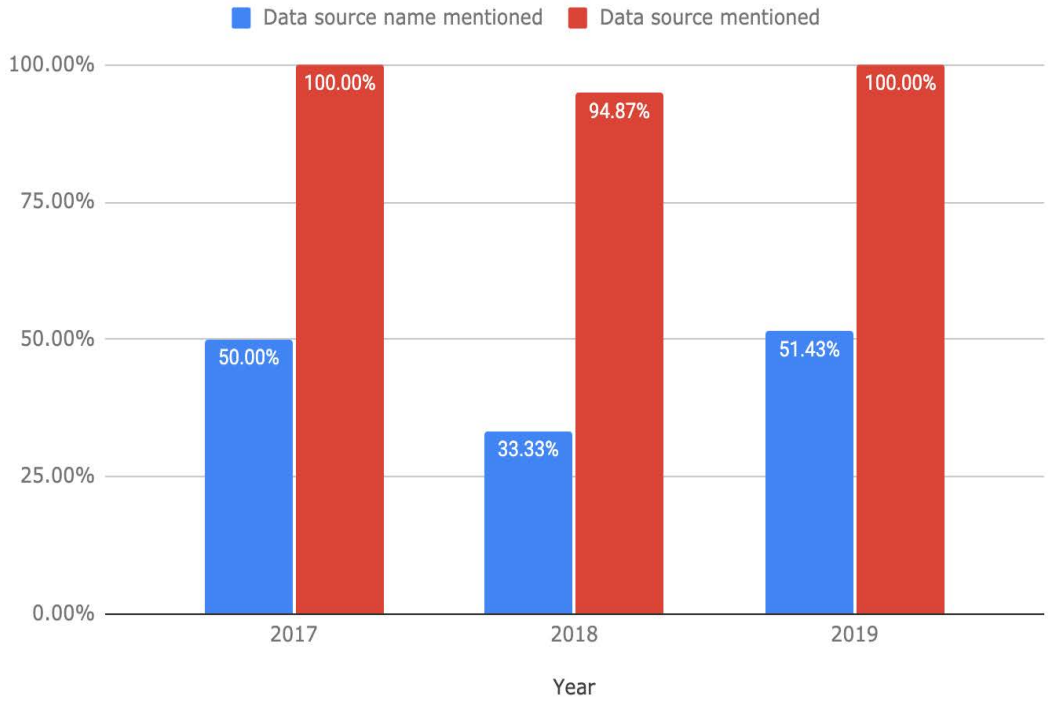
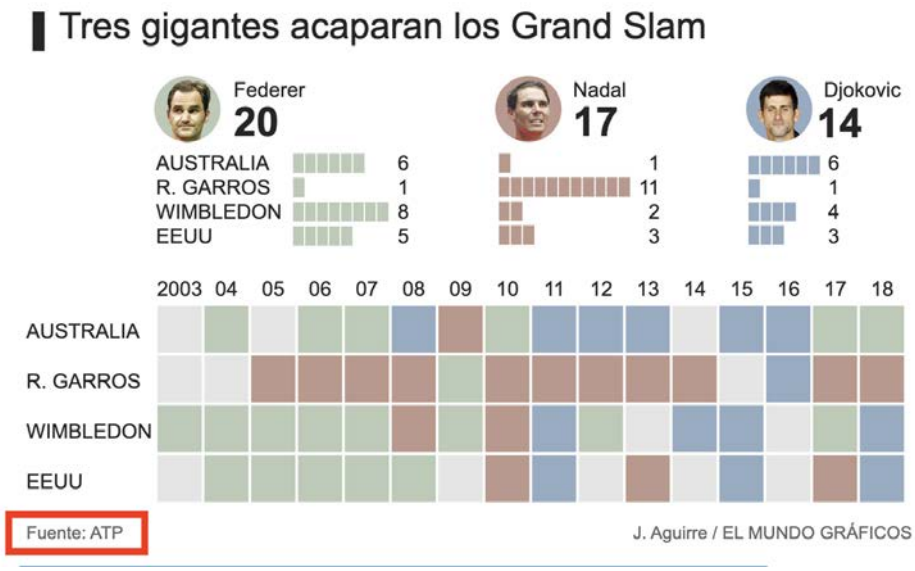


Table 35. Analysis of the accessibility of the data sources per year, *El Mundo* (2017-2019)

	2017		2018		2019		Total	
Accessibility of data	n	%	n	%	n	%	n	%
Not accessible	10	100	39	100	35	100	84	100
Accessible	0	0	0	0	0	0	0	0
Total	10	100	39	100	35	100	84	100

Image 61. Mentioning data source in *El Mundo*, "Federer, Nadal y Djokovic: tres reyes para una corona" 10/08/2018



4.4.3. Analysis of number of visualitions, visualisation types, form of interactivity and ratio of text and multimedia

The analysis showed the dominance of the articles with 1 visualisation in the analyzed time period. 82.14% of the articles had 1 visualisation, 17.86% of the articles had 2 to 3 visualisations in total 84 articles (Image 62 and Image 63). Articles with more than 3 visualisations were not observed in the analyzed time period (Figure 30).

Table 36. Analysis of the number of visualisations per year, *El Mundo* (2017-2019)

	2017		2018		2019		Total	
Number of visualisations	n	%	n	%	n	%	n	%
1 visualisation	8	80,0	32	82,05	29	82,86	69	82,14
2-3 visualisations	2	20,0	7	17,95	6	17,14	15	17,86
More than 3 visualisations	0	0	0	0	0	0	0	0
Total	10	100	39	100	35	100	84	100

It was observed that the articles with 1 visualisation was increasing each year while the articles with 2 to 3 visualisation was decreasing. In 2017, 80%, in 2018 82.05%, and in 2019 82.86% of the articles had 1 visualisation. Opposite to this, articles with 2 to 3 visualisation were observed with 20% in 2017, 17.95% in 2018, and 17.14% in 2019 (Table 36). The analysis presented that data journalistic style of *El Mundo* did not change in time, similar style of visualisations were used in the articles. The number of visualisations was not observed dominantly in one topic, was used in balance for all branches of sports.

Figure 30. Analysis of the number of visualisations, *El Mundo* (2017-2019)

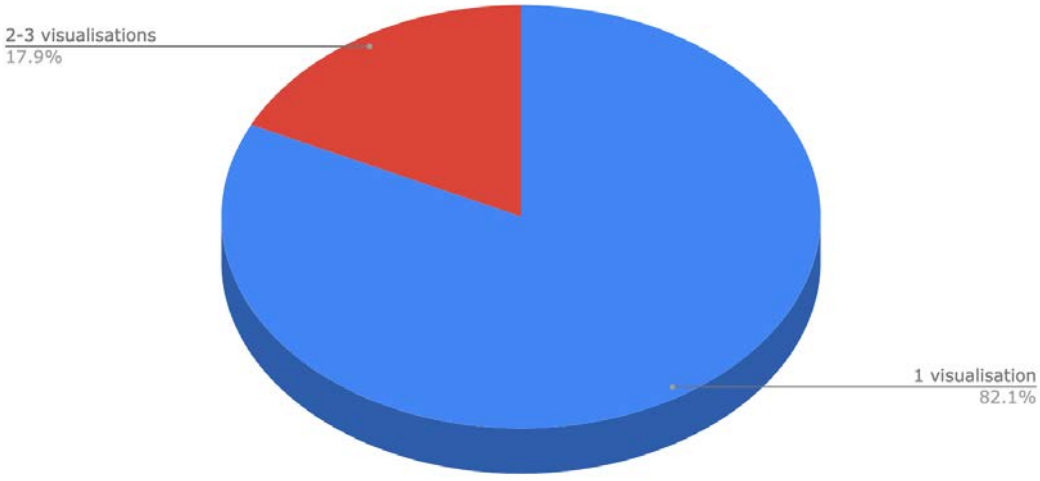


Image 62. Example of 1 visualisation, “Federer, Nadal y Djokovic: tres reyes para una corona” 10/08/2018, *El Mundo*

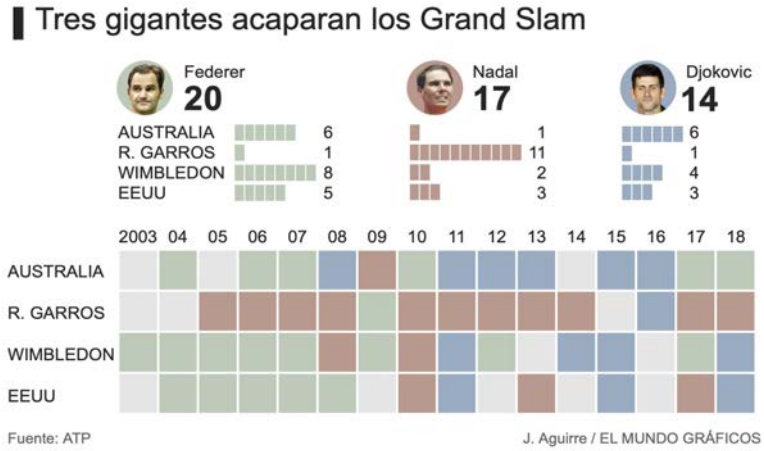
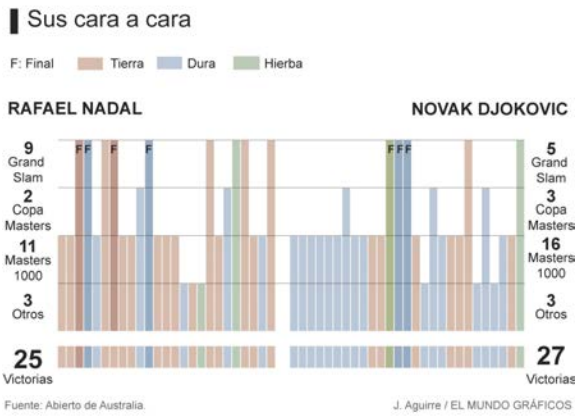


Image 63. Example of 2-3 visualisations, “Un nuevo Nadal estrecha el cerco sobre Djokovic” 26/01/2019, *El Mundo*



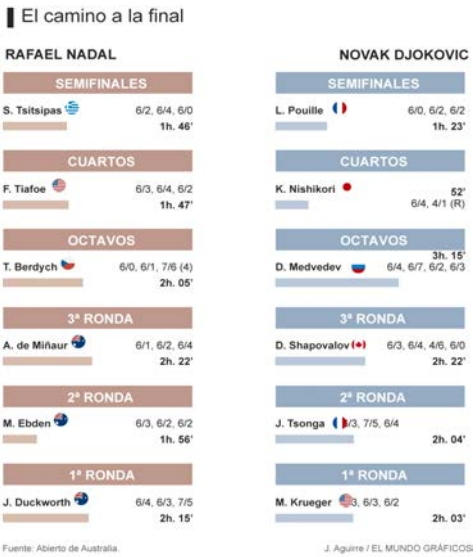


Table 35 corresponds to the visualisation types of the articles in the analyzed time period. *El Mundo* published 80 articles (95.24%) with static visualisations and 4 articles (4.76%) with interactive visualisations in total. In 2017 and 2018 interactive visualisation was not observed in total 49 articles. In 2019, 88.57% of the articles were static while interactive visualisations were 11.43% (Table 37). 4 articles with interactive visualisations were only observed in 2019. 3 articles with interactive visualisations were observed in July 2019 in the topic of tennis and 1 article with interactive visualisation was observed in August 2019 in the topic of cycling. These 4 articles were presented with transmissional (low) interactivity (Table 38).

Table 37. Analysis of the visualisation type per year, *El Mundo* (2017-2019)

	2017		2018		2019		Total	
Visualisation type	n	%	n	%	n	%	n	%
Static	10	100	39	100	31	88,57	80	95,24
Interactive	0	0	0	0	4	11,43	4	4,76
Total	10	100	39	100	35	100	84	100

“Kyrgios: "No sé si me tomaría una cerveza con Nadal"” (02/07/2019) and “Nick Kyrgios, un diablo en el camino de Rafa Nadal” (04/07/2019) offered transmissional (low) interactivity with right / left buttons to offer the reader to see the comparison between Kyrgios and Nadal and “Rafa Nadal - Roger Federer, el duelo de nunca acabar” (11/07/2019) offered the same type of visualisation to offer the reader to see the comparison between Nadal and Federer. The article about cycling titled “ Las etapas de la Vuelta a España 2019” (22/08/2019) offered a similar type of visualisation with right / left buttons to show the stages of Vuelta a España 2019 (Image 65).

Table 38. Analysis of the level of interactivity per year, *El Mundo* (2017-2019)

	2017		2018		2019		Total	
Level of interactivity	n	%	n	%	n	%	n	%
No interactive functions	10	100	39	100	31	88,57	80	95,24
Transmissional	0	0	0	0	4	11,43	4	4,76

Consultational	0	0	0	0	0	0	0	0
Conversational	0	0	0	0	0	0	0	0
Total	10	100	39	100	35	100	84	100

Image 64. Example of no interactive functions, “Los motivos que anticipan que Marc Márquez superará a Valentino Rossi” 22/10/2018, *El Mundo*

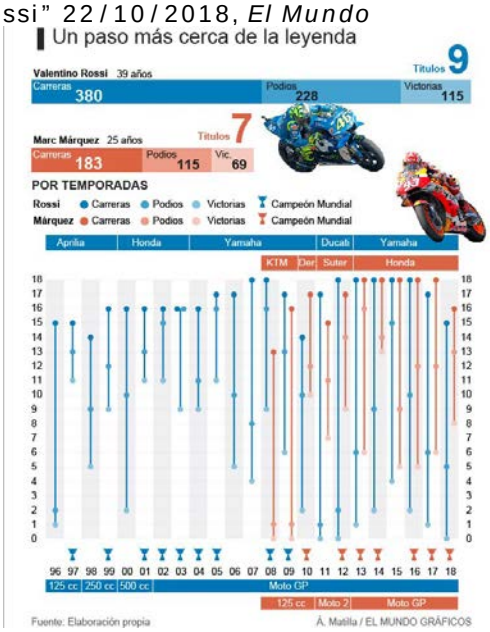
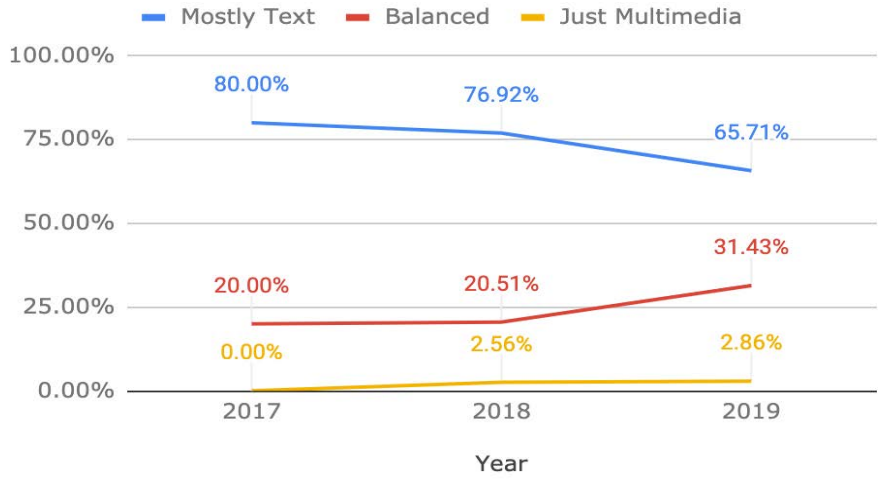


Image 65. Example of transmissional interactivity, “Las etapas de la Vuelta a España 2019” 28/08/2019, *El Mundo*

Figure 31 presents the change in ratio of text and multimedia in the analyzed time period. In 2017, page layout was majorly based on mostly text with 80% while 20% of the articles had balanced use of text and multimedia. In 2018, articles with mostly text observed with 76.92% and balanced use of text and multimedia was observed with 20.51%. In addition to these, articles with just multimedia were seen with 2.56%.

In 2019, a decrease was observed in the articles with mostly text. 65.71% of the articles were based on mostly text. Articles with balanced use of text and multimedia were observed with 1.43% and articles with just multimedia with 2.86%. In total 84 articles, mostly multimedia articles were not seen.

Figure 31. Evolution of the ratio of text and multimedia, *El Mundo* (2017-2019)



Conclusion

The analysis presented that *El Mundo* published mostly about football but in time other sports branches like tennis and basketball became important too. It was observed that data journalism articles in El Mundo were mostly based on singular events such as FIFA World Cup and Olympics. The analysis showed that increased percentages of some topics in time were based on global events. These increases were observed mostly in football and “other” sports. Data journalism articles were mostly based on comparison, drawings, and listings. It was seen that the majority of the articles were created by more than 1 author but mostly with 1 static visualisation. Despite the high number of creators, increasing the interactivity was not preferred.

4.5. Sports data journalism in *El Periodico* (2017-2019)

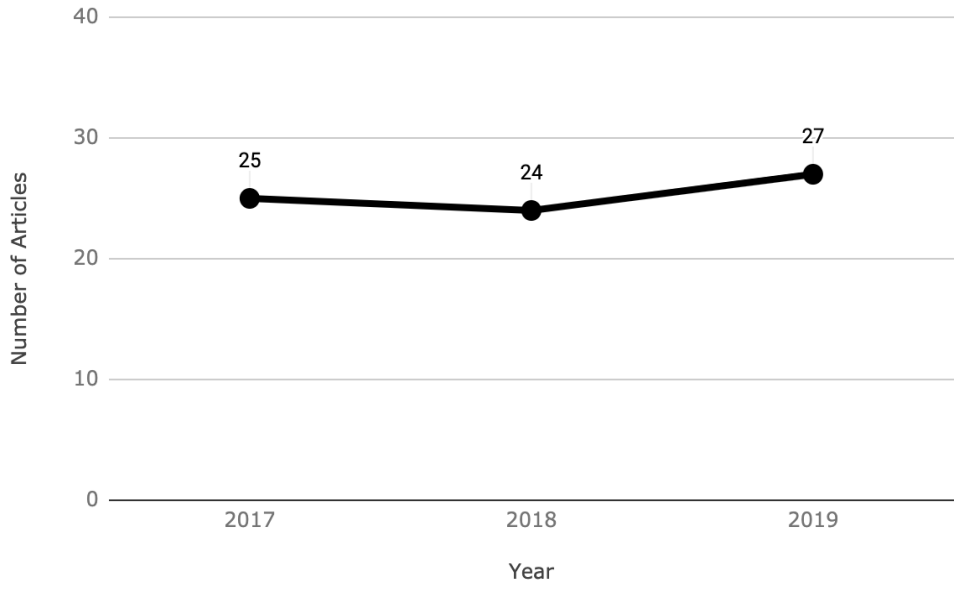
This section analyzes the sports data journalism articles in *El Periodico* between 2017-2019. *El Periodico* published 76 articles with visualisations on its website during the selected years (Table 39).

Table 39. Analysis of data journalism articles, *El Periodico* (2017-2019)

2017		2018		2019		Total	
n	%	n	%	n	%	n	%
25	32,89	24	31,58	27	35,53	76	100

In 2017 25 sports data journalism articles (32.89%), in 2018 24 sports data journalism articles (31.58%), and in 2019 27 sports data journalism articles (35.53%) were published. Sports data journalism articles in *El Periodico* did not show an alteration intime, the numbers of published articles were balanced (Figure 32).

Figure 32. Changes in data journalism articles per year, *El Periodico* (2017-2019)



4.5.1. Analysis of topics and story properties

The analysis presented that *El Periodico* majorly published data journalism articles about football with 56.58% and secondly motorsports with 15.79%. Other

sports were observed less than 10% each. Basketball and the “other” category were observed with 9.21% each. Tennis was observed with 6.58%, and cycling was observed with 2.63% in total 76 articles (Figure 33).

Table 40. Analysis of data journalism articles by topic per year, *El Periodico* (2017-2019)

	2017		2018		2019		Total	
Topic	n	%	n	%	n	%	n	%
Football	13	52,0	15	62,50	15	55,56	43	56,58
Basketball	4	16,0	1	4,17	2	7,41	7	9,21
Tennis	0	0	2	8,33	3	11,11	5	6,58
Motorsports	4	16,0	4	16,67	4	14,81	12	15,79
Cycling	1	4,0	0	0	1	3,70	2	2,63
Other	3	12,0	2	8,33	2	7,41	7	9,21
Total	25	100	24	100	27	100	76	100

The analysis presented that football articles were the main focus of *El Periodico* in the analyzed time period. Dominance of football was seen especially in 2018. Data journalism articles about football were observed with 52% in 2017, 62.50% in 2018, and 55.56% in 2019. Motorsports articles showed an increase from 2017 to 2018 and a decrease from 2018 to 2019 like football. In 2017 16%, in 2018 16.67%, and in 2019 14.81% of the data journalism articles were about motorsports (Table 40).

Basketball and cycling articles showed an opposite alteration in time. Basketball articles were observed with 16% in 2017, 4.17% in 2018, and 7.41% in 2019 while cycling articles were observed with 4% in 2017, 0 in 2018, and 3.70% in 2019 (Table 40).

The analysis proved that data journalism articles about tennis became important in time. Tennis articles were not seen in 2017. However, the rates of the tennis articles increased to 8.33% in 2018, and 11.11% in 2019. The “other” category showed a decrease in time with 12% in 2017, 8.33% in 2018, and 7.41%

in 2019. It was observed that the “other” category consisted of athletics, olympics, swimming, skating (Table 40).

Figure 33. Data journalism articles by topic, *El Periodico* (2017-2019)

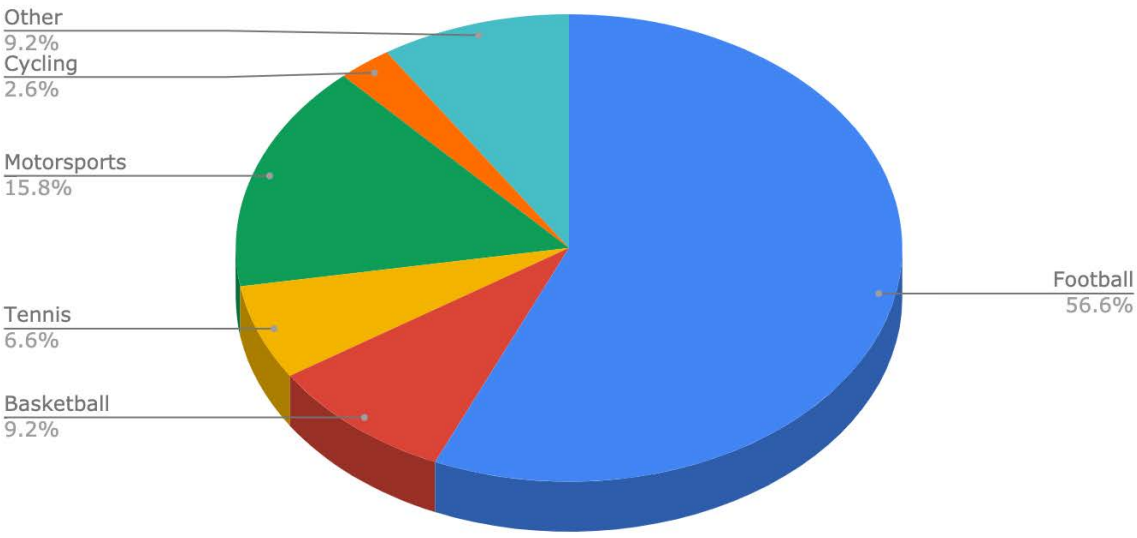


Table 41 corresponds to the story property of 76 sports data journalism articles in *El Periodico* in the analyzed time period. The 2 major story properties were seen as statistics with 27.63% and comparison with 25% (Image 69) (Image 66). The “other” category came third in frequency rate with 22.37% which includes mostly mapping, listing and calendars (Image 71). Change over time was seen as 15.79 in total 76 articles (Image 68). Connection & flow (6.58%) and predictions (2.63%) were observed as the least used story properties in total (Table 41) (Image 67) (Image 70).

Table 41. Analysis of the story properties found, *El Periodico* (2017-2019)

	2017		2018		2019		Total	
Story Property	n	%	n	%	n	%	n	%
Comparison	9	36,0	2	8,33	8	29,63	19	25,0
Connection & Flow	2	8,0	3	12,50	0	0	5	6,58
Change Over Time	4	16,0	2	8,33	6	22,22	12	15,79
Statistics	5	20,0	11	45,83	5	18,52	21	27,63

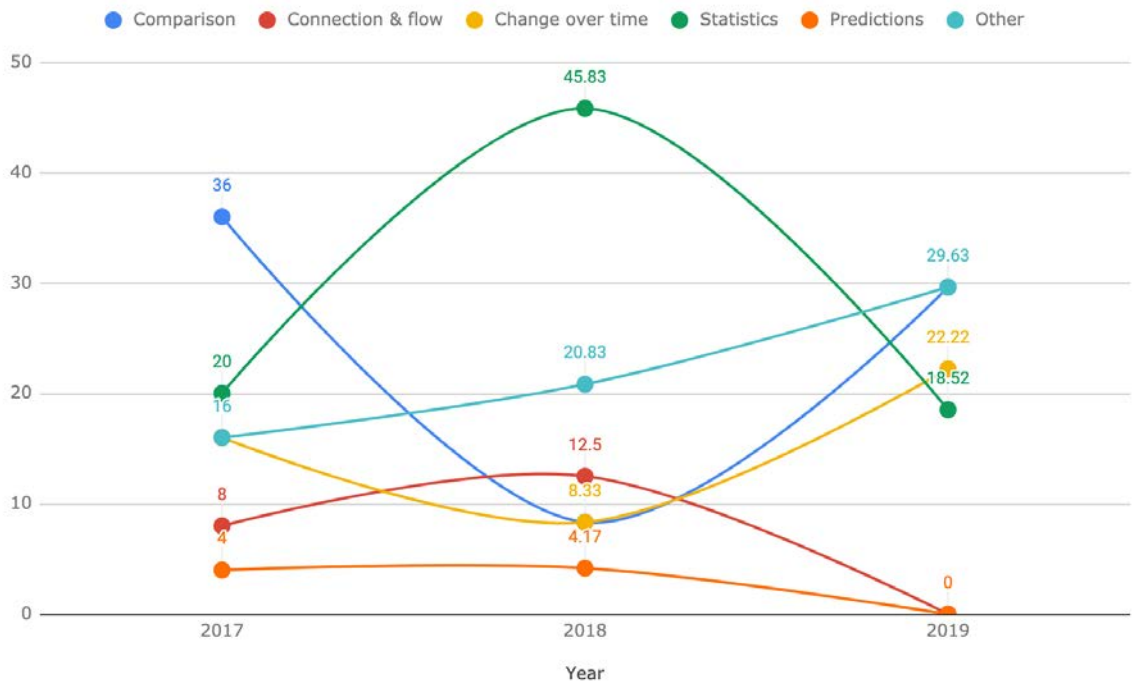
Predictions	1	4,0	1	4,17	0	0	2	2,63
Other	4	16,0	5	20,83	8	29,63	17	22,37
Total	25	100	24	100	27	100	76	100

Statistics based data journalism articles showed alterations in the analyzed time period. In 2017 20% of the articles were statistics based and this rate showed a significant increase in 2018 to 45.83%. A sharp decrease was observed in 2019 to 18.52%.

Comparison based articles showed an opposite alteration in the analyzed time period. In 2017 36% of the articles were comparison based. The analysis presented a sharp decrease in comparison based articles in 2018 to 8.33%. Comparison based articles increased to 29.63% in 2019.

In 2017 16% of the articles were based on change over time. The use of change over time as story property had also a similar decrease in 2018 to 8.33% and increased to 22.22% in 2019 (Figure 34).

Figure 34. Evolution of the story properties by year, *El Periodico* (2017-2019)



"Other" as a story property was observed with 16% in 2017, 20.83% in 2018, and 29.63% in 2019. The observation presented that *El Periodico* published

more articles consisting of mapping and listing each year but also integrated animation, drawing and calendars to the articles (Image 71).

Connection & flow and prediction based articles were observed in 2017 and 2018 with low rates. The frequency rate of connection & flow articles was seen as 8% in 2017 and 12.50% in 2018 while the rate of prediction based articles were 4% in 2017 and 4.17% in 2018. Connection & flow and prediction based data journalism articles were not observed in 2019.

Data journalism style of *El Periodico* showed a change in years. It was observed that data journalism articles of 2017 were mostly based on comparison and statistics while 2018 had dominantly statistics based articles and mapping, listing, drawing as “other”. Story properties in the “other” category were dominant again in 2019, not only the “other” category but also comparison and change over time based articles were observed at high rates (Figure 34).

Image 66. Example of comparison technique, “Messi aún manda” 04/05/2017, *El Periodico*

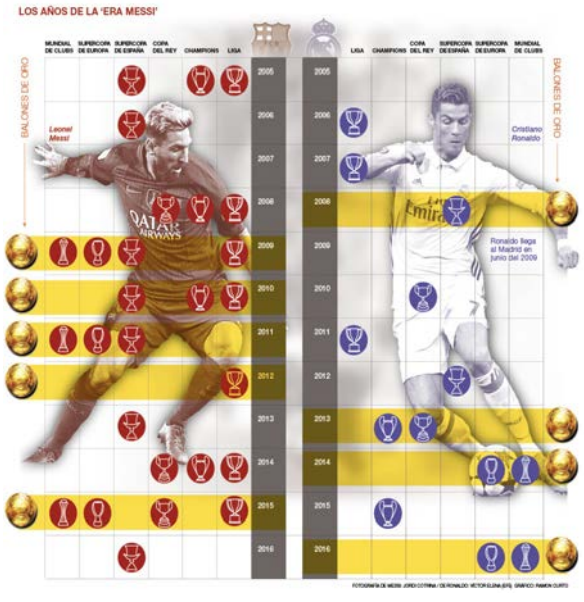


Image 67. Example of connection and flow technique, “La plantilla que quería Valverde” 31/01/2018, *El Periodico*

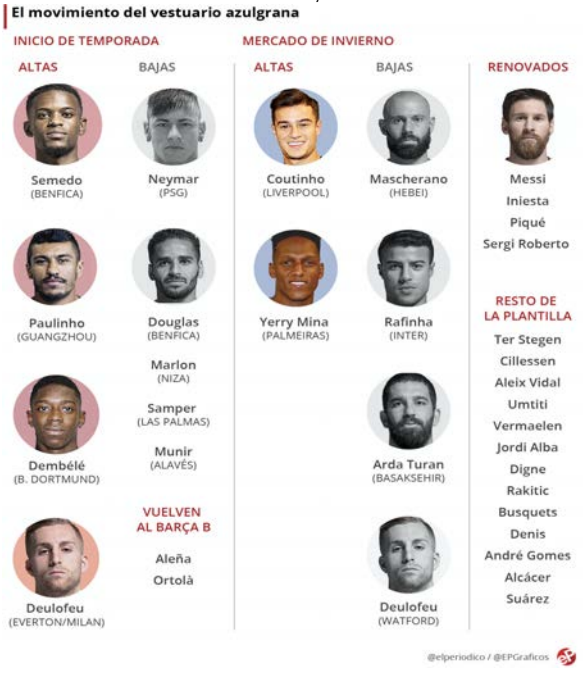


Image 68. Example of changes over time technique, "Djokovic, Nadal y Federer vuelven a ser los favoritos en Wimbledon" 31/03/2019, *El Periodico*

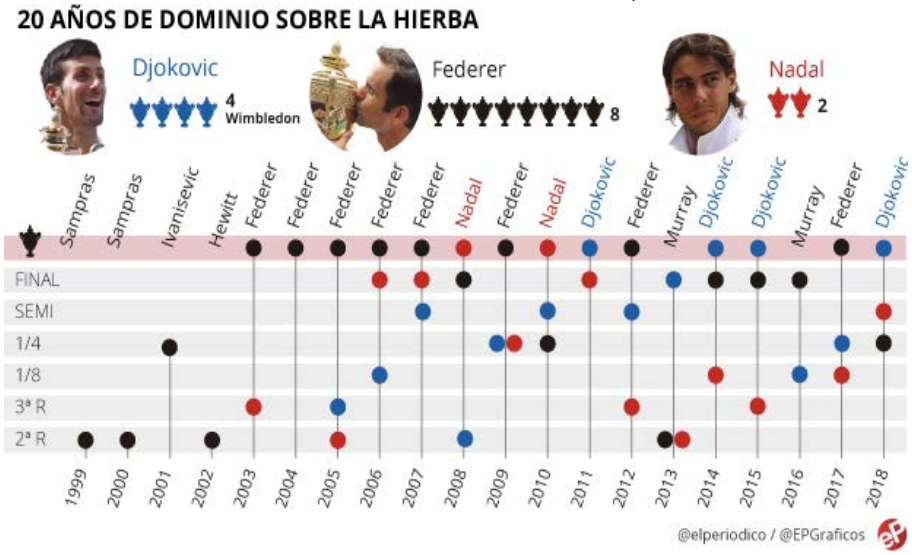


Image 69. Example of statistics technique, "El Espanyol despide a Gallego y ficha a Machín" 12/07/2019, *El Periodico*

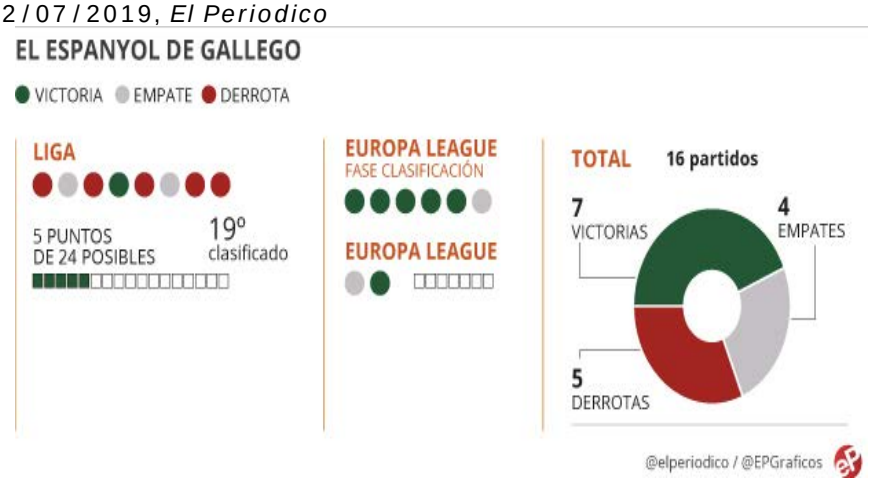


Image 70. Example of predictions technique, "El Barça sin el frances" 17/09/2017, *El Periodico*

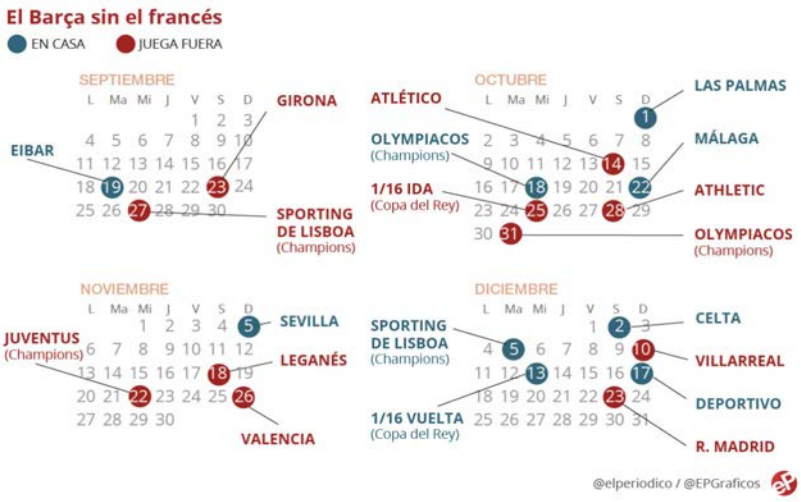
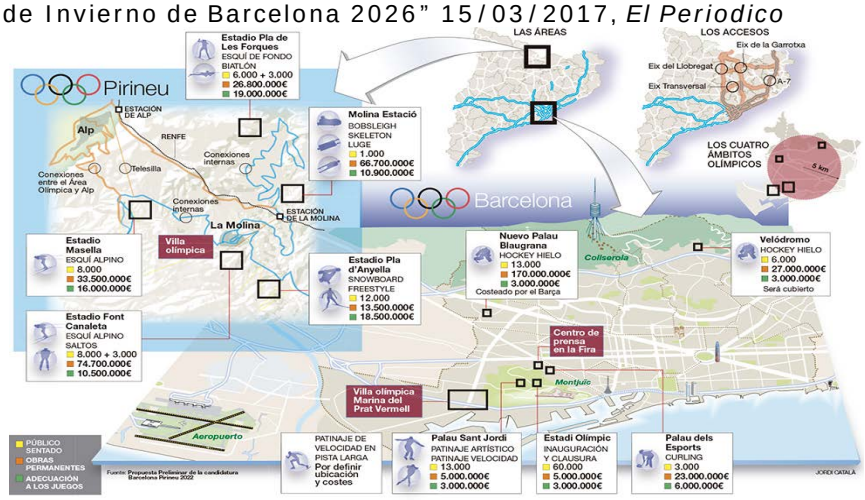


Image 71. Example of "other", "Así era el proyecto descartado de los Juegos Olímpicos de Invierno de Barcelona 2026" 15/03/2017, *El Periodico*



4.5.2. Analysis of number of creators, data sources, accessibility of data

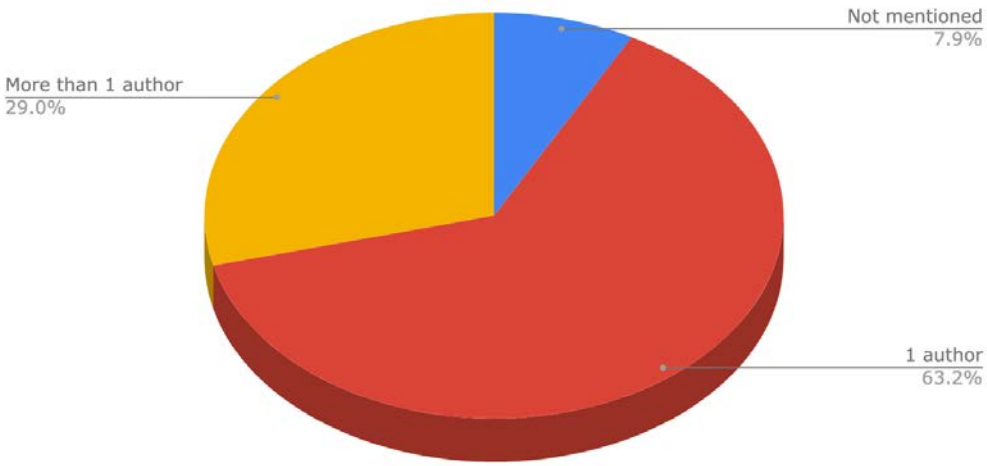
It was observed that 63.16% of the sports data journalism articles were created by 1 person and 28.95% of the articles had more than 1 creator. Articles without an information of the creator were observed as 7.89% in total 76 articles (Figure 35). The analysis presented that the articles with 1 author were majorly created by the graphic designer and had the name of the designer both below the title of the article and in the visualisation. Articles with more than 1 author consisted of minimum 1 author and 1 graphic designer. In this case, the name of the author(s) was seen below the title and the name of the graphic designer was seen in the visualisation as "name of the designer / EPGraficos".

Table 42. Analysis of the number of creators per year, *El Periodico* (2017-2019)

	2017		2018		2019		Total	
Number of creators	n	%	n	%	n	%	n	%
Not mentioned	5	20,0	0	0	1	3,70	6	7,89
1 author	14	56,0	13	54,17	21	77,78	48	63,16
More than 1 author	6	24,0	11	45,83	5	18,52	22	28,95
Total	25	100	24	100	27	100	76	100

56% of the data journalism articles were created by 1 author in 2017 while the articles with more than 1 author was 24%, and articles without the information of the creator was 20%. An increase was observed in the rate of articles with more than 1 author to 45.83% in 2018 while the articles with one author was 54.17% (Table 42). Articles created by 1 person were observed in 13 articles in 2018 which is more than half of the articles but it was observed that the articles had only 1 graphic designer for visualisation. Increased number of creators was seen in terms of authors. Most of the articles had 2 writers and 1 designer. Articles without the information of the creator were not seen in 2018.

Figure 35. Analysis of the number of creators, *El Periodico* (2017-2019)



The analysis proved the dominance of the articles with 1 author in 2019. 77.78% of the data journalism articles had only 1 author in 2019 while a decrease was seen in the articles with more than 1 author to 18.55%. Only 1 article (3.70%) was observed without the information of the creator (Table 42).

Analysis of data sources showed that 97.37% of the data journalism articles which is 74 of 76 had not the information about the data source of the visualisation (Table 43). 2.63% of the data journalism articles mentioned data sources.

Table 43. Analysis of the data sources per year, *El Periodico* (2017-2019)

	2017		2018		2019		Total	
Data source	n	%	n	%	n	%	n	%
Not mentioned	24	96,0	23	95,83	27	100	74	97,37
Mentioned	1	4,0	1	4,17	0	0	2	2,63
Total	25	100	24	100	27	100	76	100

Data journalism articles with the information of the data source were seen in 2017 and 2018 and these articles were about cycling and motorsports. These articles also mentioned the name of the data source. Official website of Tour de France was used as data source for the article "El Tour de Francia del 2017" (29/06/2017) and Graphic News was used as data source for the article "El Mundial más esperado: Márquez-Dovizioso (II parte)" (16/03/2018) (Image 72). Accessible data was not seen in total 76 articles in the selected years (Table 44).

Table 44. Analysis of the accessibility of the data sources per year, *El Periodico* (2017-2019)

	2017		2018		2019		Total	
Accessibility of data	n	%	n	%	n	%	n	%
Not accessible	25	100	24	100	27	100	76	100
Accessible	0	0	0	0	0	0	0	0
Total	25	100	24	100	27	100	76	100

Image 72. Mentioning data source in *El Periodico*, "El Mundial más esperado: Márquez-Dovizioso (II parte)" 16/03/2018

4.5.3. Analysis of number of visualisations, visualisation types, form of interactivity and ratio of text and multimedia

El Periodico published 60 articles (78.95%) with 1 visualisation, 12 articles (15.79%) with 2 to 3 visualisations, and 4 articles (5.26%) with more than 3 visualisations in the analyzed time period (Figure 36).

Table 45. Analysis of the number of visualisations per year, *El Periodico* (2017-2019)

	2017		2018		2019		Total	
Number of visualisations	n	%	n	%	n	%	n	%
1 visualisation	17	68,0	20	83,33	23	85,19	60	78,95
2-3 visualisations	5	20,0	3	12,5	4	14,81	12	15,79
More than 3 visualisations	3	12,0	1	4,17	0	0	4	5,26
Total	25	100	24	100	27	100	76	100

The analysis presented that the frequency of the visualisations changed in time. It was observed that the frequency rate of articles with 1 visualisation increased in time while the rates of articles with 2 to 3 visualisations and more than 3 visualisations decreased. Articles with 1 visualisation were observed as 68% in 2017, 83.33% in 2018, and 85.19% in 2019. Articles with 2 to 3 visualisations were observed as 20% in 2017, 12.5% in 2018, and 14.81% in 2019. Articles with more than 3 visualisations were seen with 12% in 2017, and 12.5% in 2018 (Image 74). Articles with more than 3 visualisations were not seen in the year of 2019 (Table 45). It was observed that 1 visualisation was mostly used in comparison and statistics based articles in football, motorsports to compare players, teams, and give statistics of the games, career peaks of players (Image 73). Articles with more visualisations were mostly seen in tournaments, international games.

Figure 36. Analysis of the number of visualisations, *El Periodico* (2017-2019)

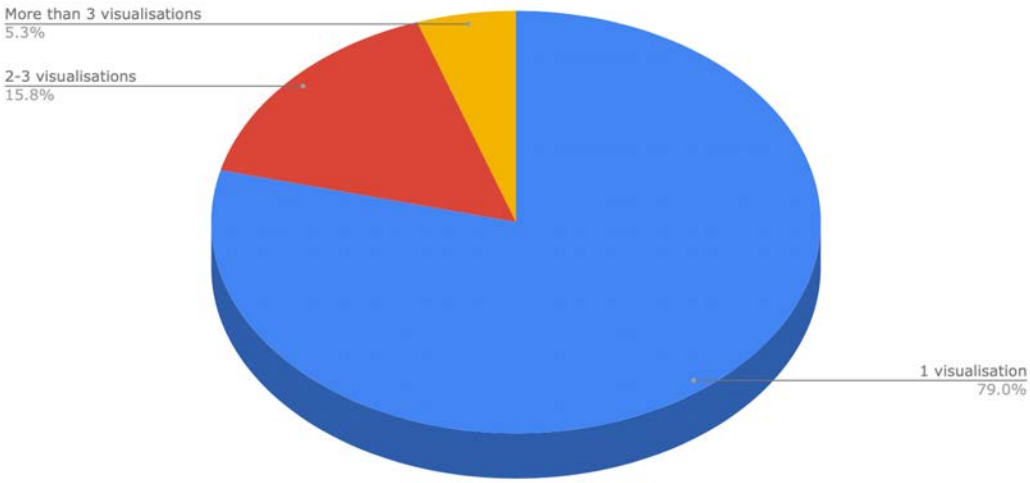


Image 73. Example of 1 visualisation, "Djokovic, Nadal y Federer vuelven a ser los favoritos en Wimbledon" 29/06/2019, *El Periodico*

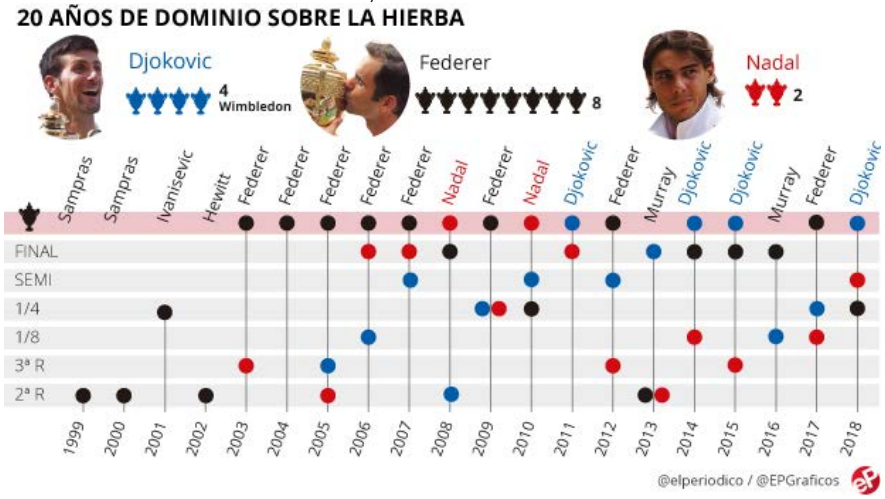


Image 74. Example of 2-3 visualisations, "Márquez: 100 grandes premios después, cabeza, mucha cabeza" 06/08/2018, *El Periodico*

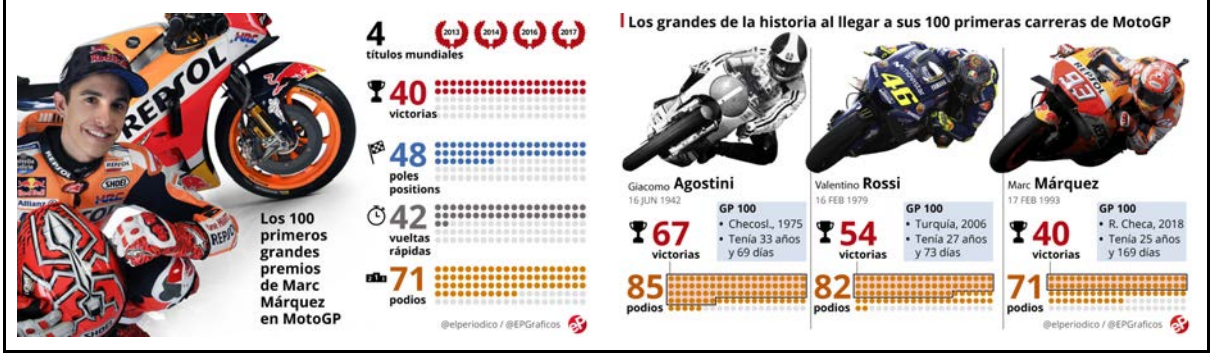
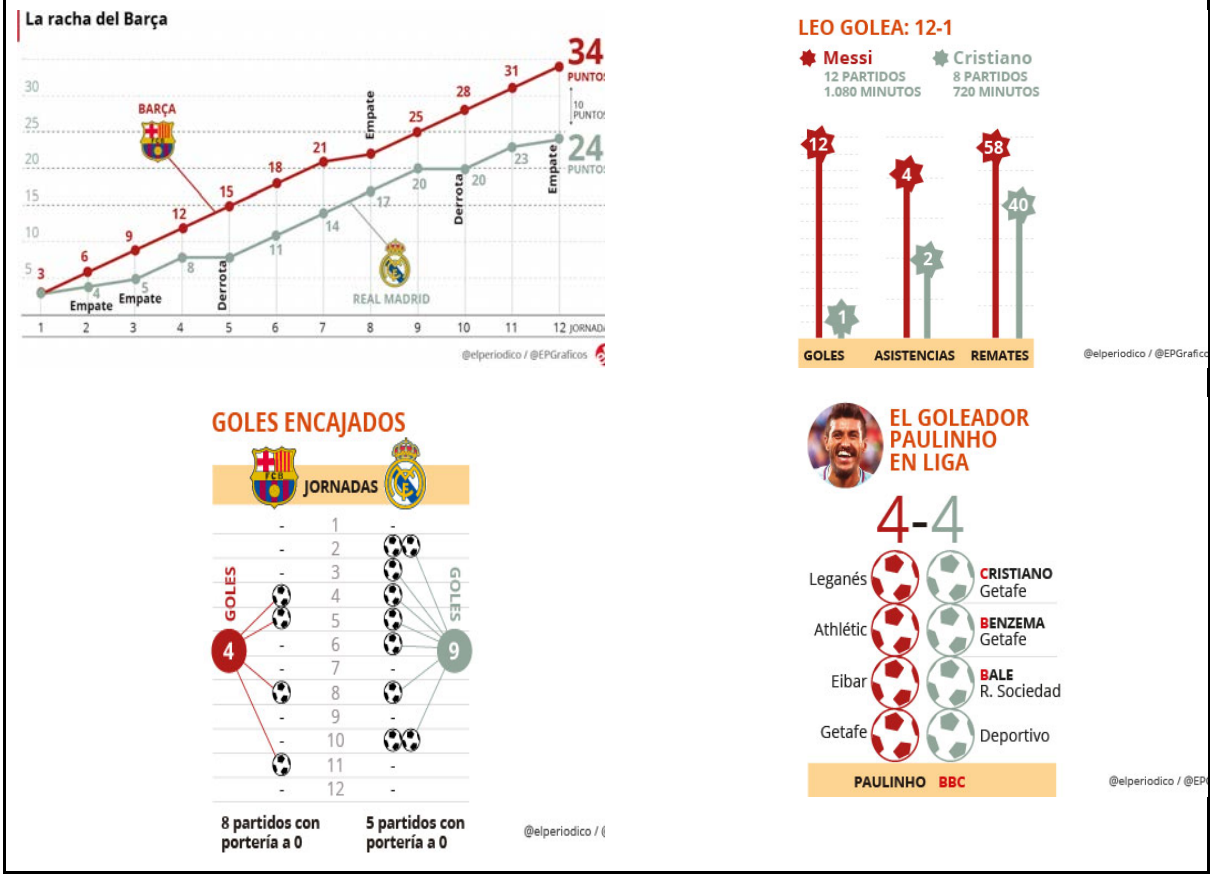


Image 75. Example of more than 3 visualisations, "El Barça, 10 razones para 10 puntos de distancia sobre Madrid y Atlético" 19/11/2017, *El Periodico*



The analysis pointed to the lack of interactivity in sports data journalism articles of *El Periodico* in the analyzed time period. According to the analysis, only 2 articles (2.63%) had interactive visualisations while static articles were 97.37% of total.

Table 46. Analysis of the visualisation type per year, *El Periodico* (2017-2019)

	2017		2018		2019		Total	
Visualisation type	n	%	n	%	n	%	n	%
Static	25	100,0	23	95,83	26	96,30	74	97,37
Interactive	0	0	1	4,17	1	3,70	2	2,63
Total	25	100	24	100	27	100	76	100

The first interactive visualisations was seen in 2018 in an article about football which is "Ibrahimovic marca su gol 500 con un impresionante gesto de karateca" (16/09/2018). An animation of Zlatan Ibrahimovic's 500th goal in the

minute of 43 of the Los Angeles Galaxy - Toronto FC game was seen in the article (Image 77). The article didn't allow the reader to interact with the visualisation, the animation was playing automatically. The second article with an interactive visualisation was seen in 2019 and it was about gymnastics. "La gimnasta Simone Biles logra lo nunca visto: un doble salto mortal con triple giro" (15/02/2019) presented drawings about a double somersault with triple twist of Simone Biles in the United States gymnastics championships. The visualisation was a combination of static drawings with an option to scroll right to see the movement in detail.

Table 47. Analysis of the level of interactivity per year, *El Periodico* (2017-2019)

	2017		2018		2019		Total	
Level of interactivity	n	%	n	%	n	%	n	%
No interactive functions	25	100,0	22	91,67	26	96,30	73	96,05
Transmissional	0	0	2	8,33	1	3,70	3	3,95
Consultational	0	0	0	0	0	0	0	0
Conversational	0	0	0	0	0	0	0	0
Total	25	100	24	100	27	100	76	100

Table 47 corresponds to the level of interactivity of 76 sports data journalism articles in *El Periodico* in the analyzed time period. According to the analysis, data journalism articles in 2017 didn't offer any interactive functions to readers. 91.67% of the articles in 2018 had not any interactive functions and 2 articles (8.33%) offered reader transmissional (low) interactivity which offers readers a one way communication. Both of the articles with transmissional interactivity were about football. "Cuando Messi caminaba por Sevilla" (02/04/2018) presented drawings of the key moments in the Barcelona - Sevilla game with an option to scroll right to see the positions in detail. "Iniesta, el alma del talento" (27/04/2018) was about the statistics of Andres Iniesta during his career with an option to zoom in to see the statistics in detail. Tranmissional interactivity was observed in one article (3.70%) about Simone Biles in 2019 which was explained above.

Image 76. Example of no interactive functions, "El Barça ya está en su sitio: el liderato" 20/10/2019, *El Periodico*

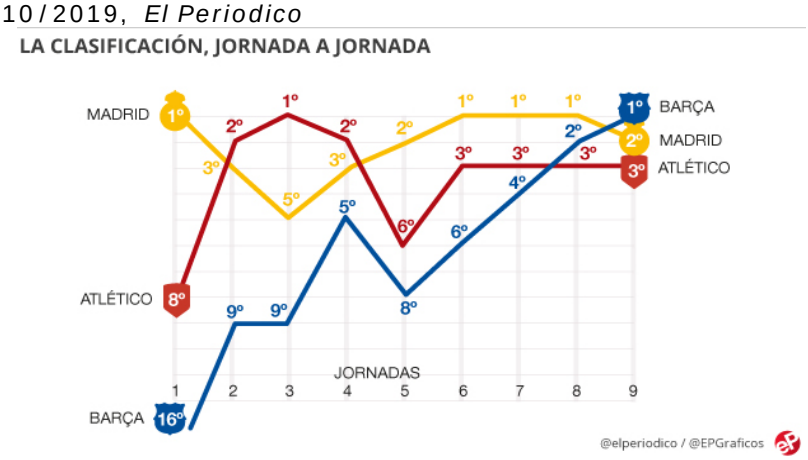
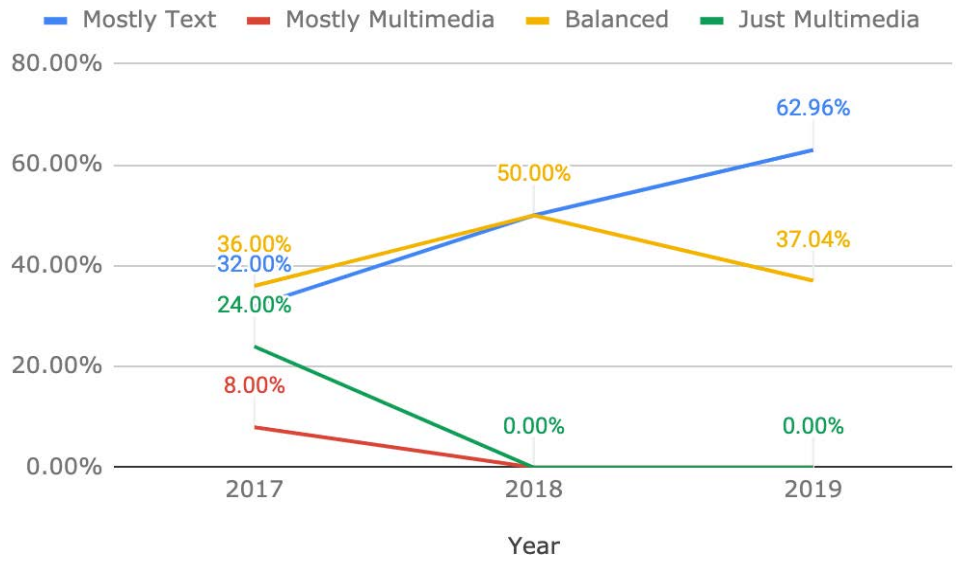


Image 77. Example of transmissional interactivity, "Ibrahimovic marca su gol 500 con un impresionante gesto de karateca" 16/09/2018, *El Periodico*

Figure 37 presents the change in ratio of text and multimedia in the analyzed time period. Page layout was mostly based on balanced use of text and multimedia in 2017 with 36% and followed by mostly text with 32%. 24% of the articles had just multimedia and 8% of the articles had mostly multimedia with less use of text.

Figure 37. Evolution of the ratio of text and multimedia, *El Periodico* (2017-2019)



A significant change was observed in 2018 in the ratio of text and multimedia in the analyzed data journalism articles. Articles with mostly text and balanced use of text and multimedia were observed with 50% each. Articles with mostly multimedia and just multimedia were not observed. Articles with mostly multimedia and just multimedia remained at 0 in 2019 and a change was observed in the rate of articles with mostly text and the rate of the articles with balanced use of text and multimedia. An increase to 62.96% was observed in the rate of articles with mostly text while the articles with balanced use of text and multimedia decreased to 37.04% (Figure 37).

Conclusion

The analysis presented that *El Periodico* mostly published data journalism articles about football but tennis and motorsports were on the rise in the selected time period. Articles were mostly based on comparison, mapping, listing and the only animation was observed in *El Periodico*. Articles were mostly based on 1 static visualisation and these articles were created by 1 author. Lack of data sources was observed.

4.6. Sports data journalism in *El Pais* (2017-2019)

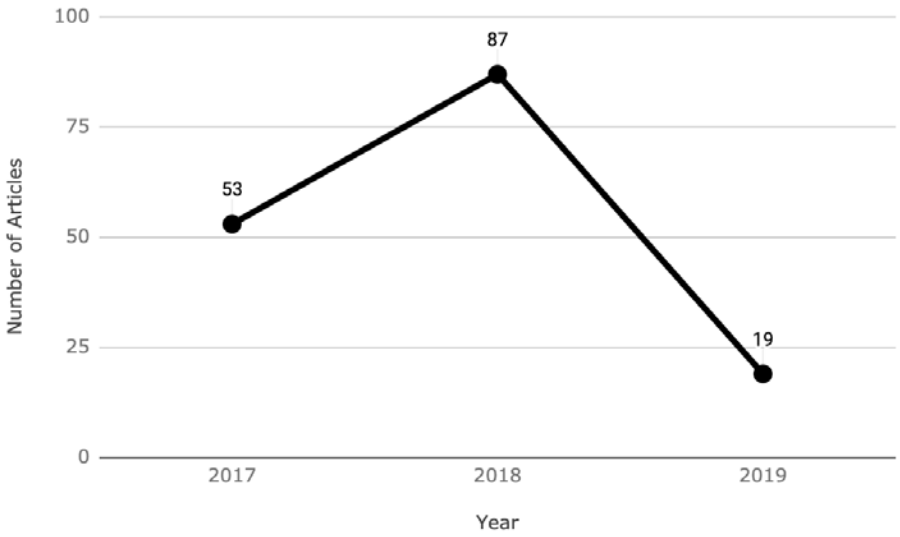
This section analyzes the sports data journalism articles in *El Pais* between 2017-2019. *El Pais* published 159 articles with visualisations on its website during the selected years (Table 48).

Table 48. Analysis of data journalism articles, *El Pais* (2017-2019)

2017		2018		2019		Total	
n	%	n	%	n	%	n	%
53	33,33	87	54,72	19	11,95	159	100

In 2017 53 data journalism articles (33.33%), in 2018 87 data journalism articles (54.72%), and in 2019 19 data journalism articles (11.95%) were published. Data journalism articles in *El Pais* showed alterations in the analyzed time period. An increase in published articles was observed from 2017 to 2018 and a sharp decrease was observed in 2019 (Figure 38).

Figure 38. Changes in data journalism articles per year, *El Pais* (2017-2019)



4.6.1. Analysis of topics and story properties

The analysis of the topics presented the dominance of football articles in *El Pais* in the selected time period. The analysis presented that *El Pais* majorly published data journalism articles about football with 50.31% and secondly tennis

with 18.24%. Motorsports articles were observed with 10.06%. Basketball, cycling, and “other” were observed less than 10% each. Basketball articles were observed with 8.81%. Cycling articles were observed with 5.66%, and “other” was observed with 6.92% in total 159 articles (Figure 39).

Table 49. Analysis of data journalism articles by topic per year, *El Pais* (2017-2019)

	2017		2018		2019		Total	
Topic	n	%	n	%	n	%	n	%
Football	27	50,94	49	56,32	4	21,05	80	50,31
Basketball	6	11,32	6	6,90	2	10,53	14	8,81
Tennis	11	20,75	10	11,49	8	42,10	29	18,24
Motorsports	3	5,66	10	11,49	3	15,79	16	10,06
Cycling	3	5,66	5	5,75	1	5,26	9	5,66
Other	3	5,66	7	8,05	1	5,26	11	6,92
Total	53	100	87	100	19	100	159	100

The analysis presented that football articles had a major impact on data journalism in *El Pais* in 2017 and 2018. Dominance of football articles were seen in 2017 with 50.94%, and in 2018 with 56.32%. A sharp decrease in the rate of football articles was observed in 2019. In 2019, only 4 articles (21.05%) were about football in total 19 data journalism articles (Table 49). 3 of these articles were about Real Madrid and one article was about Women’s Soccer World Cup 2019.

Tennis articles were observed with 20.75% in 2017 and showed a decrease to 11.49% in 2018. However, opposite to football articles, a sharp increase in tennis articles was observed in 2019 with 42.10% (Table 49). Tennis articles in 2019 were mostly about the statistics and comparisons of famous players in international tournaments such as Wimbledon, Australia Open and Roland Garros.

The analysis presented an increase in motorsports articles in the selected time period. In 2017 5.66%, in 2018 11.49%, and in 2019 15.79% of the articles were about motorsports. Basketball articles presented a decrease from 2017 to 2018 and increase from 2018 to 2019 in the analyzed time period. In 2017

11.32%, in 2018 6.90%, and in 2019 10.53% of the articles were about basketball (Table 49).

According to the analysis cycling and “other” were the least published sports between 2017 and 2019. Cycling articles were observed with 5.66% in 2017, 5.75% in 2018, and 5.26% in 2019 while the “other” sports which consisted of golf and olympic sports were observed with 5.66% in 2017, 8.05% in 2018, and 5.26% in 2019 (Table 49).

Figure 39. Data journalism articles by topic, *El Pais* (2017-2019)

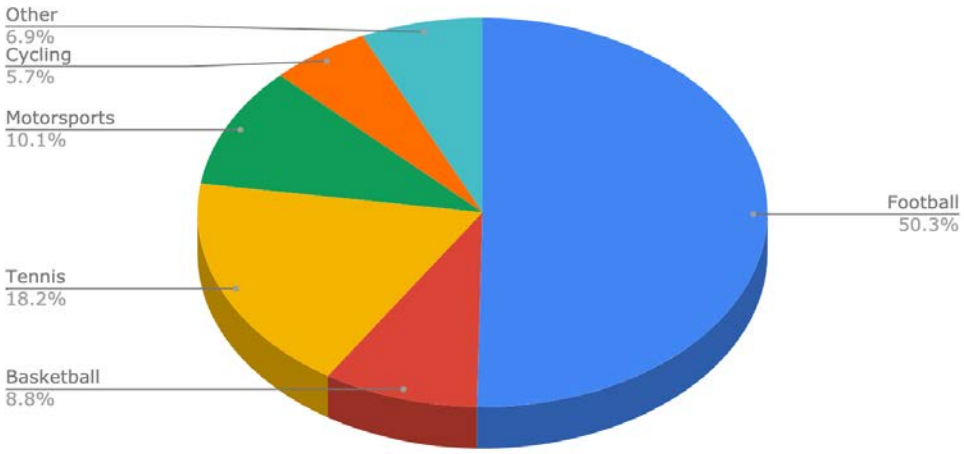


Table 50 corresponds to the story property of 159 data journalism articles in *El Pais* in the analyzed time period. *El Pais* published majorly about football with 47.80% in total. The “other” category which includes mapping, calendars, and photo based explanations was observed with 22.01% (Image 82). Statistics based data journalism articles were seen with 18.24% and change over time based articles with 11.32% (Image 80) (Image 81). The least preferred style was connection & flow which was observed in only 1 article with 0.63% (Image 79). Prediction based data journalism articles were not observed in the analyzed time period (Table 50).

Table 50. Analysis of the story properties found, *El Pais* (2017-2019)

	2017		2018		2019		Total	
Story Property	n	%	n	%	n	%	n	%
Comparison	28	52,83	43	49,42	5	26,31	76	47,80
Connection & Flow	1	1,88	0	0	0	0	1	0,63
Change Over Time	4	7,55	11	12,64	3	15,79	18	11,32
Statistics	12	22,64	12	13,79	5	26,31	29	18,24
Predictions	0	0	0	0	0	0	0	0
Other	8	15,09	21	24,14	6	31,58	35	22,01
Total	53	100	87	100	19	100	159	100

A sharp decrease was observed in comparison based articles from 2017 to 2019. 52.83% of the data journalism articles were based on comparison in 2017 and this rate decreased to 49.42% in 2018, and 26.31% in 2019. Opposite to this, increases were seen in the rates of change over time and “other” articles. The articles with other types of story properties were seen with 15.09% in 2017, 24.14% in 2018, and 31.58% in 2019. Data journalism articles about changes over time were preferred more each year. 7.55% of the data journalism articles were based on change over time while this rate was 12.64% in 2018, and 15.79% in 2019 (Figure 40). Connection & flow was observed in only 1 article in 2017 with 1.88% and was not observed in 2018 and 2019. Prediction based data journalism articles were not observed (Table 50).

Figure 40. Evolution of the story properties by year, *El Pais* (2017-2019)

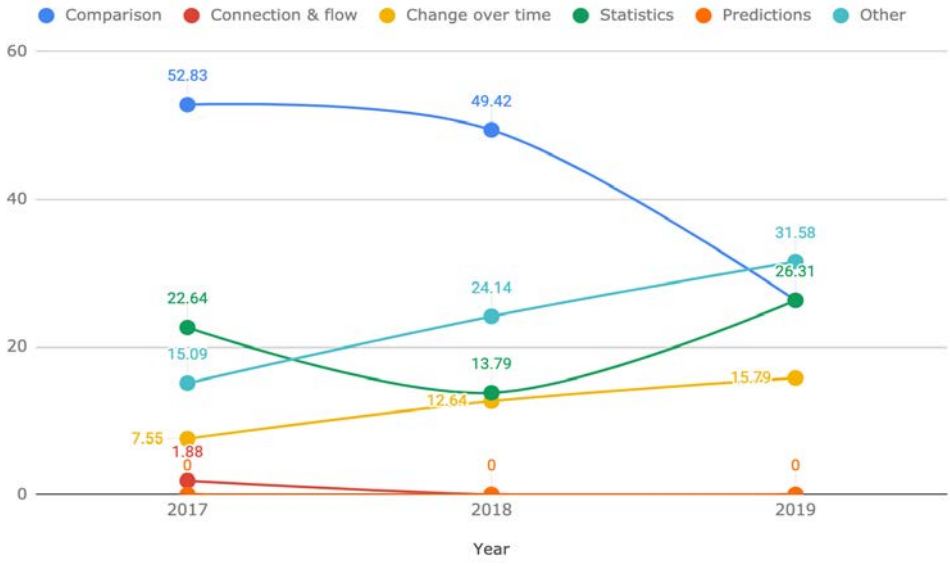


Image 78. Example of comparison technique, “Los tenistas con más Grand Slams” 14/07/2019, *El Pais*

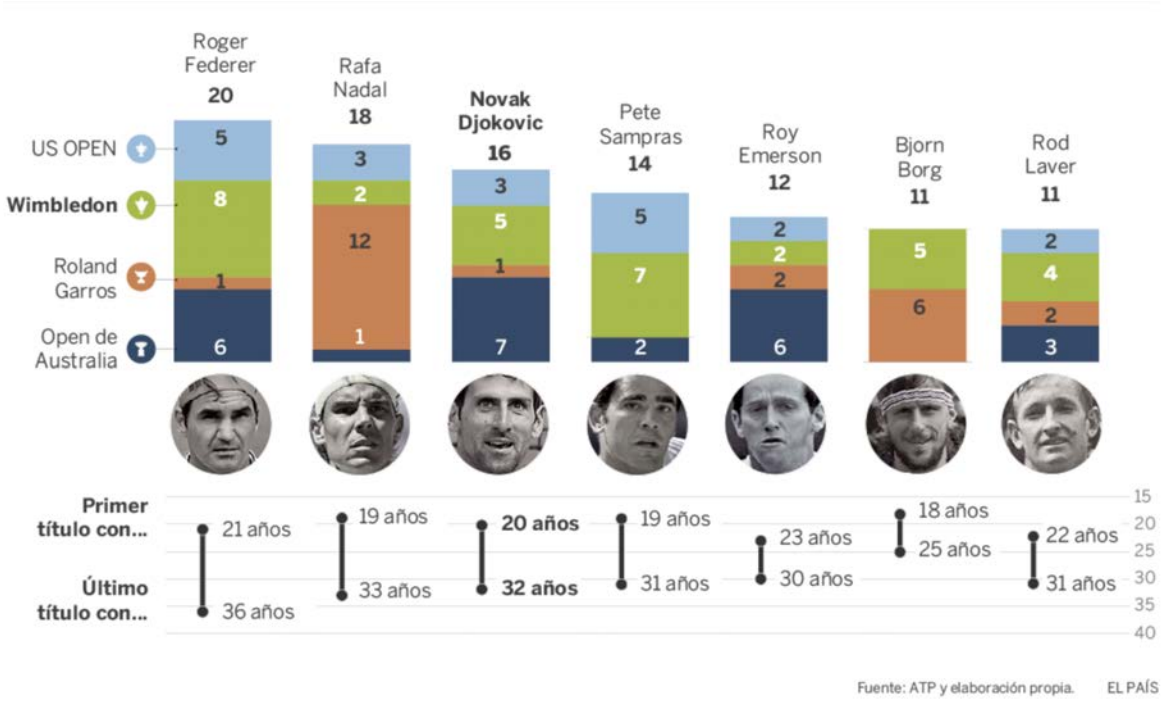


Image 79. Example of connection and flow technique, “El palmarés de la España de Navarro y Gasol” 17/09/2017, *El Pais*

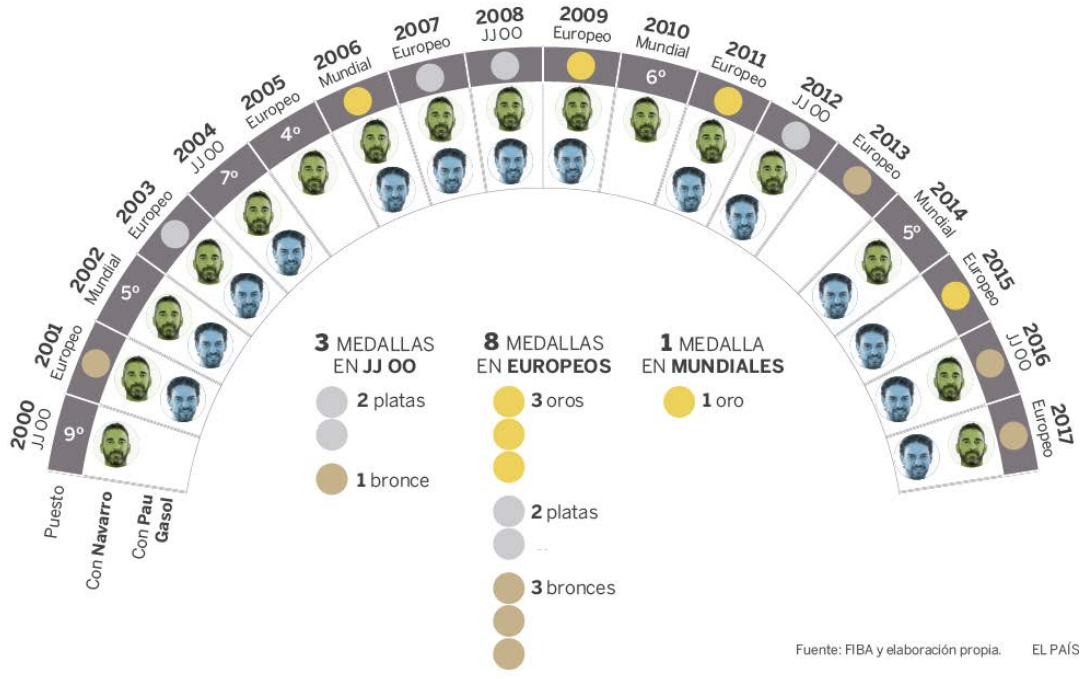


Image 80. Example of change over time technique, “La edad de los campeones” 30/12/2018, *El Pais*

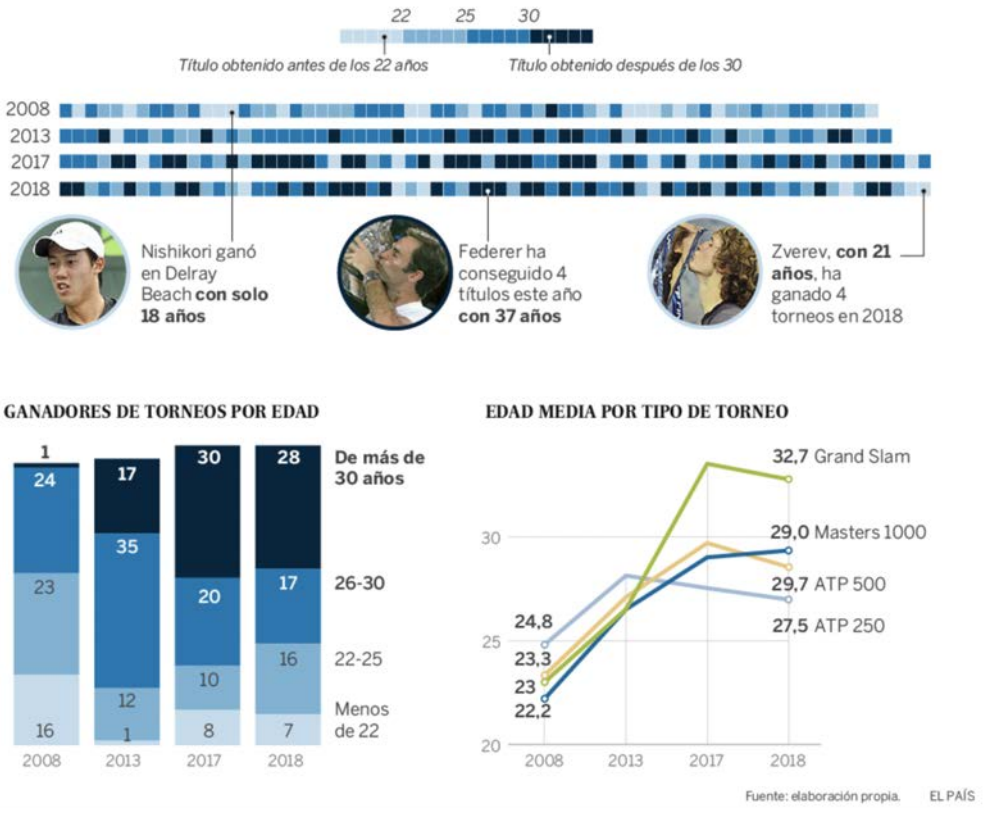


Image 81. Example of statistics technique, "La trayectoria de Cristiano Ronaldo en el Real Madrid" 10/07/2018, *El Pais*

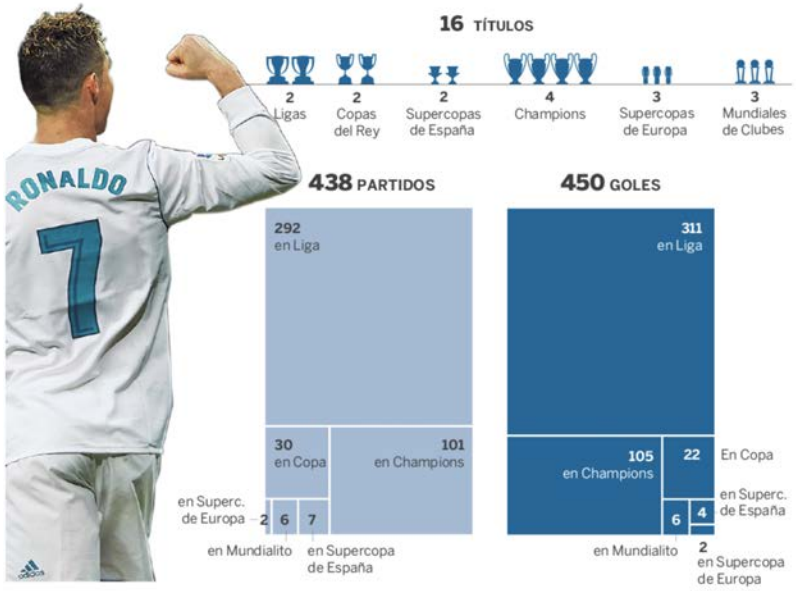


Image 82. Example of "other", "Recorrido del Tour de Francia 2018" 04/07/2018, *El Pais*

ETAPAS	Km
1 Noirmoutier - Fontenay	189
2 Mouilleron - La Roche	183
3 Cholet - Cholet (CRE)	35
4 La Baule - Sarzeau	192
5 Lorient - Quimper	203
6 Brest - Mûr de Bretagne	181
7 Fougères - Chartres	231
8 Dreux - Amiens Métropole	181
9 Arras Citadelle - Roubaix	154
Annecy (descanso)	

ETAPAS	Km
10 Annecy - Le Grand-Bornand	159
11 Albertville - La Rosière Espace	108
12 Bourg-St-Maurice - Alpe d'Huez	175
13 Bourg d'Oisans - Valence	169
14 St-P-Trois-Châteaux - Mende	187
15 Millau - Carcassonne	181
Carcassonne (descanso)	

ETAPAS	Km
16 Carcassonne - Bagnères-de-L.	218
17 Bagnères - Saint-Lary-Soulan	65
18 Trie-sur-Baïse - Pau	172
19 Lourdes - Laruns	200
20 St-Pée - Nivelle Espelette (CRI)	31
21 Houilles - París	115

Fuente: Tour de Francia. EL PAÍS

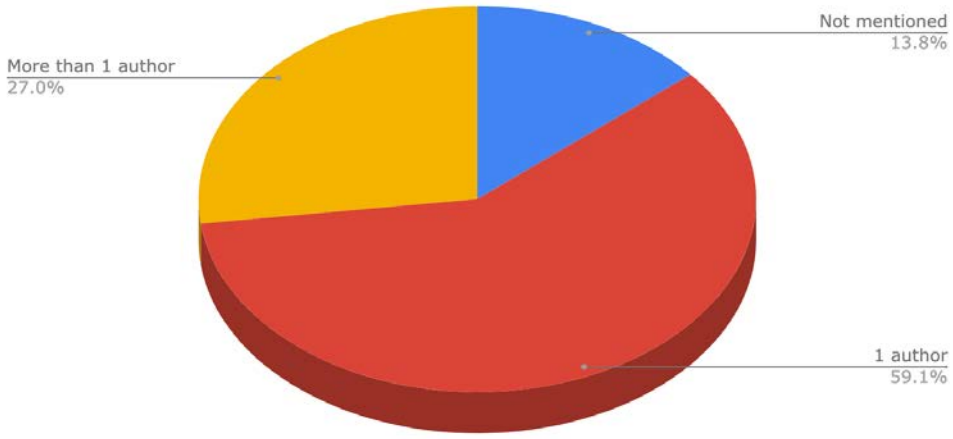
4.6.2. Analysis of number of creators, data sources, accessibility of data

It was observed that 59.12% of the data journalism articles were created by 1 person. 27.04% of the articles had more than 1 author while the articles without the information of the creator were 13.84% in total of 159 articles (Figure 41). It was observed that there was no specific information about the writer and the graphic designer in the data journalism articles of *El Pais*. All the names of the creators were seen at the bottom of the article. However, the articles with just multimedia were majorly created by 1 person and it was predicted that the articles with 1 author were mentioning the name of the graphic designer.

Table 51. Analysis of the number of creators per year, *El Pais* (2017-2019)

	2017		2018		2019		Total	
Number of creators	n	%	n	%	n	%	n	%
Not mentioned	9	16,98	12	13,79	1	5,26	22	13,84
1 author	37	69,81	46	52,87	11	57,89	94	59,12
More than 1 authors	7	13,21	29	33,33	7	36,84	43	27,04
Total	53	100	87	100	19	100	159	100

Figure 41. Analysis of the number of creators, *El Pais* (2017-2019)



According to the analysis, articles with 1 author showed alterations in time. A dominance was observed in the rate of the articles with 1 author in 2017 with 69.81%. This rate decreased to 52.87% in 2018 and increased to 57.89% in 2019. The analysis presented that the rate of the articles with more than 1 author was increased each year. Articles with more than 1 author were seen with 13.21% in 2017, 33.33% in 2018, and 36.84% in 2019 (Table 51). A relation was observed in the increased rates of the articles with more than 1 author and articles with more than 1 visualisation in time (Figure 42).

Figure 42. Evolution of the articles with more than 1 author and more than 1 visualisation by year, *El Pais* (2017-2019)

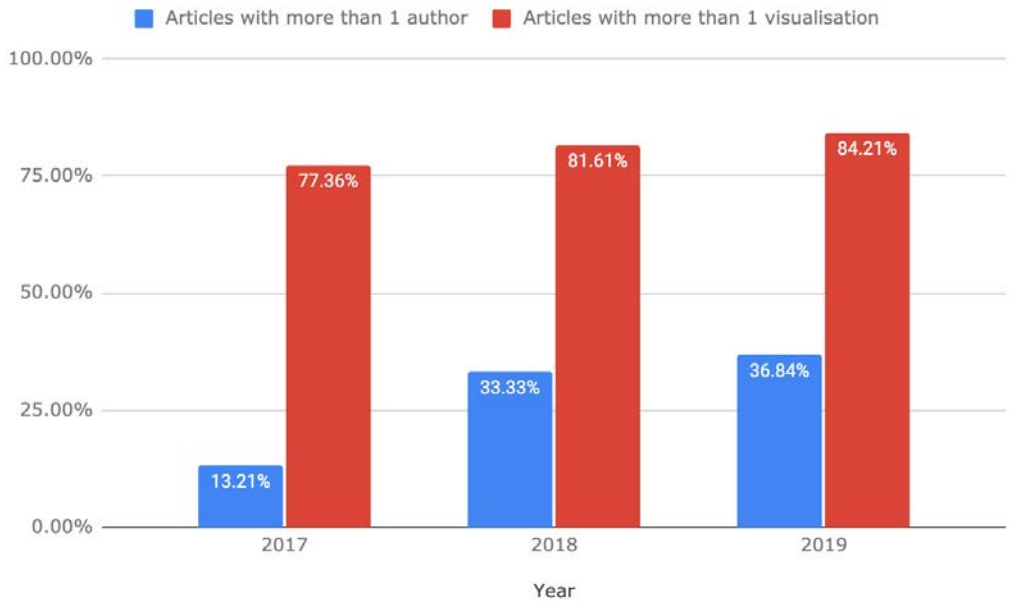


Table 52 corresponds to the data sources of 159 data journalism articles in *El Pais* in the analyzed time period. Analysis of data sources showed the dominance of the articles with the information of data sources. 152 articles (95.60%) had the information of data source while 7 articles (4.40%) were not mentioning the data source in total 159 articles (Table 52).

The analysis showed changes in mentioning the data source in time. From 2017 to 2018 the rate of the articles which mention the data source increased from 92.45% to 98.85% while the articles without the data source information decreased from 7.55% to 1.15%. An increase was observed in the rate of articles without the data source information in 2019. 10.53% of the articles had not the information of data sources while 89.47% of the articles mentioned the data source in 2019 (Table 52) (Image 83).

Table 52. Analysis of the data sources per year, *El Pais* (2017-2019)

	2017		2018		2019		Total	
Data source	n	%	n	%	n	%	n	%
Not mentioned	4	7,55	1	1,15	2	10,53	7	4,40
Mentioned	49	92,45	86	98,85	17	89,47	152	95,60
Total	53	100	87	100	19	100	159	100

According to the analysis of data sources, mentioning the name of the data source changed between 2017 and 2019. 92.45% of the articles mentioned data sources in 2017 and 86.79% of these articles published the name of the data source. Despite the increased rate of the articles with data source information (98.85%) in 2018, the rate of the articles with the data source name decreased to 85.06%. The lowest rate of articles with the name of the data source was seen in 2019. 89.47% of the articles had data source information in 2019 while 73.68% of these articles published the name of the data source (Figure 43). Accessible data was not seen in total 159 articles in the selected years (Table 53).

Figure 43. Evolution of the mentioning data source by year, *El Pais* (2017-2019)

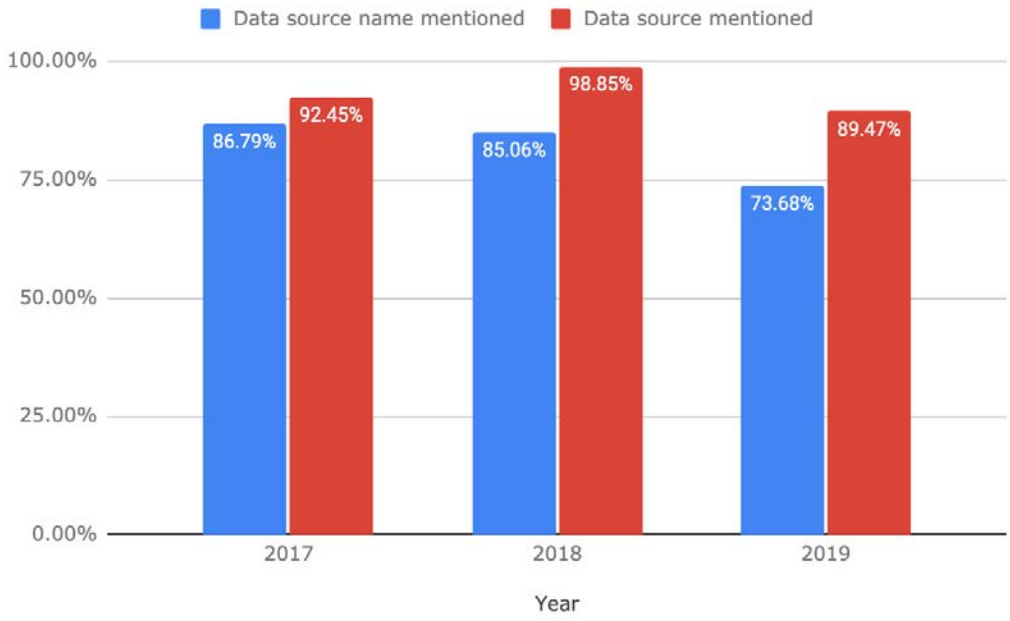
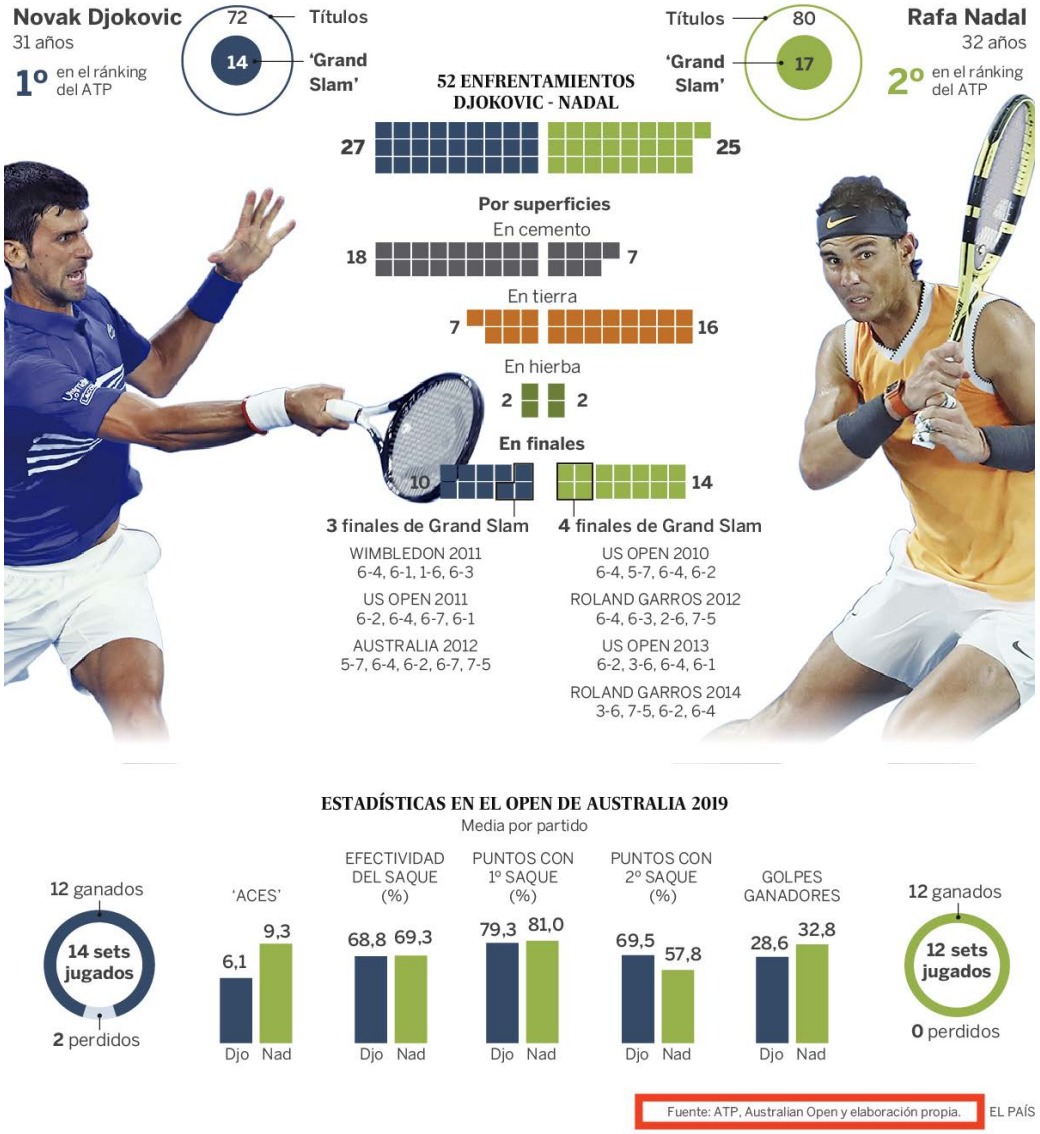


Table 53. Analysis of the accessibility of the data sources per year, *El Pais* (2017-2019)

	2017		2018		2019		Total	
Accessibility of data	n	%	n	%	n	%	n	%
Not accessible	53	100	87	100	19	100	159	100
Accessible	0	0	0	0	0	0	0	0
Total	53	100	87	100	19	100	159	100

Image 83. Mentioning data source in *El Pais*, "Djokovic y Nadal, frente a frente" 26/01/2019



4.6.3. Analysis of number of visualisations, visualisation types, form of interactivity and ratio of text and multimedia

El Pais published 31 articles (19.50%) with 1 visualisation (Image 84), 61 articles (38.36%) with 2 to 3 visualisations (Image 85), and 67 articles (42.14%) with more than 3 visualisations (Image 86) out of a total 159 articles between 2017 and 2019 (Figure 44).

Table 54. Analysis of the number of visualisations per year, *El Pais* (2017-2019)

	2017		2018		2019		Total	
Number of visualisations	n	%	n	%	n	%	n	%
1 visualisation	12	22,64	16	18,39	3	15,79	31	19,50
2-3 visualisations	20	37,74	32	36,78	9	47,37	61	38,36
More than 3 visualisations	21	39,62	39	44,83	7	36,84	67	42,14
Total	53	100	87	100	19	100	159	100

The analysis presented that the rate of articles with 1 visualisation decreased in the analyzed time period. In 2017 22.64%, in 2018 18.38%, and in 2019 15.79% of the articles had 1 visualisation. Opposite to this, *El Pais* published articles with more visualisations in 2018 and 2019. Articles with 2 to 3 visualisations were seen as 37.74% in 2017, 36.78% in 2018, and 47.37% in 2019. Articles with more than 3 visualisations were observed with 39.62% in 2017, 44.83% in 2018, and 36.84% in 2019 (Table 54). The analysis clearly showed that using more than 3 visualisations was the most preferable style in 2017 and 2018 and using 2 to 3 visualisations became more popular in 2019.

Figure 44. Analysis of the number of visualisations, *El Pais* (2017-2019)

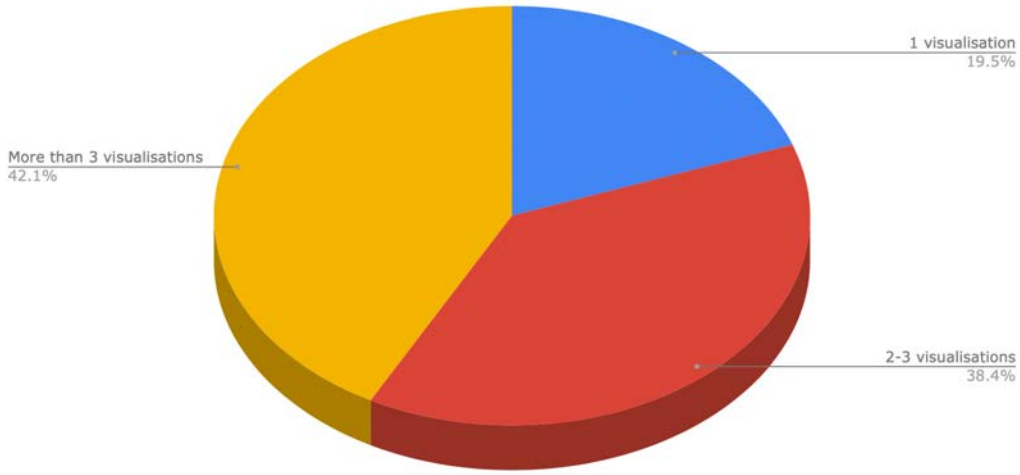


Image 84. Example of 1 visualisation, “La trayectoria de Iniesta en el Barcelona: 16 años y 31 títulos” 27/04/2018, *El Pais*

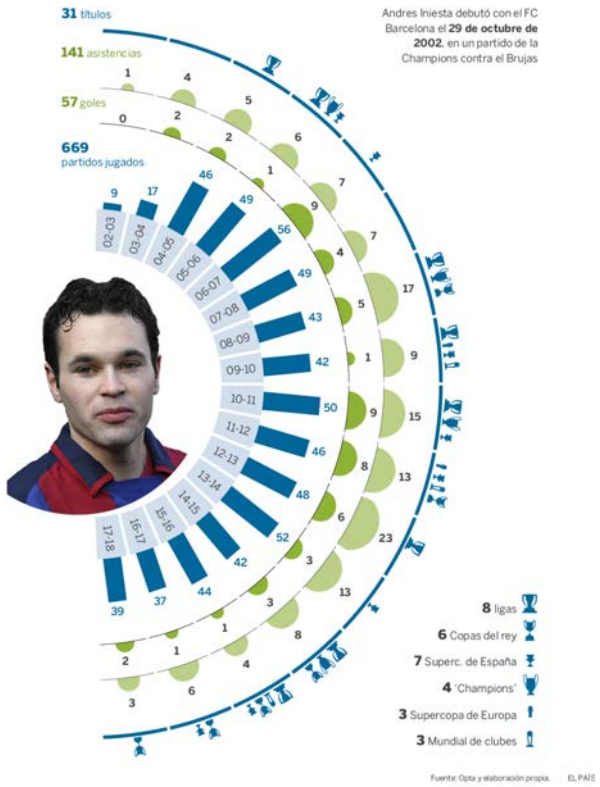


Image 85. Example of 2-3 visualisations, “La trayectoria de Lopetegui en los banquillos” 29/10/2018, *El Pais*

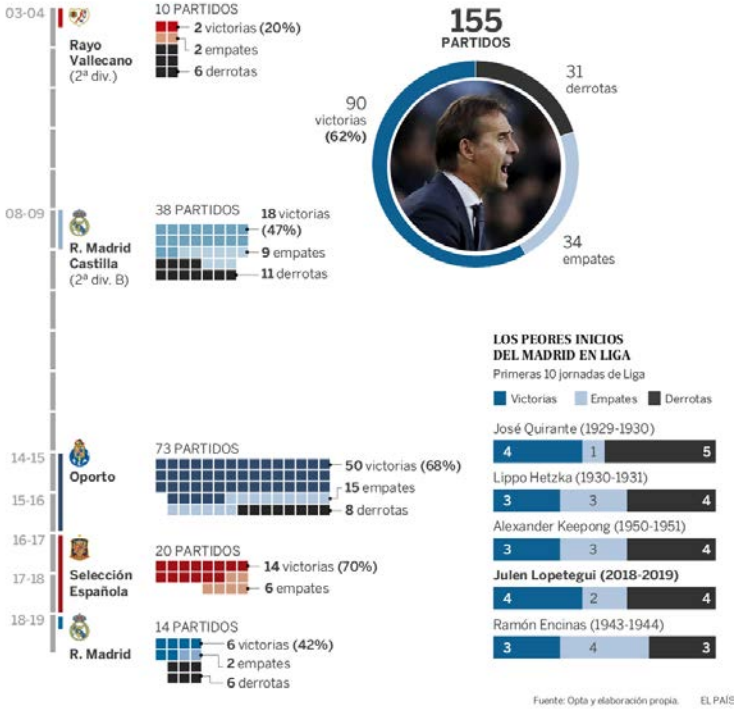


Image 86. Example of more than 3 visualisations, "Nadal logra su duodécimo Roland Garros" 09/06/2019, *El Pais*

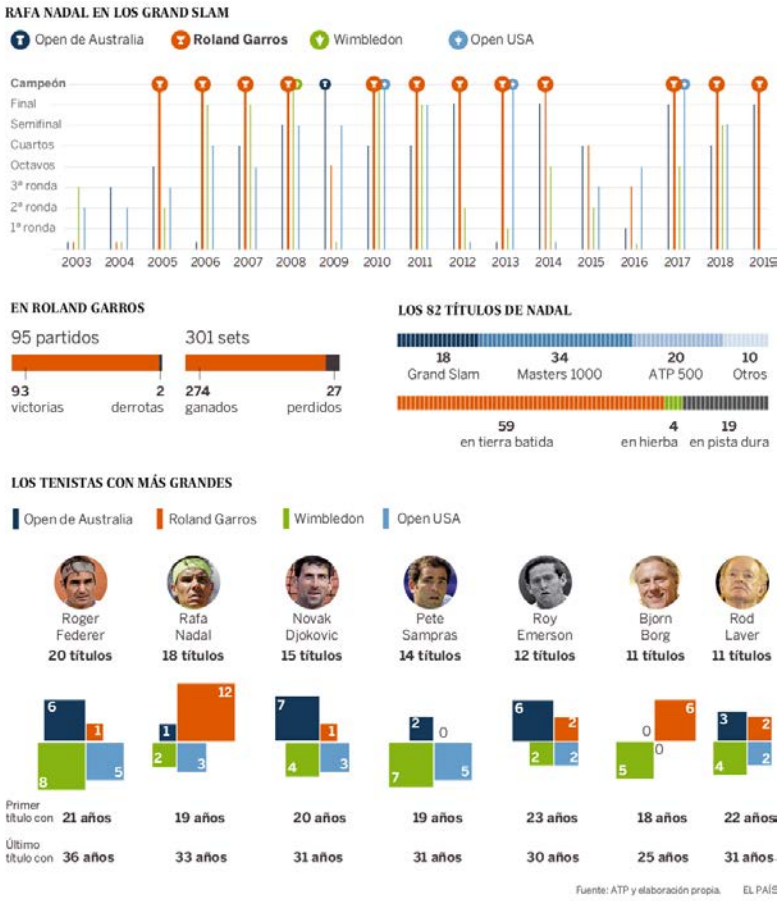


Table 55 presents the analysis of the visualisation type of the articles published in *El Pais* during the selected time period. 96.86% of data journalism articles between the analyzed period were static while 3.14% of the articles had interactive visualisations in total 159 articles. The analysis showed that 1 article in 2017, 3 articles in 2018, and 1 article in 2019 had interactive visualisations. Different topics were observed in 5 articles with interactive visualisations. 3 of the articles were about tennis while the other 2 articles were about basketball and motorsports.

Table 55. Analysis of the visualisation type per year, *El Pais* (2017-2019)

	2017		2018		2019		Total	
Visualisation type	n	%	n	%	n	%	n	%
Static	52	98,11	84	96,55	18	94,74	154	96,86
Interactive	1	1,89	3	3,45	1	5,26	5	3,14
Total	53	100	87	100	19	100	159	100

The analysis presented that 93.71% of the articles had not any interactive functions among the analyzed years (Image 87). Transmissional (low) and consultational (medium) interactivity were observed with 3.14% each. Conversational interactivity was not observed in the analyzed time period (Table 56).

Table 56. Analysis of the level of interactivity per year, *El Pais* (2017-2019)

	2017		2018		2019		Total	
Level of interactivity	n	%	n	%	n	%	n	%
No interactive functions	51	96,22	80	91,95	18	94,74	149	93,71
Transmissional	1	1,89	3	3,45	1	5,26	5	3,14
Consultational	1	1,89	4	4,60	0	0	5	3,14
Conversational	0	0	0	0	0	0	0	0
Total	53	100	87	100	19	100	159	100

Transmissional (low) interactivity which offers the reader a one way communication was observed with 1.89% in 2017, 3.45% in 2018, and 5.26% in 2019 (Table 56). The article with transmissional interactivity in 2017 was about the stadium of Atletico de Madrid and offered before and after photographs of the stadium's neighbourhood with an option to scroll right and left to see the difference between 1966 and 2017. 3 interactive articles in 2018 showed transmissional interactivity and they were about basketball, motorsports, and tennis. These 3 articles offered a mouseover option to highlight the statistics in detail. The article with transmissional interactivity in 2019 was about tennis and offered an interactive visualisation with the option to stop and restart to the reader (Image 88).

Consultational (medium) interactivity which offers a two way communication was observed with 1.89% in 2017 and 4.60% in 2018. Consultational interactivity was not observed in 2019 (Table 56). The article with consultational interactivity 2017 was about tennis and offered an option to filter to see more information in detail. 3 articles with consultational interactivity were seen in 2018 and these articles were about 2018 FIFA World Cup and Euroleague Final

Four (Image 89). 3 articles about the 2018 FIFA World Cup offered menu items to the reader and the article about Euroleague Final Four offered an option to filter and see the statistics of teams in Euroleague history.

Image 87. Example of no interactive functions, “El Madrid toma ventaja ante el Bayern para pasar a la final” 25/04/2018, *El Pais*

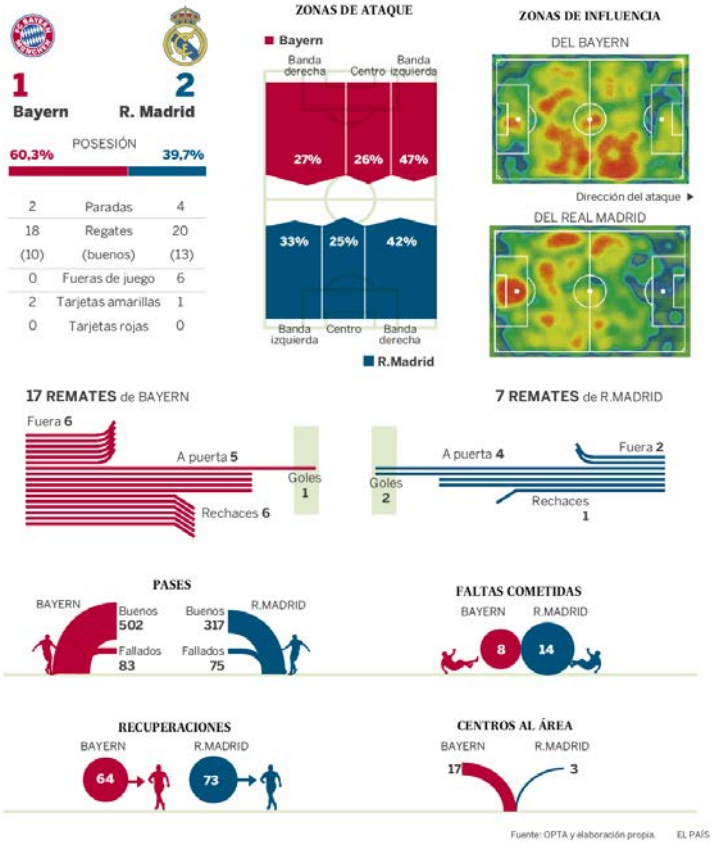


Image 88. Example of transmissional interactivity, “Los mayores ganadores de Grand Slam” 09/09/2019, *El Pais*

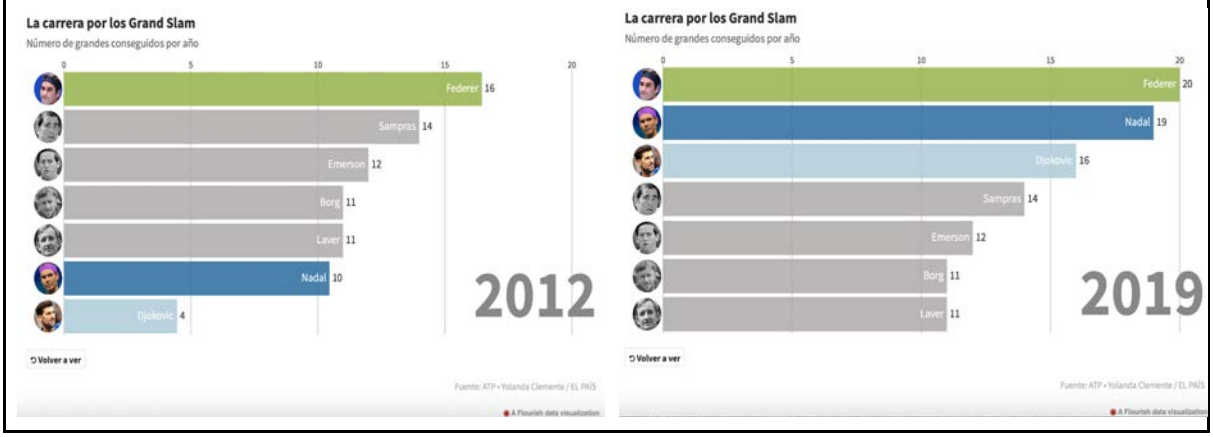


Image 89. Example of consultational interactivity, “Balance de España frente al resto de selecciones” 14/05/2018, *El Pais*

Figure 45. Evolution of the ratio of text and multimedia, *El Pais* (2017-2019)

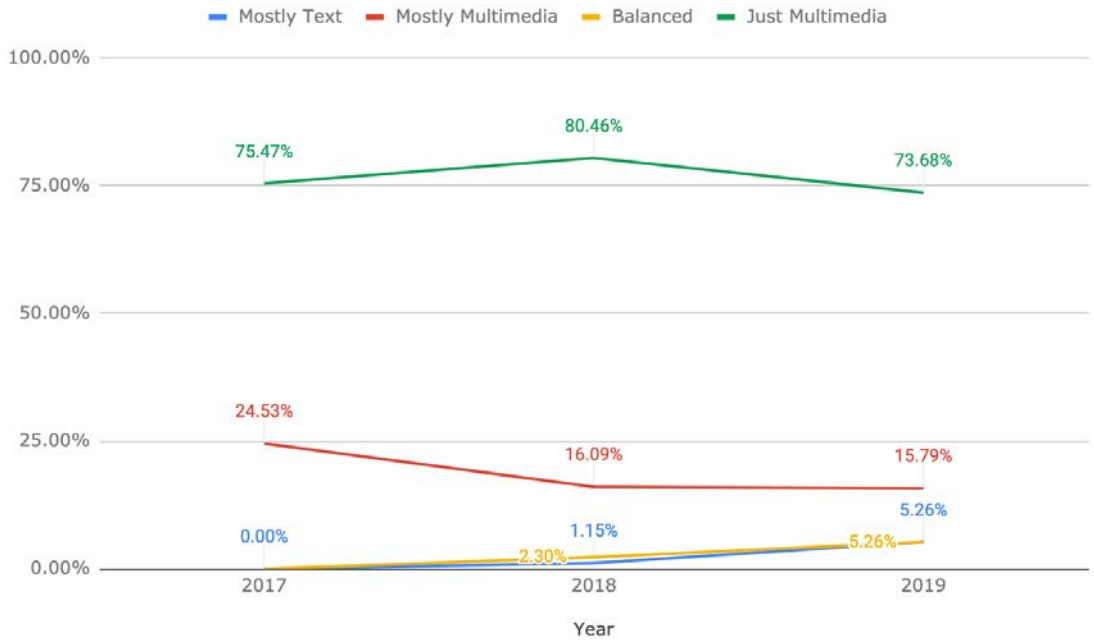


Figure 45 presents the change in ratio of text and multimedia in the analyzed time period. Data journalism articles were dominantly based on just multimedia in 2017 with the rate of 75.47%. 24.53% of the articles in 2017 had mostly multimedia. Articles with mostly text and articles with balanced use of text and multimedia were not observed in 2017.

Articles with just multimedia showed an increase to 80.46% in 2018. The articles with mostly multimedia decreased to 16.09% and articles with mostly text and balanced use of text and multimedia were observed at low rates. Articles with balanced use of text and multimedia were observed with 2.30% and articles with mostly text were observed with 1.15% (Figure 45).

Articles with just multimedia were dominant again in 2019 with 73.68%. However, increased rates were observed in articles with mostly text and articles with balanced use of text and multimedia with 5.26% each. Articles with mostly multimedia were observed with 15.79% (Figure 45).

Conclusion

The analysis presented that *El Pais* published data journalism articles mostly about football but tennis articles were on a sharp rise in the selected years. Articles were mostly based on comparison, photo based explanations, and listings and the visualisations were majorly static. Articles were majorly created by 1 author but a relation was observed between the number of creators and number of visualisations. In the analyzed time period *El Pais* increased the number of visualisations and integrated more creators to the articles. This was predicted as the reason for the decreased number of published articles.

4.7. Comparative Analysis

This section provides a comparative analysis of selected newspapers. According to the number of analyzed articles, the majority of the sports data journalism articles were seen in sports newspapers while national newspapers were publishing fewer sports data journalism articles (Table 57).

Table 57. Analysis of data journalism articles in *Marca, Mundo Deportivo, Diario AS, El Mundo, El Periodico, El Pais* (2017-2019)

Marca		Mundo Deportivo		Diario AS		El Mundo		El Periodico		El Pais	
n	%	n	%	n	%	n	%	n	%	n	%
234	100	51	100	464	100	84	100	76	100	159	100

Table 58 corresponds to the topics of sports data journalism articles in the selected newspapers. The analysis presented the dominance of football articles in selected newspapers. Football articles were observed dominantly in *Marca* with 88.46%. Data journalism articles about football were seen approximately in half of the articles *El Mundo, El Periodico*, and *El Pais*, as national newspapers, and *Diario AS*. *Mundo Deportivo* presented the lowest football articles in total 6 newspapers.

Table 58. Analysis of data journalism articles by topic in *Marca, Mundo Deportivo, Diario AS, El Mundo, El Periodico, El Pais* (2017-2019)

	Marca		Mundo Deportivo		Diario AS		El Mundo		El Periodico		El Pais	
Topic	n	%	n	%	n	%	n	%	n	%	n	%
Football	207	88,46	20	39,22	261	56,25	42	50,0	43	56,58	80	50,31
Basketball	3	1,28	6	11,76	49	10,56	9	10,71	7	9,21	14	8,81
Tennis	4	1,71	4	7,84	31	6,68	16	19,05	5	6,58	29	18,24
Motorsports	13	5,55	9	17,65	32	6,9	6	7,14	12	15,79	16	10,06
Cycling	4	1,71	5	9,8	23	4,96	3	3,57	2	2,63	9	5,66
Other	3	1,28	7	13,73	68	14,65	8	9,52	7	9,21	11	6,92
Total	234	100	51	100	464	100	84	100	76	100	159	100

The analysis presented the interests of the selected newspapers in different topics besides football. Diversity in the topics was mostly observed in *Mundo Deportivo* opposite to the lower number of articles. *Mundo Deportivo* and *El Periodico* were interested in publishing articles about motorsports. An interest in other sports, such as athletics, swimming, boxing, was seen in *Diario AS*. An interest in publishing data journalism articles about tennis was observed in *El Mundo* and *El País*. Analysis of the topics presented the different intentions to use data journalism in sports articles among selected newspapers.

Table 59. Analysis of the story properties found in Marca, Mundo Deportivo, Diario AS, El Mundo, El Periodico, El Pais (2017-2019)

	Marca		Mundo Deportivo		Diario AS		El Mundo		El Periodico		El Pais	
Story Property	n	%	n	%	n	%	n	%	n	%	n	%
Comparison	119	50,85	13	25,49	128	27,59	26	30,95	19	25,0	76	47,8
Connection & flow	8	3,42	13	25,49	28	6,03	6	7,14	5	6,58	1	0,63
Change Over Time	22	9,4	4	7,84	58	12,5	14	16,67	12	15,79	18	11,32
Statistics	37	15,81	8	15,69	153	32,97	11	13,1	21	27,63	29	18,24
Predictions	4	1,71	3	5,88	0	0	0	0	2	2,63	0	0
Other	44	18,8	10	19,61	97	20,91	27	32,14	17	22,37	35	22,01
Total	234	100	51	100	464	100	84	100	76	100	159	100

Table 59 presents the story properties of selected newspapers in total. According to the analysis of the story properties, different narratives in data journalism articles were seen. *Mundo Deportivo* was seen as the newspaper which has both a variety of topics and story properties. The analysis presented the dominance of comparison based football articles in *Marca* and *El Pais*. Connection & flow as story property was mostly seen in *Mundo Deportivo*. Statistics based data journalism articles were published with high rates in *Diario AS* and *El Periodico*. Prediction based data journalism articles were observed in *Mundo Deportivo*, *Marca*, and *El Periodico*. “Other” as a story property was seen in all newspapers in higher rates in the types of photo-based explanations, mappings, and drawings.

Table 60. Analysis of the number of creators in *Marca, Mundo Deportivo, Diario AS, El Mundo, El Periodico, El Pais* (2017-2019)

	Marca		Mundo Deportivo		Diario AS		El Mundo		El Periodico		El Pais	
Number of Creators	n	%	n	%	n	%	n	%	n	%	n	%
Not mentioned	32	13,67	8	15,69	54	11,64	0	0	6	7,89	22	13,84
1 author	100	42,74	30	58,82	372	80,17	23	27,38	48	63,16	94	59,12
More than 1 authors	102	43,59	13	25,49	38	8,19	61	72,62	22	28,95	43	27,04
Total	234	100	51	100	464	100	84	100	76	100	159	100

Table 60 corresponds to the number of creators of data journalism articles in selected newspapers. The analysis showed that *El Mundo* was publishing the name of the journalist and/or infographic artist in each data journalism article. In addition, articles created by a team were also observed dominantly in *El Mundo* and followed by *Marca*. Data journalism articles in *Mundo Deportivo*, *Diario AS*, and *El Periodico* were created mostly by the infographic artists.

Table 61. Analysis of the data sources in *Marca, Mundo Deportivo, Diario AS, El Mundo, El Periodico, El Pais* (2017-2019)

	Marca		Mundo Deportivo		Diario AS		El Mundo		El Periodico		El Pais	
Data source	n	%	n	%	n	%	n	%	n	%	n	%
Not mentioned	146	62,39	50	98,04	69	14,87	2	2,38	74	97,37	7	4,4
Mentioned	88	37,61	1	1,96	395	85,13	82	97,62	2	2,63	152	95,6
Total	234	100	51	100	464	100	84	100	76	100	159	100

Table 61 presents the data sources of data journalism articles in selected newspapers. According to the analysis, *Mundo Deportivo* and *El Periodico* were not sharing data sources with readers while *El Mundo* and *El Pais* were more likely to share the source of the data used in the article. A dominance in articles with the information of data sources was also observed in *Diario AS*. Opposite to the information of data sources in the articles, accessibility of related data was not observed in 5 newspapers except *Marca*. The analysis presented a lower rate of the articles with the information of data sources in *Marca*, but *Marca* was the only

newspaper which gives access to related data in its 11 articles in total 234 (Table 62).

Table 62. Analysis of the accessibility of the data sources in *Marca, Mundo Deportivo, Diario AS, El Mundo, El Periodico, El Pais* (2017-2019)

	Marca		Mundo Deportivo		Diario AS		El Mundo		El Periodico		El Pais	
Accessibility of data	n	%	n	%	n	%	n	%	n	%	n	%
Not accessible	223	95,3	51	100	464	100	84	100	76	100	159	100
Accessible	11	4,7	0	0	0	0	0	0	0	0	0	0
Total	234	100	51	100	464	100	84	100	76	100	159	100

Table 63 corresponds to the analysis of the number of visualisations in the data journalism articles from selected newspapers. A balance in using visualisations in articles was observed in *Diario AS* with similar rates for each variable. Dominance in the articles with 1 visualisation was seen in *El Mundo* and *El Periodico* and these articles were based on mostly text as seen in Table 64. While articles with 1 visualisation were seen in more than half of the articles in *Marca*, the other two newspapers which are *Mundo Deportivo* and *El Pais* were publishing data journalism articles with mostly more than 3 visualisations.

Table 63. Analysis of the number of visualisations in *Marca, Mundo Deportivo, Diario AS, El Mundo, El Periodico, El Pais* (2017-2019)

	Marca		Mundo Deportivo		Diario AS		El Mundo		El Periodico		El Pais	
Number of visualisations	n	%	n	%	n	%	n	%	n	%	n	%
1 visualisation	120	51,29	12	23,53	141	30,39	69	82,14	60	78,95	31	19,5
2-3 visualisations	38	16,24	5	9,8	175	37,71	15	17,86	12	15,79	61	38,36
More than 3 visualisations	76	32,47	34	66,67	148	31,9	0	0	4	5,26	67	42,14
Total	234	100	51	100	464	100	84	100	76	100	159	100

Table 64 presents the visualisation types of articles in selected newspapers. The dominance of articles with static visualisations was seen in national newspapers which are *El Mundo*, *El Periodico*, and *El Pais*. While *Diario AS* was the

primary newspaper in rates with static visualisations, *Marca* and *Mundo Deportivo* presented balanced use of static and interactive visualisations in data journalism articles.

Table 64. Analysis of the visualisation type in *Marca, Mundo Deportivo, Diario AS, El Mundo, El Periodico, El Pais* (2017-2019)

	Marca		Mundo Deportivo		Diario AS		El Mundo		El Periodico		El Pais	
Visualisation type	n	%	n	%	n	%	n	%	n	%	n	%
Static	137	58,55	29	56,86	463	99,78	80	95,24	74	97,37	154	96,86
Interactive	97	41,45	22	43,14	1	0,22	4	4,76	2	2,63	5	3,14
Total	234	100	51	100	464	100	84	100	76	100	159	100

Table 65 presents the analysis of the level of interactivity in selected newspapers. Effects of the analysis of the visualisation types were seen in the level of interactivity in analyzed data journalism articles. *Marca* and *Mundo Deportivo* as the newspapers with the most interactive visualisations presented a variety to their readers in the level of interactivity in the articles. While data journalism articles with all types of level of interactivity were seen in these 2 newspapers, other newspapers did not present a variety to their readers. The articles with static visualisations from *Diario AS* and *El Mundo* had no interactive functions. Only difference was seen in *El Pais* and *El Periodico* in terms of different rates of status visualisations and level of interactivity. *El Pais* and *El Periodico* published some articles with transmissional and consultational interactivity in menu/booklet style which includes static visualisations.

Table 65. Analysis of the level of interactivity in *Marca, Mundo Deportivo, Diario AS, El Mundo, El Periodico, El Pais* (2017-2019)

	Marca		Mundo Deportivo		Diario AS		El Mundo		El Periodico		El Pais	
Level of interactivity	n	%	n	%	n	%	n	%	n	%	n	%
No interactive functions	130	55,56	8	15,69	463	99,78	80	95,24	73	96,05	149	93,71
Transmissional	65	27,78	15	29,41	1	0,22	4	4,76	3	3,95	5	3,14
Consultational	36	15,38	25	49,02	0	0	0	0	0	0	5	3,14
Conversational	3	1,28	3	5,88	0	0	0	0	0	0	0	0

Total	234	100	51	100	464	100	84	100	76	100	159	100

Table 66 corresponds to the analysis of the ratio of text and multimedia in the data journalism articles of selected newspapers. A relation was observed between the number of visualisations and the ratio of text and multimedia of the analyzed data journalism articles. It was seen that sports newspapers were publishing articles without a high amount of texts. The articles based on mostly text contained 1 visualisation and this relation was seen in *El Mundo* and *El Periódico*. *El Pais* showed a relation between the visualisation number and the ratio of text and multimedia as well. According to the analysis, *El Pais* was publishing articles with just multimedia at higher rates and these articles had dominantly more than 3 visualisations.

Table 66. Analysis of the ratio of text and multimedia in *Marca, Mundo Deportivo, Diario AS, El Mundo, El Periodico, El Pais* (2017-2019)

	Marca		Mundo Deportivo		Diario AS		El Mundo		El Periodico		El Pais	
Ratio of text and multimedia	n	%	n	%	n	%	n	%	n	%	n	%
Mostly text	18	7,69	1	1,96	22	4,74	61	72,62	37	48,68	2	1,26
Mostly multimedia	81	34,62	16	31,37	337	72,63	0	0	2	2,63	30	18,87
Balanced	122	52,14	20	39,22	60	12,93	21	25,0	31	40,79	3	1,89
Just multimedia	13	5,56	14	27,45	45	9,7	2	2,38	6	7,89	124	77,99
Total	234	100	51	100	464	100	84	100	76	100	159	100

Consequently, some similarities and differences were observed in the analyzed data journalism articles from selected newspapers. Data journalism articles about football and using comparison and statistics as story properties were common in both sports and national newspapers. A significant difference was not observed in the mentioning data sources or the accessibility of data between sports and national newspapers. The only newspaper which offers access to data was seen as *Marca*. The number of visualisations and its types presented a difference in sports and national newspapers. While all types of visualisations were observed in sports newspapers more balanced, national newspapers had dominantly static visualisations. All types of interactivity were seen in the data

journalism articles of selected sports newspapers while conversational interactivity was not observed in national newspapers. The ratio of text and multimedia of analyzed articles also showed an alteration in sports and national newspapers. Data journalism articles with balanced use of text and multimedia, and mostly multimedia were chosen more in sports newspapers while national newspapers were publishing data journalism articles with mostly text and just multimedia.

SECTION III: QUALITATIVE ANALYSIS

5. Qualitative Analysis of *Marca, Mundo Deportivo, Diario AS, El Mundo, El Pais, El Confidencial*

In this chapter, data journalism in Spain was discussed with 15 interviewees from *Marca, Mundo Deportivo, Diario AS, El Mundo, El País, and El Confidencial*. Interviewees answered 37 questions in 6 themes as; the production process in Spanish newspapers, access to data in Spanish data journalism, being data journalist in Spain, current environment in Spanish newspapers after integrating data journalism, reader engagement in data journalism, and the future of data journalism in Spain. In the first section, decision-making and workflow in the newsrooms, tools and guidelines in sports data journalism, challenges in the production of sports data journalism, characteristics of a good sports data article, advantages and disadvantages of creating sports data journalism articles were discussed with interviewees to understand the basics of data journalism in Spain and highlighted the newsrooms differences, especially the difference between sports and national newspapers.

In the second section, access to data in Spain was discussed with interviewees with the subtopics including data sources of Spanish newspapers, challenges in working with data in Spain, difference between the data access in national and international events, and transparency of information in Spain to draw conclusions about the current state of open data in Spain and external effects on Spanish data journalism.

In the third section, questions about being a data journalist in Spain were asked to interviewees and discussed about investment in data journalism in Spanish newspapers and expected skills from data journalists in Spanish newsrooms. The third section drew conclusions about the internal effects on Spanish data journalism and presented the different needs in Spanish newsrooms.

In the fourth section, the current environment in Spanish newspapers after integrating data journalism was discussed with interviewees and the working conditions of journalists, current needs in the newsrooms, economic motivations in data journalism were explained. Statements of interviewees presented the

different levels in Spanish newspapers in terms of integrating data journalism better.

In the fifth section, reader engagement in data journalism was discussed and the different levels of engagement in traditional articles and data articles were highlighted. Interviewees shed light on the strategies to keep the interest of readers with data journalism. In the sixth section, interviewees' opinions on data journalism and its future in Spain were discussed and both positive and negative opinions were presented by interviewees.

5.1. Production Process in Spanish Newspapers

In this section, decision-making and workflow in the newsrooms, tools and guidelines in sports data journalism, challenges in the production of sports data journalism, characteristics of a good sports data article, advantages and disadvantages of creating sports data journalism articles were discussed with interviewees. Interviewees explained the workflows of the newsrooms, their creative processes for data journalism articles, and the challenges they faced during the creative process. These explanations were followed by the desired aspects of data journalism articles and the level they were trying to reach. Lastly, interviewees explained both negative and positive sides of sports data journalism based on their experiences.

5.1.1. Decision-making and Workflow in the Newsrooms

Interviewees noted that the decision-making process was double-sided and there are no strict rules. The decision-making process has been evaluated under two headings as visualisation requests by journalists for their articles and article proposals by infographic designers who already have data that tells a story. Jesus Escudero, a data journalist, mentioned that *El Confidencial Data Unit* was working in collaboration with sections and was making visualisation mostly based on journalists' requests. Escudero pointed to a difference in the decision-making process for daily projects as, "For daily projects, we do all the visualisation and

create the daily news report in the data unit. So it's more an informal decision".[57] He also explained the process when data unit has an idea for a data journalism article:

> When we have an idea and data, we present this idea to the reporting section of the related topic. If they're okay with the idea we start to work together. Mainly we do the data part like combination, analysis, cleaning and visualising and another colleague does the reporting part.

However, Dario Ojeda, a journalist from *El Confidencial Sports Unit* stated that he was mostly choosing topics to work on himself to visualise and ask his chief to publish the data based article. Tomas Alhambra who is an infographic artist from *Marca* mentioned that they were working mainly in visualisation not searching a story with these words:

> In the infographic section we usually try to adapt a news story that comes to us from an editor to view it correctly. So normally we are not the ones looking for the information. But we can do it if we want to.

Ruben Gimeno who is also an infographic artist from *Marca* has shared the same opinions with Alhambra but he stated the difference in the decision-making process in breaking news. According to Gimeno's statement, infographic artists could take the responsibility to create a data based article and have it published on the website as breaking news. Gimeno supported his statement with an example:

> Do you remember the terrorist attack in Paris? There was a match against France and another national team. So, we (the infographic section) did the localization of the place and we worked directly with the source we found on the internet. So If it's breaking news, we need to find the information through the journalist or documentation section to make visualisation.

Interviewees from *AS, El Mundo, and Mundo Deportivo* also have mentioned the same double-sided decision-making process. A difference in the decision-making process between sports and national newspapers was not observed according to the statements of interviewees from 6 newspapers. Fernando Robato,

an infographic artist, mentioned the decision-making process in *AS* according to priority and explained the priority as the visualisation requests which come from reporters for data journalism articles. Ferran Morales from *Mundo Deportivo* pointed to the same process in decision-making and mentioned that the visualisation requests for data journalism articles mostly come from an editor and added the percentage of editor-requested visualisation as 70% of the workload. In addition to this, Morales also explained the articles which are suggested by infographic section as:

> We propose topics that may be of interest to the reader and we do larger projects with more time. We start with looking for the data. Depending on the topic, we go to the specialist editor in basketball, football or whoever to complement our project. But it is a project of ours, we're independent. They do not give us the data. We have data, we visualise it and an editor helps us to explain it better in the text.

Paula Guisado, a data journalist from *El Mundo*, talked about the importance of the news cycle and explained the process of preparing data journalism pieces for hot topics. According to Guisado's statements, the idea was coming from the editor and data desk was searching data and proposing possible visualisations if it fits to the topic. Marta Ley who is the colleague of Guisado, explained the data journalism articles which created in the data desk as:

> Sometimes you find some data that you think may be interesting. When you analyze the data if you see an interesting topic you comment on it to the related section.

Daniele Grasso, a data journalist from *El Pais*, mentioned a different decision-making process than other interviewees. According to the statements of Grasso, the starting point of a data journalism piece was generally the data, sometimes a topic. Grasso also pointed that they're not making visualisations in some cases and explained the three ways of decision-making process in *El Pais* as:

> One point of view is, "this data set is super interesting, let's do something with that". And the other point of view is "we can arrange an investigative story with this dataset". Lastly "we are talking about this topic these days, let's do something about it". So there are three types. And sometimes we don't make an extra visualisation of data, if data tells a story without making any visualisation. So we are not strict in this.

To sum up, different strategies were observed in the decision-making process and the workflow of newspapers. Interviewees from *El Confidencial, Marca, AS, El Mundo, and Mundo Deportivo* stated that the breaking news were prepared inside the data/infographic department and data article requests for investigative projects were coming from either the data/infographic department or the reporting department to make a collaboration. A difference in the decision-making process was observed in *El Pais*. Statement of Daniele Grasso presented that the decision-making for a data journalism article was the duty of his team and Visual Narratives section accordingly the dataset they have or a hot topic. It was observed that data journalism articles were differentiated as data based, topic based or reader interest based.

Interviewees mentioned that they were working independently for making visualisations for a project unless it's a big project and also making collaborations for projects was between different sections like data and reporting section or infographic and data section. Miguel Angel Carbonero, an infographic artist, mentioned that the infographics section of *Marca* take visualisation requests from editors personally and if they need support for web development or data, they are working as a team. Tomas Alhambra supported the statements of Carbonero in terms of working independently and exemplified the workflow for big projects as:

> We did one big project for cycling to commemorate the 80th anniversary of the Vuelta Ciclista a España. So we made a huge file. We had previously discussed it with an editor and then we distributed duties to ourselves in the things we knew best. And then someone made the map part, another person made a timeline etc. So that each one took a part and we were able to unify everything at the end.

Differences in the workflow for daily coverages and big events have varied at *Mundo Deportivo* too, as Ferran Morales, an infographic artist, mentioned. According to his statement, the infographic section of *Mundo Deportivo* was working in the same way as *Marca,* which was distributing the duties to colleagues according to their interests, and talents and explained the distribution of tasks as:

> Roger is very good at layout and web design, this is his potential. Vanesa is good at illustration, and I have another thing, we work as a team, but each one is in charge of one thing.

Roger Guillamet, an infographic artist, supported the statements of Morales and exemplified the collaboration as:

> Sometimes Ferran and I work together. He designs and I make the structure the html or these kinds of things. For example, for the last World Cup we made a project together about all the teams, star players. (...) We have the programmers on floor 2 who also helped us. They helped us with programming elements to make the interaction move from one page to another. The programmers on floor 2 help us in these.

Daniele Grasso, a data journalist, explained the collaborations in *El Pais* as inside the Visual Narratives Department which was a department includes data unit and infographics section and pointed the reason of collaborations as the lack of person in data unit which has only 3 people and added:

> We use their (Visual Narratives Department) expertise and they use ours. For example today we are publishing a story where we do most of the data work, but then they produced a couple of graphics and wanted to add a couple of graphics. (...) The easiest is to visualise. 80% of the time is analyzing the data, understanding the story, finding a focus to a story, and so on. And then 20% of the time is the visualisation process.

Paula Guisado mentioned that they have more collaborations than in the past in *El Mundo* because of the decreased number of people in the data section. According to Guisado's statements, *El Mundo* data section had a bigger team

including web developer and graphic designer and the articles were being created inside the department. However, more collaborations were made with the infographic section in time because of the lack of web developers and graphic designers in the data unit in recent times.

To sum up, interviewees mentioned that they were working independently except big/investigative projects. For daily coverage, duties were assigned by their chief and the tasks were distributed to the teams for big projects. Different newsroom structures and sections were explained by interviewees. Data journalism articles were created by different sections in each newspaper. Marca had a wider team and was creating data journalism articles with 3 departments as reporting section, data section, and infographics section. The data was coming from the data section, visualised by the infographics section, and the reporting section was writing the story. *Mundo Deportivo and Diario AS* had no specific data sections. Creation process of data journalism articles were made by reporting and infographics sections. Infographics sections' main duty was the visualisation process while reporting sections were bringing the story and the data together. A similar newsroom structure was seen in the national newspapers. *El Mundo, El Confidencial, and El Pais* had reporting and data sections and the data sections were making visualisations. However, in the national newspapers, most of the data journalism articles were created by the data section with all stages.

Interviewees explained the difference workflow in the regular coverages and big events or investigative stories in detail and pointed to the importance of daily news or breaking news. According to interviewees statements, preparation for the projects for international events or investigative stories were starting around 3 to 6 months before, because of the occupied daily schedule in the newsrooms. Paula Guisado mentioned that the preparation for the big events starts before the tournament with working on the data of historical plays, principle players etc. Daniele Grasso exemplified the workflow for the UEFA Euro 2020 as:

> We started preparing things now, and the tournament is in this summer. So we prepared a special site, where data is just a part of this. There were more people involved in this in time. We'll try to experiment a bit more because it's more difficult to experiment with things in a short time.

Fernando Robato mentioned that *AS* will start to work for UEFA Euro 2020 before 4 to 6 months and generally *AS* was starting to work for Olympic Games 8 months before the event. Opposite to this, Ferran Morales stated that data journalism projects for Olympics were more easy than others because the Olympics are repeated events and they have a background content from previous games and this makes the process easier. Roger Guillamet mentioned the workflow for big events and investigative projects in *Mundo Deportivo* as:

> We have a daily job and we have a few hours to make graphics for the paper and for the web. We make graphics for these. When we finish the paper and the web, we have two hours left and these two hours we can work for another project for the future. We need to start 4 to 5 months before. We have this kind of template.

However, interviewees pointed to the lack of time for daily tasks, important games, and international tournaments. Carlos Forjanes from *AS* explained the difference between the workflow of Champions League and La Liga and pointed to the workflow for the weeks with important games from both leagues as:

> Real Madrid won the Champions League three years in a row. So I can tell you that April to May is insane. It's insane for us, because we need to have full coverage on wednesdays, saturdays and sundays. We need to work really hard. (...) These competitions bring us so much work, because at the same time we need to work on the domestic competition. So this is double work.

According to Miguel Angel Lara from *Marca* smaller games were not worth the effort because when there's bigger games or Champions League games in that week, the spotlight was always on those games. Lara explained two data journalism articles about Valladolid and Manchester City from the same week and exemplified the difference as:

> When the Champions League game of Manchester City, it's different. The protagonist is Guardiola, or a City player who is first class. It gives you a lot of information and of course, the data supports you. But you have good information about a Valladolid player too. But that's smaller, less important data. The value of the data is multiplied with Gundogan with Agüero.

Consequently, interviewees from *Marca, AS, Mundo Deportivo, El País, El Mundo, and El Confidencial* made statements that were basically the same about the decision-making process and workflow in the newsroom for daily tasks and big events. Journalists, data journalists and infographic artists were proposing topics for data journalism articles and it was observed that there were no strict rules. But it was seen that the requests for data journalism articles were coming mostly from editors and journalists. However, differences in the creation of data journalism articles were observed in terms of included sections to an article's creation process. It was seen that the newspapers with a special data section were achieving the 4 stages of a data journalism article which are extracting, cleaning, analysing, and visualising inside the data section, either a data journalism article request comes from an editor or the data section itself. Besides this, the newspapers with infographics departments were working in collaboration and the data journalism articles were requested by reporting sections. This situation was showing some exceptions in breaking news as infographic artists and data journalists were working independently for breaking news to inform the reader in a fastest way. Infographic sections and data sections were free to take the responsibility to create a data journalism article about breaking news and publish it independently on the newspapers' websites to inform the reader in a fastest way and catch readers' attention. It was observed that the decision-making process of data journalism articles were working in a different way in *El Pais*. The requests were coming from either the data section or reporting section but the articles were created by the data section based on 3 reasons as interesting data, hot topic, or current audience interest. Working with a group or a collaboration with different sections were observed mostly in big events, international tournaments etc. It was observed that, for these events, journalists, data journalists and infographic artists were starting to work between 3 to 8 months before, depending on the event and daily workflows of the newspapers. The statements explained the reason for long preparation processes of bigger events as lack of people in the newsrooms and the changing agenda of the newspapers because of the breaking news. Especially the infographic artists and data journalists were starting to work for big and international events 3 to 8 months before to create original contents for repetitive events and desire to make experiments before showing to the public.

5.1.2. Tools and Guidelines in Sports Data Journalism

4 stages of creating a data journalism article which are extracting, cleaning, analysing, and visualising were discussed and the softwares, online platforms, and the advantages and disadvantages of these tools were explained by interviewees. Tools used for data extracting, cleaning, analysing and visualisation are summarized in Table 65. and It was seen that journalists, data journalists, and infographic artistics were choosing the tool that they work on based on their knowledge about the tools, most of the tools were not chosen by the newspaper.

Infographic artists mentioned that data extraction was done mainly by the documentation unit or the journalists. The newspapers who had not a data journalist but had infographic artists and documentation unit, data extraction and data cleaning were done mainly by the documentation department and visualised in the infographic department. However, it was seen that infographic artists were also doing data extraction and data cleaning in some cases, for example for individual projects. It was observed that the interviewees who are data journalists have comprehensive knowledge of the tools for the whole process. Jesus Escudero explained the data extraction in *El Confidencial* as:

> It depends on the project. If the data is huge, if there is public statistics, we can download the Excel file and work with that. We can ask for this information by the transparency law. So, it depends on the project and what kind of data is available or not. Or we can write out a database if there are a little bit of records like 150 to 500 rows so it's more quick for us to pick something to write and create our database.

Marta Ley from *El Mundo* pointed to her colleague Hugo Garrido from the data unit and mentioned Python as his tool to extract data. When Marta Ley and her colleague Paula Guisado needed to extract data, they were using Excel. Ferran Morales and Vanesa Mauri from *Mundo Deportivo* Infographics section stated that the infographic section of *Mundo Deportivo* was using Google extensions to capture tables and when they needed to extract a general data, their choice was Excel. Tomas Alhambra, an infographic artist from *Marca*, supported the statement of Morales and Mauri and added that he was using an additional tool, import.io,

when he needed to extract data but mainly he was not doing this. Lorenzo Lara, a data journalist from *Marca*, explained the tools to extract data as:

> I use spreadsheets to extract data. It can be Google Drive, for example, it allows you to extract some tables. I also use Tabula on some occasions, which is very good for me to extract data from PDFs.

To sum up, interviewees mentioned 5 different tools to extract data. Excel was the main tool for all newspapers and the other tools were differentiating depending on the knowledge of the journalists, data journalists, and infographic artists. For instance, *El Mundo* was using Python while *El Pais* was using R. *Marca* was using more simple tools to extract data such as Tabula, and import.io. *El Confidencial, Mundo Deportivo and Diario AS* were using Excel to extract data (Table 65).

Interviewees mentioned 4 tools in general to clean data which are Excel, R, OpenRefine, and Tableau. It was seen that the frequency of the use of these tools differentiated in newspapers. Dario Ojeda from *El Confidencial* was using only Excel to clean data while his colleague Jesus Escudero was working with more tools which are Excel, R, and OpenRefine. Lorenzo Lara also pointed to the power of OpenRefine and mentioned that he was using it in second place after spreadsheets. It was seen that Paula Guisado and Marta Ley mentioned different tools to clean data in *El Mundo*. Guisado was using OpenRefine while Ley was using Excel and Tableau. Daniele Grasso stated that the data unit in *El Pais* was using the tools simultaneously to get more benefit from these tools. Grasso explained the cleaning and analysing process together as:

> To clean the data we use R or OpenRefine. Normally it starts with R or Excel and then uses OpenRefine and we go back to our Excel with cleaner data. And then we start to make the graphs in scratch with our Excel to see what's going on. To analyze the data we normally use Excel or R. We don't use Python much because I can't use it, but Borja, for example, uses Python. But mostly to make something interactive, with JavaScript and so on. So to analyze data we use mostly R because it's more human readable than Python so it's easy to use.

Jesus Escudero from *El Confidencial* shared the same opinions with Grasso and mentioned the effectiveness of R to analyze data as:

> If data is more complex I do the analysis with R because I think it is the best tool to analyze statistics and data.

It was observed that other interviewees do not use R for data analysis, they were using mostly Excel and Tableau. Ruben Gimeno and Tomas Alhambra from *Marca*, Marta Ley and Paula Guisado from *El Mundo* mentioned that they were using Excel for data analysis, mainly. However, they also mentioned Tableau for data analysis. Alhambra explained his reason to use Tableau as:

> I have worked a lot with Tableau. When you have a huge Excel, you cannot analyze it quickly but it seems more easy to me in Tableau. Many times when you have a giant Excel that you don't know where to handle the information, it doesn't hard for you in Tableau. I have used Tableau many times just to give me an idea of where the graph has to go. Although the representation is not final. But it does give you a general idea of all the data you have.

It was observed that Ferran Morales, an infographic artist from *Mundo Deportivo*, mentioned Tableau too but also different tools for data analysis with these words:

> We are currently using Flourish to draw conclusions. But in recent times there is a part that is I want to analyze data internally and we are starting to do little things in Tableau and PowerBI.

To sum up, a richness was observed in the tools for data cleaning and analysing. The tools were differentiated by the knowledge of the journalists, data journalists, and infographic artists like the data extraction process. Newspapers who have someone with a knowledge of programming and coding were using more complex tools such as Python and R. To clean data, Excel was the main tool for all newspapers in the first place. However, a variety in the tools were observed in national newspapers. *El Confidencial* was using Excel, R for cleaning and analysing, *El Mundo* was using Excel, OpenRefine, and Tableau for both cleaning

and analysing, and *El Pais* was using Excel, R, OpenRefine for cleaning and additionally Python and Javascript for analysing. Marca and Mundo Deportivo were the newspapers which had more variety in tools to analyze data. *Marca* was using Excel and Tableau, and Mundo Deportivo was using Tableau, PowerBI, and Flourish. *Diario AS* was only using Excel for both cleaning and analysing (Table 65). Use of these tools were based on the size and the source of the data.

A variety of tools to visualise data was observed in interviewees' statements. Interviewees explained the tools that they're using based on the visualisation's interactivity and topic and also the tools' expenses for the newspaper. Dario Ojeda from El Confidencial mentioned Tableau and Datawrapper for data visualisation and stated that he continues to learn more tools for data journalism. His colleague Jesus Escudero talked about the tools for different type of visualisations and said:

> I use R in some projects but our main tool is Datawrapper for simple graphic lines and bar charts. We use Datawrapper for the daily news. Also for static infographics we use Adobe Illustrator, and for maps we use QGIS. For example we use QGIS to insert a map of municipalities. We use QGIS to combine the data and visualise them. And then the last two months we use Mapbox to do some kinds of maps.

Escudero mentioned that they do not use Tableau and Flourish anymore and explained the reason as:

> We used them like four years ago but we left because it was not looking well on mobile. So we don't use them anymore. And the problem with Tableau is that you have few dashboards on one dashboard. They collapse in mobile. (...) Five years ago, we were trying to show all data, but then we realized that in mobile, you must do some simple graphics because you have very little space in mobile. (...) For example, We have more than 8100 municipalities in Spain. So in a detailed map on mobile, it's a mess, it collapses. We must simplify the graphics, the data load. (...) If we produce a Datawrapper graphic it can be visualised both on mobile, tablet, and desktop. So for us it is more useful than Flourish or Tableau.

Paula Guisado mentioned the data visualisation tools used in El Mundo as Flourish, Hype and Carto. A variety in tools was also observed in the statement of the interviewees from *Marca*. Lorenzo Lara, a data journalist from *Marca*, presented Tableau, Datawrapper, Flourish and Adobe Animate as his data visualisation tools. Tomas Alhambra supported the statement of Lara and explained the tools he's using with these words:

> Datawrapper is simple because it does everything for you. It takes all your data and directly does it for you. In Tableau you have to know where to touch to adapt it and maybe the same graphic does not work for mobile and for and for PC. You have to do two versions. (...) It is also true that the visualisation is more pleasant in Datawrapper. In other words, it is more user friendly (...) For interactive visualisation what we have used is Hype and Adobe Animate. (...) I believe that each one has its advantages and disadvantages (...) Now I'm trying to learn JavaScript, jQuery, html, css. I think it is the way to make better graphics, we can say more professional in the sense of training yourself to be.

Fernando Robato mentioned that AS was using only Adobe Illustrator and Photoshop for data visualisation and it was observed that the reason for using less tools was the lack of interactivity in AS. Content analysis of data journalism articles between 2017 and 2019 proved the statements of Robato. Because only 1 interactive article was seen in the analyzed time period. Robato agreed with this observation and mentioned that they don't use three dimensions for data visualisation. Ferran Morales and Vanesa Mauri explained the data visualisation tools of Mundo Deportivo as Adobe Photoshop and Adobe Illustrator but they mentioned that lately they have started to use Adobe Animate and Flourish too (Table 67).

A diversity in data visualisation tools were seen in *El Pais*. Daniele Grasso explained all the tools of data unit with this words:

> We have our own style created to make all the graphs in the *El Pais* style which are on R. Sometimes we go to Datawrapper, where you can make super easy interactive graphs. When we need maps we use Mapbox. Mapbox is the tool that we must use. And then when we need to make a static infographic

we use Adobe Illustrator or Sketch. Sketch is similar to Illustrator mostly. And then 5% of the time we have to produce a graph from scratch. For a visualisation with interactivity we speak with the rest of the team of Visual Narratives and they help us in D3 or JavaScript.

Table 67. Tools used for extracting, cleaning, analysing, and visualising data by newspapers

	Extracting	Cleaning	Analysing	Visualising
El Confidencial	Excel	Excel, R	R	Tableau, Datawrapper, R, Illustrator, QGIS
El Mundo	Excel, Python	Excel, OpenRefine, Tableau	Excel, Tableau	Flourish, Hype, Carto
El Pais	Excel, R	Excel, R, OpenRefine	Excel, R, Python, Javascript	R, Datawrapper, Mapbox, Illustrator, Sketch, D3, JavaScript
Marca	Excel, Tabula, import.io	Excel, OpenRefine	Excel, Tableau	Tableau, Datawrapper, Flourish, Animate, Hype
Mundo Deportivo	Excel	Excel	Tableau, PowerBI, Flourish	Illustrator, Photoshop, Animate, Flourish
Diario AS	Excel	Excel	Excel	Illustrator, Photoshop

To sum up, different tools to visualise data were explained by interviewees. A variety of data visualisation tools were observed in the newspapers except *Diario AS*. *Diario AS* was using Adobe Photoshop and Illustrator for data visualisation and the connection between the statements and the analysis of articles' levels of interactivity in 2017, 2018, and 2019 were proven with 0.22% interactive articles. *Marca* was using Tableau, Datawrapper, Flourish, Animate, and Hype for data visualisation and this variety was seen in the interactive articles in *Marca* with 44.44%. *Mundo Deportivo* was using Illustrator, Photoshop, Animate, and Flourish for data visualisation. Despite the 2 tools to make interactive articles, the content analysis presented the interactive articles in *Mundo Deportivo* with 84.31%. A contrast was seen in the content analysis of *El Pais* and *El Mundo* and the interviewees' statements. El Pais was using R, Datawrapper, Mapbox, Illustrator, Sketch, D3, Javascript for data visualisation but only 6.28% of the articles in the

analyzed period were interactive. *El Mundo* presented the same contrast with 4.76% interactive articles despite the use of Flourish, Hype, and Carto.

Interviewees agreed that they're free to choose data visualisation tools but mentioned that there were some exceptions if the company needs to buy a license. Miguel Angel Carbonero from *Marca* explained this situation as:

> We usually use free versions, there is no problem. We're authorized to use any tool that does not involve an expense for the company. If it is a paid tool, you have to negotiate it and see if it is feasible.

Ruben Gimeno from *Marca* agreed on Carbonero and added:

> If I want to use a new medium, I can tell them.

Ferran Morales stated the same situation in *Mundo Deportivo* and mentioned that they're free to choose their data visualisation tools but If a license is needed they need to talk with the related department to do a feasibility. Paula Guisado explained this situation in *El Mundo* with these words:

> If it's free we choose it. And if there is a license, then they decide. For example, we wanted to use Mapbox like *El Pais* because it's better and you have many possibilities. (...) So we tried to see if that was possible here. We would learn how to use it because it's a learning curve, they thought about it, but it was an expensive license so they decided to stick with Carto because it's cheaper.

Daniele Grasso stated that they're free to choose the data visualisation tool and the company accepts. Grasso explained the way they started to use Mapbox as:

> For example, we talked with Mapbox and asked them for a six months trial. We used a 6 months trial and we closed with them a one-year agreement. We have a contract we can use whatever we want.

Besides the choice of data visualisation tools, interviewees also agreed that they're free to choose their stories' topics and narration formats but in some cases an approval needed to be taken in the end. Paula Guisado explained this situation in *El Mundo* as:

> We obviously know what every newspaper leans in one way or at least in Spain, I think it is like that. And you obviously know that but it doesn't affect our everyday job. (...) If I have a good thing I think they will publish.

Marta Ley agreed the statements of her colleague Paula Guisado and added:

> If you find a bomb, then your job is to tell them about it. Then they decide to publish or not.

Daniele Grasso stated that they're free to choose their stories and narratives but there were some differences in the stories created by the data team and created with collaboration with other sections. Grasso explained the difference as:

> The boss of the Visual Narratives Department always takes a look at what we are doing, he approves mostly. We, only the three of us in the data team, try to go quite straightforward when we produce stories, we have a quite special kind of working style. When we work in the unit, we work in our own style. For example, we are allowed to use the first plural person in the article like "we made the map". When we work with other people in the newsroom, we have to put "*El Pais* produced the map" and we try to be more direct.

Other interviewees basically stated that they're free in their narration format but there were some rules for color and typography in the general design of the newspaper. Ruben Gimeno explained the guideline for color and typography in *Marca* as:

> We have a group of colors for different sections like Real Madrid, Atletico Madrid, FC Barcelona, Primera Division, and motor. So you can choose blue or yellow etc. The football section is green and blue. The entire Marca universe is red. We always use the same typography, the same colors. But the way you

> choose the data visualisation is your choice because we are enough professionals to find a way to show these numbers.

Fernando Robato mentioned a similar guideline in AS and exemplified as:

> For example we have blue for Real Madrid so when we make a graphic for the Real Madrid section, we use some blue for different graphics. But we're free to choose the narrative format of the article.

Consequently, interviewees from *Marca*, AS, *Mundo Deportivo*, El País, *El Mundo*, and *El Confidencial* exemplified different tools to extract, clean, analyze, and visualise the data. Statements of the interviewees showed that Excel was the main tool to extract data. However, the variety of tools were based on the profiles in the newspapers with different talents. For instance, people from *El Mundo* and *El Pais* were using Python and R which needs training or self-education to use it. Excel was also the main tool to clean data for 6 newspapers while R, OpenRefine, and Tableau were other tools to clean data. Tableau was seen in all stages of the creation of a data journalism article. However, some journalists, data journalists, and infographic artists were not using Tableau for data visualisation because of the different errors in mobile and desktop version. Despite the fact that Tableau is mainly a data visualisation tool, journalists, data journalists, and infographic artists were using Tableau for cleaning and analysing because of the program's simplicity. However, a contradiction was observed in the tools for visualisation and the content analysis of some of the newspapers. Interviewees mentioned various tools to visualise data in a contrast of the low percentages of interactive articles. For instance, Daniele Grasso from *El Pais* mentioned R, Datawrapper, Mapbox, D3, and Javascript for data visualisation in *El Pais* but the quantitative analysis presented only 3.14% interactivity between 2017 and 2019. The same contradiction was observed in *El Mundo*. Interviewees from *El Mundo* pointed to Flourish, Hype, and Carto for data visualisation in the newsroom and these tools were offering both static and interactive features to its users but only 4.76% interactivity was observed in *El Mundo* in the analyzed period. Qualitative and quantitative analyzes of *Mundo Deportivo*, *Marca*, *Diario AS* showed consistency in terms of the tools used to data visualisation and the amount of interactive articles published in the analyzed time period. Interviewees stated that they're

free to choose data visualisation tools they'll use. However, a common idea was observed that journalists, data journalists, and infographic artists need to negotiate with their bosses if they want to use a tool with a paid license. The same freedom was observed in the topics and narrative formats of the interviewees stories. Interviewees agreed that they're free to choose the narrative formats of their projects but with some color and typography guidelines they need to take into account.

5.1.3. Challenges in the Production of Sports Data Journalism

It was observed that journalists, data journalists and infographic artists were facing several challenges when creating data journalism articles based on sports data. Interviewees pointed to 3 main challenges in sports data journalism articles as finding quality data and analysing, continuous alteration in narratives and attracting readers. Dario Ojeda, Jesus Escudero, Tomas Alhambra, Paula Guisado pointed to the data extraction, and analysis in terms of challenges in the production of sports data journalism articles. However, some interviewees mentioned opposite opinions in terms of challenges in data processes. For example, Dario Ojeda from *El Confidencial* mentioned the difficulty in accessing data which was addressed in the next sections about the open data and transparency of information in Spain. A challenge to access data was the result of the monopoly in the sector of data providers and the transparency portal in Spain had not enough function. While Marta Ley from *El Mundo* was mentioning the amount of sports data in Spain is a lot and Carlos Forjanes described the access to sports data in Spain is more easy than past and added:

> Recent years, in the big clubs', like FC Barcelona and Real Madrid, annual reports are very well documented in terms of the budget, the economic operation, operations etc. They have a lot of numbers and you can work with that. In the past, it was impossible to know the prices of every team in every season. And now you can create infographics or stories with so much complex data.

Jesus Escudero from *El Confidencial* stated that it's easy to find data in some topics but in some cases there is a lack of information and described this situation as contrary. According to Escudero, this contrary is a risk in the production of sports data journalism articles in Spain and explained with these words:

> There are two main risks in sports data journalism and they are the contrary of each other. In the lack of information, you need to do crowdsourcing or ask for data by the transparency portal. The contrary effect is that: sometimes you have huge data and you don't know what to look for, and you could be wrong. The problem of a data journalist is that when you have huge data sets, you want to use everything and it's very difficult to put aside some data.

Lorenzo Lara from *Marca* supported the statements of Escudero and pointed to the lack of time to do a correct data analysis and visualisation in the newsrooms as:

> In good data journalism news, whether it is politics, sports, or whatever, I believe that it takes time to be able to elaborate data in a correct way. It is very difficult to do a deep analysis, do something a little more elaborated and have a correct approach, because many times when you start an investigation you realize in the halfway you need to take a course or make a turn or to find another perspective. That is impossible here because the aim is to publish the piece out as soon as possible.

Tomas Alhambra from *Marca* stated the challenge as finding a good quality data, and stated that the quality of data determines the success of the article and added:

> I think the difficulty is the data itself. I think that is the most important thing. In other words, if you don't have data, you don't have news and you don't have a visualisation. So I think the most important and the most hardest thing is to get good data that will allow you to make a good infographic.

Paula Guisado mentioned the lack of information and extracting data as a challenge and explained:

> Sometimes you find data in a PDF, that happens and you have to extract it. And sometimes the data is not available for the public. (...) And sometimes you would like to do a story on something, and you have to build the database on your own. We did that many times. You have to collect information from different places. (...) For example, I've seen FiveThirtyEight. They have a lot of data on the NFL, Spanish football, or even GPS data for basketball. And I think they started to do something like that in Spain too.

Miguel Angel Carbonero from *Marca* and Fernando Robato from AS mentioned the continuous change in narratives and attracting readers as challenges in sports data journalism. Miguel Angel Carbonero explained the narratives as continuous changes in trends in data journalism like articles with many maps, lots of data, or complex developments and stated that the data journalist had to adapt to the new trends but they can't know everything so it takes time to adapt new developments in the data journalism industry. Fernando Robato mentioned the same challenge and exemplified the difficulty in attracting readers continuously in sports data journalism articles with these words:

> Sometimes I have an idea and I don't know how to show this idea. For example, we are working on a story for the Olympic Games. The first record in 100 meters was in 1920 and this record was 10.6 seconds. And the last record was 9.58 seconds. A man just reached 9.58 in 94 years. We waited 94 years to get that. So can you represent that in graphics? You can. But I want to show you how hard that is. That is the main obstacle. (...) Sometimes it's not easy to make graphics as you think. Football happens every day. So how could you present football in a different way to be attractive for the people? For example, Cristiano Ronaldo used his right leg to make 27 goals and his left leg to make 19 goals. Sometimes the people who work in the newspaper think that is interesting for the people, but maybe not that important. Because the next match you have the same information. I think that is not original. You need to offer people special cases like unexpected players.

To sum up, internal and external challenges were observed in the production of sports data journalism articles. Internal challenges were described as lack of time and lack of necessary formation. The main obstacle in the newsrooms was the time consuming breaking news and lack of enough time for

data journalism articles was a challenge for journalists, data journalists, and infographic artists. Lack of necessary formation, background information, skills were other challenges to create sports data journalism articles. External challenges were described as either lack of or too much data, and the continuous change in narratives. It was noteworthy that interviewees presented opposite opinions about the available data amount. Dario Ojeda, Tomas Alhambra, Paula Guisado mentioned the lack of data while Marta Ley, and Carlos Forjanes were claiming there was too much data. Interviewees also mentioned the challenge to attract readers because the narrative trends were changing constantly. Interviewees' statements about the constant changes were linked to new tools and technological trends in journalism which is a possible result of technological determinism and McLuhan's theory.

Different points of views were observed in the statements of the interviewees from national newspapers about the difference between sports data articles and others like politics or economics. Some of the interviewees stated that there's no difference between the sports data articles and others. Paula Guisado and Marta Ley from *El Mundo* proposed that there's no difference in creating data journalism articles about sports, economics, or politics for them in the infographic section while Jesus Escudero from *El Confidencial* and Daniele Grasso from *El Pais* were stating a difference between topics. Escudero explained the difference between topics as:

> In the end you're trying to simplify the numbers that everyone can understand when they check the visualisation. The problem with the sport is that they are broadcasting 24 hours a day. So you must look for something that is very different from other news topics. In news media, from sports to politics, there are reports for a reader to pick up and read. So for me the difference is the competence or the number of articles that sports or politics produces every day. So the risk is that.

Daniele Grasso explained the challenge in sports data articles as the experiences in working with data in different sections and added:

> Because in politics, economics, society sections they are totally used to using data. Maybe they didn't do it before having an editing power as they do it now, but it's okay. This is quite more difficult in sports than in other sections.

Consequently, interviewees from *Marca*, AS, *Mundo Deportivo*, El País, *El Mundo*, and *El Confidencial* explained different challenges in sports data journalism and mainly pointed to internal and external challenges in sports data journalism. Internal challenges were seen as the lack of time, lack of formation and skills, and the daily workload in the newsrooms. The outcomes of the internal challenges were also observed in the previous sections about tools and guidelines in sports data journalism and the workflow of the newspapers such as the long preparation period for international events, collaborations between sections because of the lack of formation and the workload of breaking news. These internal challenges were also linked with quantitative analysis in terms of less interactivity in the articles, the percentage of articles created by more than 1 author, and the simplified data journalism articles in time. External challenges were observed as the amount of data and the continuous change in narratives. A contradiction was seen in the amount of data. Available data level was not consistent in all topics. Either there was too much data about game and player statistics, or it was a challenge to access data in other topics such as management of the clubs, economical information, budgets, sponsors, etc. Sports were linked to different sectors and topics and it was a business so accessing data in economical topics was turning into a challenge for newspapers and also the newspapers were always doubtful about the accuracy of the data. The main challenge was the data itself. In addition, continuous change in narratives was stated by the interviewees as an external challenge. Trends were always changing in journalism and due to the fact that the new tools and techniques were arising because of the technological determinism, journalists, data journalists, and infographic artists were facing difficulties to follow new trends. The challenge to follow new narratives could be associated with McLuhan's "medium is the message" theory. Because the information was shaping based on the way it was presented. In addition, interviewees' statements pointed to the difficulty in attracting readers in sports because sports were in everyday life, broadcasting 24 hours in a day and based on repetitive events. Because of its repetitiveness, finding an original topic to work on a data journalism article was an external challenge for journalists, data

journalists, and infographic artists. Data was one of the main characteristics for sports but visualising that data in a story with a journalistic perspective and presenting it to the reader in an original way was a challenge.

5.1.4. Characteristics of a Good Sports Data Article According to Journalists

It was observed that the interviewees shared different opinions about what a good sports data journalism should contain. Interviewees pointed to the importance of originality and research. Jesus Escudero from *El Confidencial* explained the use of statistics of a game in a data journalism article as exhausting. According to Escudero, these advanced statistics were useful for teams, like explained in “Moneyball”, but these statistics were not working very well in articles and Escudero added:

> At last, fans want to see the match. They want to see Messi pass the ball more to Suarez than Griezmann and these kinds of things. I don't see it as very useful, I like more structural things. For example, why Marc Gasol works very well in defense? But not in a particular match, in general. Two years ago, the Washington Post published a sports data journalism article about American football. There were more fights when the local teams lost with small points. And I think it was very hard because they asked for information from transparency. And they related the fights with the result of the games. So I like this kind of information and I think they are more useful than a specific match or competition.

Fernando Robato from AS supported the statements of Escudero and stated that visualising all the data was a mistake and the important thing was research based data journalism articles and added:

> I prefer to put the focus on some curious things happening in sports. For example, how is the sport using technology? How did technology impact sports and changed the sport during the history of this sport? How does science make an effect on the practice of this sport? I try to discover these kinds of things. Or for example, the graphics for Manu Ginobili. You can recognize a player with a move, we try to discover and identify these. So I

> think you need to be a little bit curious to find that things make a difference between you and the rest of the newspapers.

It was observed that the interviewees mentioned the significance of the experiments in sports data journalism articles. However, the main obstacle was the Spanish audience. Interviewees stated that the Spanish audience and Spanish sports environment were not ready for these types of sports data journalism practices. Daniele Grasso from *El Pais* mentioned the lack of interest through other sports in Spain and the focus of the Spanish sports media as football. Grasso explained the use of advanced statistics and experimenting in sports data journalism as:

> We are starting to use advanced statistics like expected goals and stuff like that. Soccer has a huge fan base in Spain, but just a little part of them really want to see those pretty freak statistics which are super accurate. (...) Secondly, a really good sports story with stats and the data can become a story that goes beyond what a simple chronicle can tell. For example, L'Ultimo Uomo from Italy published an article and explained how many goalkeepers start with a short pass, this is a statistic that I couldn't find. It's more like an experiment, but it gives you an insight that there is no other way to give you the "okay, this explains to you how the game is changing". I mean, goalkeeper making more short passes and less long passes. This is really a big story. (...) There will be UEFA Euro 2020. So we want to experiment with stuff like this. We are not sure that the Spanish audience is ready. But we also have whole Latin America that can read us. So we are going to try. On the other hand, it's also true that soccer is sold by itself. If you put soccer in it, people want to read, especially in Spain.

Ferran Morales and Roger Guillamet from *Mundo Deportivo* also explained the interest in football articles in Spain and stated that a good sports data journalism article was an article that people were interested in. Ferran Morales exemplified a good sports data journalism article from *Mundo Deportivo* as:

> One of the graphics we made was that people could make the eleven of FC Barcelona, the tactic. Well, we are interested in visualisations or data

> journalism that the user is a participant in the interactivity process. In this type of news you have a lot of feedback from the user.

Roger Guillamet pointed to the significance of football articles in Spain and claimed that the article was read by people if it contains Messi or Ronaldo. Guillamet also explained his new article project:

> For example, Messi is close to Pele in the scores in one club. He needs to make 23 goals to reach the top of Pele. So I'm interested in making a data journalism project about this, Messi vs. Pele. I'll see when Messi arrives at this score. And I'm looking for information about Pele and Messi to see how I can make this project.

It was observed that the interviewees from *Marca* mainly pointed to the design and technical characteristics of a sports data journalism article that could be considered as "good". Ruben Gimeno mentioned the importance of catching the reader's attention in a short time for a successful sports data journalism article. According to Gimeno's statements, a good sports data journalism article in a few seconds through color, typography, illustration, etc. Because more than 70% of the readers of *Marca* were accessing content from mobile and they had a few seconds to catch readers' attention, according to Gimeno's statements. Miguel Angel Carbonero supported the explanations of Gimeno and added:

> For me, a good sports data story on the web and above all mobile does not need too much interactivity. I used to think otherwise, but today the time of consumption of information is very short. So, as a journalist, we must have four or five key things we want to convey. And then for me, the ideal format of interactive and visual news in Marca has to be a very shocking initial image that is self-explanatory with the four general ideas, very easy to understand.

Consequently, interviewees explained their opinions about the characteristics of a good sports data journalism article, and the opinions of the interviewees were seen in two main topics as eye-catching design, and experiment and research-based data articles. Statistical data of a game or a player were easily accessible for readers and creating data journalism articles based on ready-made

that was not useful for readers. Opposite to these types of articles, a successful sports data journalism article could answer a question like the relation of sports and technology, how that particular sport is changed, or show statistics that are found by researching and analysing. However, it was easy to catch Spanish readers' attention with football articles, especially if it includes FC Barcelona and Real Madrid. Data journalism articles about other sports should've presented more detailed, research-based stories to catch the attention. In addition, on the basis of the statement of the interviewees, a good sports data journalism article had to catch the reader's attention in a few seconds because the readers were following the articles mostly from mobile and the articles had to be formatted based on smartphones.

5.1.5. Advantages and Disadvantages of Creating Sports Data Journalism Articles

It was observed that interviewees stated different opinions about the advantages and disadvantages of creating sports data journalism articles. Statements about the disadvantages of creating sports data journalism articles were not seen in the explanations of Dario Ojeda from *El Confidencial* and Ferran Morales from *Mundo Deportivo* while Jesús Escudero from *El Confidencial* mentioned only disadvantages. The rest of the interviewees stated both advantages and disadvantages in the themes of audience interest, available data, and topics to visualise. Most of the interviewees mentioned the available sports data as an advantage. Dario Ojeda from *El Confidencial* claimed that sports data journalism allowed the people to understand the games and sports in general better and added:

> The analytics and the advanced stats are important. If you like specific sports and stats, you can understand better. For example, I like basketball. If you understand advanced stats and analytics you can understand that there is a reason behind the stats. So you can understand better that the sports is possible with these tools, these visualisations, data journalists.

Ferran Morales from *Mundo Deportivo* referred the importance of working with data and being a sports data journalist as:

> I think it would have been difficult to draw the conclusion without analyzing the data and show it to the reader with a total. How is framed? At what time? Against what teams? To know all this data you need data journalism. I believe that it is an advance that each time the news will have more quality because more will be known. You work on the best data and you will be able to draw other conclusions that you have not drawn so far, which is the important part of data journalism.

Roger Guillamet supported the statements of Ferran Morales and added:

> I think that it is an added value to the competition as Ferran said. You can get news that another newspaper does not get and that is because only you have worked with the data and only you have been able to get those conclusions. And you can show ideas that are established with data, and state a hypothesis and corroborate with data.

Statements of Daniele Grasso from *El Pais* presented the same idea with Morales and Guillamet and claimed that a data journalist can create a story that no one did before through data. However, according to Grasso's opinions the disadvantage was in the newsrooms because the journalists were not used to working with data. Tomas Alhambra from *Marca* mentioned that available data in sports is both an advantage and a disadvantage in some cases and said:

> The advantage is you have all the data that happen in sports. There is a lot of data to analyze like the games of the players. And the main disadvantage is that other than that, there is no data on anything else.

A conflict was observed in the statements of Jesus Escudero from *El Confidencial* and Miguel Angel Carbonero from *Marca*. Miguel Angel Carbonero mentioned that creating sports data journalism is an advantage because it does not enter into political conflicts. However, Jesus Escudero presented an opposite opinion. According to Escudero, sports and politics were so close to each other in Spain and this was a disadvantage:

> Especially in Spain politics and sports are very ideological. You are on the left or you are on the right. You support Real Madrid or you support Barcelona. And if you support Barcelona, you can't say that Real Madrid played well. Why? Is Real Madrid your enemy? Maybe this is because sports are too much into politics.

Interviewees also mentioned the amount of audience in sports data journalism as an advantage. Miguel Angel Carbonero and Ruben Gimeno from *Marca* pointed to the audience in Spanish sports journalism. Gimeno claimed that when a journalist created a sports data journalism piece, it's easy to catch attention and get millions of people. Carbonero supported the statement of Gimeno and added:

> The impact that your work has professionally is not the same as any other medium. And almost with a minimum effort, your impact is huge. Your name is getting published many times.

However, Carbonero also mentioned the variety of topics as a disadvantage in sports data journalism. According to Carbonero's statement the events that happen periodically were forcing journalists in terms of creating original data journalism articles, because topics could get boring for audience in time:

> There is what we call the wheel of sports. I consider it to be a wheel that spins every four years. Every four years there are Olympic Games and Eurocup. And periodically there are Copa del Rey, Copa del Rey's Cup, Formula 1,La Liga, the NBA. Every year the same organizations are happening.

Consequently, interviewees pointed to the different advantages and disadvantages of creating sports data journalism articles. Interviewees mostly mentioned that sports data journalists make sports more understandable when they had data. Especially the articles based on hypotheses, research, and analysis were adding value to sports and this could be provided only by sports data journalism. In addition, experiment and research based data journalism articles were allowing readers to doubt and criticize about a topic and this was adding

value to journalism too. Also, readers were showing interest in sports data journalism articles and sports data journalism articles were making a bigger impact with less effort compared to other topics. However, accessing data was a disadvantage for newsrooms. In this point, accessible data was pointed as both an advantage and disadvantage. Because data in certain topics were not easily accessible and could create political and economical conflicts. Sports events were repetitive and it was an disadvantage for newsrooms to create original articles. In this point, lack of formation was the issue as described in previous sections. Journalists, data journalists, and infographic artists had to be original when presenting repetitive events, add value to the article with hypotheses and analyzes to be novel but current teams of newspapers had not enough formation to work with these types of data.

5.2. Access to Data in Spanish Data Journalism

In this section, data sources, challenges in working with data in Spain, differences between the available data on national and international events, and journalists', data journalists' and infographic artists' opinions about transparency of information in Spain were discussed. Interviewees mentioned their data sources and how they were using the transparency portal and then explained the challenges to access data in Spain through the transparency portal, data providers and free sources. In addition, internal and external challenges in working with data were discussed by journalists, data journalists, and infographic artists.

5.2.1. Data Sources of Spanish Newspapers

It was observed that the interviewees were using the same platforms to obtain sports data and especially Opta, a British sports analytics company, had an agreement with *El Confidencial*, *El Mundo*, *El Pais*, *Marca*, AS, and *Mundo Deportivo*. All interviewees mentioned Opta as their first source for sports data. However, interviewees explained different types of contracts made with Opta. Miguel Angel Lara mentioned that *Marca* had an agreement with Opta to access

all the information on Opta Portal while Vanesa Mauri was explaining *Mundo Deportivo*'s contract with Opta as receiving only the game day information provided by Opta, they didn't have an access to use Opta Portal to search for data.

Besides Opta, interviewees mentioned other subscription-based companies and sources of official institutions (FIFA, UEFA, NBA, ATP, LaLiga, Euroleague, Vuelta a España, etc.), free sports statistics websites (Overbasket, Transfermarkt, WhoScored, Squawka, Statsbomb, Stats, FootballMe, etc.) and the transparency portal. Jesus Escudero mentioned that they use transparency portal to access some data and his colleague Dario Ojeda exemplified their use of transparency portal and explained the other sports data sources as:

> We wrote an article with Jesus about Vuelta de España, cycling and we requested data from councils, regions, basically from the government. I usually download data from free sources like Whoscored and Squawka for football, the stats of NBA is free. These are not advanced stats, only regular stats. But there are some services like Overbasket for Euroleague and I used a premium service only for a month. I also used the free subscription in Instat for basketball. I wrote about two or three articles.

Miguel Angel Carbonero from *Marca* stated that they use mostly official reports besides Opta and the database of *Marca* and claimed that they were not using Wikipedia and added:

> Instead of databases, we used studies many times already carried out like the studies of some external agencies. For example, there was a FIFA study prepared by an agency but as basically was advertising research. We asked it directly from the department itself. (...) We would look for a way to always acquire from primary sources and access primary sources in official bodies, but there were sources already within the website's own public content, such as FIFA, UEFA, or La Liga. But never Wikipedia.

Opposite to Carbonero, Daniele Grasso from *El Pais* also mentioned that they use Wikipedia as a data source and explained the other data sources besides Opta as:

> We use Transfermarkt. There is another webpage called Statsbomb. They are really good too. So we want to ask them things, to try to do things with them and explore them. And sometimes we go to betting sites to check and see if there are some stories like "how many times the bets were right about this team, or other one?". But I think that the top is Wikipedia, they have a huge amount of data.

It was seen that the other interviewees also mentioned more or less the same data sources but added different sources for sports data. Carlos Forjanes from AS mentioned that he was using Business Insider to reach data about economic situations of the clubs or transfer markets. Ferran Morales and Roger Guillamet from *Mundo Deportivo* explained the effectiveness of Stats, a sports analytics database like Opta, and FootballMe.

Consequently, it was seen that interviewees from six newspapers were using Opta as primary sports data source and searching data from other sources like Transfermarkt, Statsbomb, Stats, FootballMe, Business Insider, Whoscored, Squawka to create different sports data journalism articles. Besides these sources, interviewees also stated that they were using official pages and reports of sports institutions, clubs, organizations such as NBA, FIFA, UEFA, La Liga, ATP to access data. It was observed that data sources addressed by the interviewees were compatible with the quantitative analysis. Analyzed data journalism articles of *Marca*, *Diario AS*, *El Mundo*, and *El Pais* presented the mentioned data sources by the interviewees while other newspapers were mentioning data sources rarely.

5.2.2. Challenges in Working with Data in Spain

It was observed that interviewees pointed to different challenges in working with data in Spain such as accessing data, format of the accessed data, limitations in accessing data in certain topics. Journalists, data journalists and infographic artists who use transparency portals for their sports data journalism articles explained the process of data request and its difficulties. Dario Ojeda and Jesus Escudero from *El Confidencial* and Daniele Grasso from *El Pais* mentioned that the

legal response time of the public institutions was minimum one month but it was challenging for them to get a response for all their requests. Dario Ojeda claimed that some institutions were not responding requests in required time and added:

> The minimum is one month because it's the legal process. It can be two, three months, or never. I could say 30 percent of my requests were rejected.

Daniele Grasso from *El Pais* supported the statements of Ojeda and claimed that the reasons for the late responses were that the portal was particularly new and there were different rules between regions. He exemplified the waiting process and way to ask for a data as:

> At the moment we are preparing a big story, just based on transparency law. And there are some autonomous communities that are making us wait for three months before giving us an answer, because they ask us to take longer to give us data. And then they asked to review later. I mean it's not easy to go through the transparency law. (...) A big problem is that each region has its own rules that apply. They have the general state transparency law. But for example, the law in Navarra is more strict. You need larger timing than in other states. In Catalonia they're working really well. (...) But also when I ask something, I always send it from my Gmail and not saying that I am a journalist working at *El Pais*.

Interviewees also pointed to the format of the data they accessed as a challenge in the process of creating a data journalism article. Jesus Escudero from *El Confidencial* mentioned that the data they received was not organized in general and organizing and cleaning a database in spreadsheets was their daily work. Dario Ojeda pointed to the same difficulty and claimed that they generally receive PDF even if they were asking for a spreadsheet from public institutions. Daniele Grasso supported the statements of Escudero and Ojeda and mentioned that the half of the data he received was needed format. Marta Ley from *El Mundo* also shared her experiences about non-readable data she receives and exemplified as:

> For example we created a database with all the assets of MPs. Data was received from the webpage of the Parliament published one by one, the documents. And those were PDF but an image, not readable. So we created

> the database with this information by hand. Each one was different because they don't have a rule to fill it. It was the longest case. Because we had to build the database with 350 people, and also senators, and also cleaning.

According to the Vanesa Mauri's statements, formatting and cleaning a database were 40% of her projects. Ferran Morales from *Mundo Deportivo* mentioned the format of the data as a major problem and claimed that the 80% of the data he receives needs format, combining and cleaning and he exemplified:

> We did something about Juan Carlos Navarro, a basketball player, which is to look for data from the ACB, data from Euroleague, data from the Cup and then put it all together. In other words, there was not one dataset, they were all there, but rather they were different sources and we grouped them together because we wanted to tell a thing.

Miguel Angel Lara from *Marca* pointed to a different challenge in working with data in Spain and mentioned the trustworthiness of the data. According to Lara, when he received data he needed to compare the information with 2 or 3 more sources to make sure of the data. Lara mentioned the need for this process for sports analytics websites and added:

> For example, a Spanish based website called Tercer Tiempo, which has a lot of information. But it has some errors. So I always have to confirm it. And of course, as for the three sources, they take longer, but I think it is necessary. But it also depends a bit on the type of report. A report of a player is simpler, but if it is a whole team, it's more complex.

Interviewees mentioned the limitations in accessing sports data in both Spain and other countries as lack of transparency, lack of available data in certain topics such as economics or management. Miguel Angel Carbonero from *Marca* mentioned the challenges in searching for a data in specific topics as:

> On economic issues. The issue of money that moves in football because money never seems transparent to me, is talking about what money goes to which club. The accounts are never clear in any sports news. In the signings it is not known what percentage goes to the club, what percentage goes to

> the representative, what is paid for taxes etc. In the end is made a ball in which you do not want to enter.

Ferran Morales from *Mundo Deportivo* pointed to the same challenge and explained that the most important thing in an article was being reliable. According to his statements, reliability was the priority of *Mundo Deportivo*. Other interviewees mentioned the limitations in accessing data as lack of sources and the monopoly in the sports analytics industry. Lorenzo Lara from *Marca* explained the monopoly in the sports analytics industry as:

> There is a kind of monopoly, because basically it is Opta and other companies which are also a data provider, but it is really an exhausting monopoly, so it is quite complicated. There are many competitions and many actions in the game and that has to be carried out by a company. That is impossible for an individual to carry.

Tomas Alhambra from *Marca* supported the statements of Lara and claimed that newspapers had to accept this monopoly to create sports data journalism articles and added:

> It is very difficult to quantify everything that happens in a game, if you do not have a company that offers you these data, it is impossible. You have to buy the data.

Dario Ojeda from *El Confidencial* mentioned the lack of transparency and public data in sports. Ojeda compared the institutions and organizations to explain the challenge in available sports data and claimed that this challenge was seen not only in Spain but also in general, Europe and added:

> Did you look at the NBA? I think they are the best. They publish all information, all the game data in their website and you can access that information and you can write whatever you want. Here In Europe, not only in Spain, we don't have that. Sports institutions have that data internally but they don't publish. I think there is a big problem with that. I don't know why they do that like in UEFA, Euroleague, in Spain Liga ACB, La Liga. We need more transparency in data I think.

Miguel Angel Lara from *Marca* pointed to the same difficulty with Ojeda and claimed that the amount of sports data is good but still not enough. Lara compared the transparency and public data in skiing and football and explained:

> FIS (International Ski Federation) has the international agency, a very good database for me, one of the best, much better than FIFA, much better than UEFA. In skiing can find a thousand things and is very easy. Now you can put the skier, the type of competition, the position that has been, the time that has been marked and you can make a huge filter. There is no such thing in football. FIFA is very bad. UEFA doesn't have much else either. It's a little bit better, but not much more either. The Spanish Federation is a little better, but before it had no data. The English Federation is quite good, the French is fine, the German is fine, but more complicated. For example, in Spain many things are missing. I tell you that skiing is a minor sport but you have everything.

Consequently, it was seen that journalists, data journalists, and infographic artists were facing different challenges such as available data,requesting data from transparency portal, limitations in accessing data in certain topics like economic information of the clubs, organizations and institutions while working with data. Interviewees pointed to the needed time when data was requested from the transparency portal and they have to know the rule of each region in Spain. Legal response time for data requests from transparency portal was minimum 1 month but it could be 3 months and in the end autonomous authorities could reject the request. Different response times and regulations in each region were challenging journalists to work on a national project. According to the statements of the interviewees, there should have been the same regulation for each region to access data in a desired level. On the other hand, journalists, data journalists, and infographic artists mentioned that it’s an obligation to check the trustworthiness of the data from other sources because there’s a problem in the quality of data. In addition, the data that journalists received was not in a proper format in general, formatting and cleaning was taking too much time. Lastly, interviewees mentioned the monopoly in the sports analytics industry and lack of available data in clubs, organizations and institutions, especially in football. It was seen that the challenges in working with data was forcing journalists to create better sports data journalism articles.

5.2.3. Difference Between the Data Access in National and International Events

It was observed that the interviewees had more difficulty in accessing data for national and especially regional events in Spain, while accessing data for international events were offering much variety. Interviewees explained the possible reasons for the difficulties in accessing data for national events. However, some interviewees claimed that there was no difference in accessing data for national and international events if the data was provided by a company. Tomas Alhambra from *Marca* explained that the level of access was the same through data providers because the sports analytics industry was a monopoly. Miguel Angel Carbonero, Alhambra's colleague, supported the statements of Alhambra but mentioned that accessing data for both international and national events was at the same level if the topic does not involve politics or economics and explained this situation as:

> Sports economic data is complex internationally. I particularly think FIFA is very opaque and it never makes anything clear. If someone asks me to do information about FIFA numbers, I wouldn't be able to. I would have to ask many colleagues for advice and be behind it and devote a lot of time with the consequent problem. The big problem we have globally is the corporate weakness that the press has. We are very powerful in audience level, but very weak economically. We depend on a lot of economic interests that make us very fragile. Then sometimes we don't go deep.

Jesús Escudero from *El Confidencial* supported the statements of Carbonero in terms of being transparent but claimed that the problem with transparency and accessing data was a challenge in national, and especially regional events and added:

> The problem is the lack of workers. So they have knowledge about the transparency law, and at the national level they don't want to give you the information. They work to find any argument to break the law and to deny the request.

Daniele Grasso from *El Pais* also claimed that it was more challenging to access data for national events but mentioned that accessing data for national events was always easier than the regional events. Ferran Morales from *Mundo Deportivo* explained accessing data for international events was easy due to better planning, and implementation but it was getting harder at national and regional level. However, Morales explained the changing situation in Barcelona as:

> Barcelona City Council is promoting that more and more data is accessible to everyone and it is a culture that is being given more and more importance. But maybe in the national is not so much, because there is a lot of concern to provide data.

Roger Guillamet supported the statements of Morales and mentioned the importance of providing data to newspapers for minor sports and explained:

> In small sports, it is more difficult to find information, but I think that, as Ferran says, there will be more and more information and more data related to small sports or handball, for example. I think that every time the organization is more interested in passing data to be used in the media. I think that small sports have to pass more information to the newspapers so that sport has more visibility in the country.

Carlos Forjanes from AS pointed to the same difficulties in terms of accessing data for lower leagues and minor sports but explained the reason of this as the monopoly of Opta which is changing in time:

> Until last season Opta didn't have coverage for all the matches. So you need data from all the competition to analyze, this team versus other teams etc. But it's difficult. For example they only have data of a team, only three games, the other team has only one too. But they are working on that, and the Copa del Rey will be more like La Liga, in terms of data. But they play in a lot of teams from the Third Division. So it is so difficult to find data from teams from the Third Division.

Dario Ojeda from *El Confidencial* and Miguel Angel Lara from *Marca* pointed to the access level of the Premier League and Bundesliga and claimed that Spain

had a lack of available sources to access data. Lorenzo Lara from *Marca* mentioned the same challenge and added another challenge to his statements which was accessing data for historical events as:

> If you want to go to historical topics it is much more complicated, even in Spain you have to go practically to volumes of published newspapers. And for example, this morning I was checking a referee who whistled in a game in 1925 because I had to have data to be able to complete my article.

Consequently, it was observed that journalists, data journalists, and infographic artists were challenged by the access level of data in national events in Spain. Journalists, data journalists, and infographic artists also mentioned the difference between national and regional events in Spain in the context of data source, available data, and requesting data. According to the interviewees it was easier to find data for international events thanks to the available sources and better planning and implementation of the organizations.

5.2.4. Journalists' Opinions About the Transparency of Information in Spain

It was observed that the interviewees presented different opinions about the transparency of information in Spain. Interviewees mentioned the lack of transparency of information in Spain but also added that the level of transparency was better than the past. Most of the interviewees pointed to the Transparency Law and its effectiveness compared to the past. However, accessing data through the web always needed to double-check, according to the interviewees. Darío Ojeda and Jesus Escudero from *El Confidencial*, Lorenzo Lara from *Marca*, Marta Ley and Paula Guisado from *El Mundo* specifically mentioned the effectiveness of the Transparency Law but added that the law still needed to be improved. Dario Ojeda mentioned that Spain had to create a board of transparency to inspect the institutions in the level of available data through requests. Jesus Escudero supported the statements of Ojeda and mentioned that Spain needed a culture change to implement transparency law better and added:

> In the law there is a little bit of transparency, but it's not enough. I think that the problem in Spain with access to information is culture. The politics, public workers continue thinking that the data and information belongs to them, it's not true, it belongs to the public. We need a culture change. (...) I read in the law that in a bit of a period of time if you don't get an answer, it means rejection. Too many times we face this. You can ask the institution. And they have three months to reply. The problem is, the institution can care about transparency, but the execution of the transparency law doesn't have any enforcement powers.

Marta Ley from *El Mundo* also pointed to the political culture of Spain as a reason for not implementing transparency law at a desired level and explained:

> If a specific institution is very predisposed to be transparent, it will be faster in the responses. It will be more difficult for them to give you information or if they deny it, it will be because they do not have it, or there is some exception to the law that they can cling to. On the other hand, there are others that are even more closed. That political culture is also lacking among officials.

Paula Guisado from *El Mundo* mentioned the journalists should use transparency law more however the challenge was the time to wait for a reply for the request. Guisado explained her opinions about the transparency law as:

> It's a good tool that we have now. Until like five years ago, there was no way. So we should use it much more than we do. And I think there are good stories to be told, thanks to the transparency law. But because of the workflow of the newsroom, it's hard to use. The rhythm doesn't work in transparency law, because you have to wait for minimum a month, and then maybe they don't give you data so you have to ask again. It doesn't go with the news cycle here. You need something happening now. And for that kind of information for context, you can't get in the transparency portal.

Opposite to her colleague, Marta Ley mentioned the positive sides of the law and the effectiveness of the Transparency Council with these words:

> Before we did not have a transparency law, now we do and I do believe that it is getting better and better. In the end, I think it also depends a lot on the

> body to whom you ask the disposition that it has to give you the information. But the Transparency Council has a very good reputation among journalists that it works very well when an organization does not want to give you information. And you really have a right to receive it. It is an institution that is almost always in favor of journalists or of those who request information.

However, Lorenzo Lara from *Marca* claimed that the law was developing but when they couldn't reach a data it was hard to go to the court for the companies in the context of financial situations.

> I think there is a long way to go. We have a transparency law in Spain. It is a transparency law that is developing, let's say. Much remains to be done because it is a law that does not guarantee you an absolute guarantee. If they want, in the end they give you the data and if they don't want it they don't give it to you. It's a bit like that. And if not, then you have to go to court and see what happens. So, of course, imagine, in a company they weren't willing or financially supportive to go to court or anything like that.

Lara also claimed that transparency of information was more complicated in sports because the clubs were not public institutions. Lara explained the process of getting data from clubs as:

> I see that sports are a little more complicated. Because it is very difficult to access, for example, football clubs, because they are not public institutions. You can access club accounts, but you have to go to the Mercantile Registry and spend money, obviously, because it is not free. That does not go for transparency.

According to the statements of Fernando Robato from AS, the level of transparency of information was at a good level compared to non-European countries. However, Robato mentioned that the level of transparency needed more improvement in Spain especially compared with Europe and explained:

> Because for political reasons, there are newspapers who have different ideas. For example, when I came to Spain, I took the ABC newspaper. I didn't know a lot about Spanish history, but with the years I recognized ABC was right-

> wing *El Pais* was left-wing. That is because if you read one newspaper, you are just reading a little part of the truth. Not a lot. And inside the newspaper, a lot of information is cut, not offering more information. If I need to put in percentage numbers, I think of 80% transparency in this branch. But this is my opinion. It depends on the topic, history, political situations. (...) We need more transparency, even in sports newspapers, we are not researching a lot of things, and that's a mistake.

Miguel Angel Carbonero from *Marca* mentioned that the transparency of sports information was in a good level when the information does not enter into politics and sports journalists had more chance to access data when they don't enter into politics or economics and added:

> When there is political involvement, transparency is bad. Many times in sports journalism have the possibility of not getting too involved in shady issues. The football business moves a lot of money in Spain, but also with many political interests. They are very important companies, the management behind and then is usually shielded. I think that a lot and it's a problem we have in our profession. (...) But it is getting worse and worse because of the institutional secret generated by large corporations such as big football clubs or institutions that even representatives of football stars.

Ruben Gimeno from *Marca* pointed to the similar topics and expressed his concern for the trustworthiness of economical data in sports as:

> If we are talking about football, sometimes I don't feel that signings are very clear or very transparent. We do a lot of graphics in this like the most expensive guy in sport this summer. And we make rankings with this data. And I guess it's always something you don't know. So we publish this with our data because then the journalists know the way that this contract was made. And so we say 130 million, but you read in another newspaper and this is 135 million. So it's not very transparent, if you don't know the contracts very well.

Carlos Forjanes from AS mentioned the lack of transparency in football clubs except Real Madrid and FC Barcelona. He explained his opinions and criticism about the Spanish Football Federation as:

> Transparency is not really good, besides Real Madrid and FC Barcelona's annual reports. The transparency in sports here in Spain? I'm not on the same page. Spanish Football Federation has scandals.

Tomas Alhambra from *Marca* claimed that there's no transparency in sports data except game statistics and explained:

> It is not very transparent. We depend on private clubs and private clubs offer less information. It's better for them because those are personal data. So it seems to me that there is not much information. Except for what happens on the pitch of football, basketball, tennis matches, there is nothing.

Miguel Angel Lara from *Marca* pointed to the different topic and claimed that the data needs control by the journalist because of the trustworthiness issues.

> When I search for data, it may not be right. It may be pretty good generally, but sometimes not. That's why I have to find two or three more sources, at least to see that it matches.

Ferran Morales from *Mundo Deportivo* supported the statements of Miguel Angel Lara and mentioned the importance of finding additional data sources in *Mundo Deportivo* as:

> When we generate the data, we verify it a lot. In other words, we not only choose a site and implement it, but we contrast it with different sources to make it true. In other words, we try that the work that we reproduce is as truthful as possible.

Consequently, it was seen that interviewees had different concerns regarding the transparency of information in Spain both in general and in sports data. Almost all interviewees stated that the transparency of information had to be improved in Spain, but the current level was better than the past. To achieve this, the law and its enforcement powers to implement were needed improvements. According to the statements of the interviewees, the other challenge against the transparency law in Spain was the politic culture and its

opaque style of information. It was also observed that there were concerns regarding the transparency of sports data in Spain. Accessing sports data and its transparency about a game was not a problem for the interviewees but it was hard to access data when the topic was crossed with economical and political issues. Because of the sports business in Spain, there were too many strong companies and also politics were involved in sports and this situation was decreasing the transparency in the sports industry. Lastly, interviewees mentioned the lack of trustworthiness of data on the web and stated that the data had to be checked more than 2 to 3 more sources to create an article with that data.

5.3. Being a Data Journalist in Spain

In this section, investments and opportunities in newspapers to gain data journalism skills and also the necessary skills to work as a data journalist in Spanish newspapers were discussed with journalists, data journalists, and infographic artists. Interviewees discussed that not all the newspapers were promoting education at the same level but expecting the same skills from their staff.

5.3.1. Investment in Data Journalism in Spanish Newspapers

Interviewees explained the courses, training, and the opportunities regarding the improvement of data journalism skills of the journalists and investment in data journalism in the Spanish newspapers. It was observed that the journalists, data journalists, and infographic artists had options to gain data journalism skills both internally and externally but the main challenge was learning the skills personally and after the working hours. Dario Ojeda from *El Confidencial* mentioned that he was currently taking a data journalism course from *El Pais* Journalism School but *El Confidencial* didn't pay for the course. His colleague Jesus Escudero mentioned that he was taking a R course independently however, *El Confidencial* could pay for extra training of journalists after a negotiation. Escudero also mentioned that *El Confidencial* organized a SQL course in 2017 but didn't continue to extracurricular courses for journalists. Carlos Forjanes and Fernando Robato from AS pointed to the lack of education in AS. Forjanes mentioned that

AS had a virtual campus to gain journalistic skills but it was not efficient and added:

> We have a virtual campus like an online education, but it's only based on videos. It's really difficult to learn by watching videos. For example the video says: “try to get this data and write an article about it”. But I don't have someone to guide. This is the wrong way to do it as a lesson.

Ferran Morales and Roger Guillamet mentioned that *Mundo Deportivo* had no extra training, or an online system to gain new skills. Morales stated that the management team of the newspaper was willing to support journalists to learn new skills as:

> Normally we propose it, we look for the trainers to optimize us in the training on data and then we go in our direction as we want. It is because we encourage training. In other words, we ask for it, not because the company gives it to us, but because it is a bit of our requirement to learn new skills. When we ask it the company gives it to us.

Daniele Grasso mentioned the *El Pais* Journalism School and stated that *El Pais* were willing to pay for extra training for journalists. He exemplified the attitude of *El Pais* towards extra courses to gain skills as:

> I know that I can ask for training like a Python course. And they will pay for me to do something like this. I'm actually planning to ask for something like that this summer, and I know that it won't be a problem in theory.

Marta Ley and Paula Guisado mentioned that *El Mundo* had a school of communication and journalism and they could take various types of training both on-site and online. Ley also mentioned that they have a data journalism course in the school of journalism and communication and journalists could ask for extra training outside to gain new skills such as a D3 course she was taking recently. Guisado supported the statements of Ley and added:

> I think it's by law that big companies have to put some money on education but it is not that big, because it's expensive. But some people can ask for a master's degree and then the company pays for a part of it. There are different options. And people usually are doing stuff for education here. They offered different lectures to us. For example next Monday we have a lecture and we'll talk about digital journalism. So they are usually doing that kind of stuff.

Interviewees from *Marca* mentioned that they had also options to ask for extra training and also they were using the school of journalism and communication with *El Mundo* because *Marca* and *El Mundo* belonged to the same company. Tomas Alhambra from *Marca* explained some courses they took in the newsroom as data journalism and D3 and added:

> Even if you have a course that you are interested in doing, you comment on it and they can even pay you a part of it or maybe the whole. In other words, everything is for promoting the training of an employee.

Lorenzo Lara supported the statements of Alhambra and explained his experience with the company. Lara stated his Master's Degree in Investigative Journalism he did last year and told that the company financed his course. Miguel Angel Carbonero explained the effects and the benefits of the courses inside the company as:

> For me the courses were very beneficial, very dense and very difficult to transfer everything we have learned from the courses to the professional exercise, but they opened us a little bit the perspective and we got a little up to date, especially in D3. We found it very complex development for the day to day because of the little time we have, but it did open our minds. The company has trained us in that sense and allowed us to train if we want. They give aid and there is always good disposition on the part of the company. It is a thing to be thankful for.

Consequently, it was observed that not all of the newspapers were interested in the training of the stuff. *El Confidencial* and *Diario AS* were not willing to pay for extra training and master degrees. Dario AS had a virtual campus to gain journalistic skills but it was offering videos only. Without someone to guide

the journalists, videos on the virtual campus were not efficient to gain new skills. It was seen that *Marca* and *El Mundo* which belong to the same company were supporting the staff with the school of communication and journalism and also with paying options for the journalists' extra training and master degrees they took outside of the newsroom. It was also seen that *El Pais* had the same structure which is a school for journalism and the company were willing to pay journalists for their own training they took outside. *Mundo Deportivo* was also promoting the staff to learn new skills and willing to pay for extra courses. To sum up, it was observed that *Mundo Deportivo*, *Marca*, *El Mundo*, and *El Pais* were promoting education and supporting the newsroom staff to gain new skills with internal education and providing economic support for external education while *El Confidencial* and *Diario AS* were not investing enough budget for the trainings of journalists.

5.3.2. Expected Skills from Data Journalists in Spanish Newspapers

The interviewees pointed to the different skills that they're expecting from a data journalist. It was observed that the interviewees' expectations from a data journalist was changing based on their profession. Journalists mentioned more about the knowledge of the topic while data journalists were asking different points of views towards the stories and infographic artists were expecting more technical skills. However, all interviewees agreed that a data journalist should have an ability to do everything, but it was hard to find all skills in one person. Daniele Grasso from *El Pais* mentioned some personal characteristics were expected from data journalists because according to him, data visualisation programs could be learned and explained:

> Basically, solving problems that other people can't solve. Because of the amount of data, it's suspected that you can solve this problem. And then, the skill to see stories in data that other people don't see. I mean, we can't pitch stories that were the same stories pitched by other people. You always have to be different from the others.

Ruben Gimeno from *Marca* claimed that to see stories in data, a data journalist should have an understanding of the topic and the numbers. According

to Gimeno, that was the only way to create a different data journalism article because traditional news writing was not that hard. Gimeno also added:

> I think the news with graphics is much better if you know what you want to tell. Because we see graphics in every paragraph we read. We see a lot of graphics. You need to be able to see graphics everywhere, that is another skill that is needed.

Lorenzo Lara from *Marca* pointed to the importance of being enthusiastic about working with data and explained:

> I think that the data journalist has to be passionate about his/her work. Fundamentally you have to be in love with data. Because not everyone likes it. And then you have to have a minimum technological training to be able to scan, to be able to store that data, to be able to consult it, to analyze it. I think you have to have technological training.

Jesús Escudero from *El Confidencial* stated a similar expectation from a data journalist and mentioned the importance of gathering data to find a hypothesis for a data journalism project. However, Escudero mentioned that the most important skill was liking to work with data as Lorenzo Lara mentioned and added:

> I think that the main tasks for data journalists are the ability to gather data with transparency law, scraping data with Excel and spreadsheets. Because 90% of our time is for gathering information to compile, clean and analyze them. We must be very good in this area. Gathering process and the opinion process is very tedious. So if you don't like it, you can't do it. You must like that process.

Dario Ojeda from *El Confidencial* pointed to the importance of the data extraction process and claimed that a data journalist had to dominate Excel. According to Ojeda other programs such as Tabula and Finereader were valuable for a data journalist but when a data journalist dominated Excel, he could do everything. Tomas Alhambra pointed to the same skill for a data journalist and explained the most important skills as knowing how to handle databases and technical skills to scrape websites to gather information.

Marta Ley from *El Mundo* and Miguel Angel Carbonero from *Marca* and Roger Guillamet from *Mundo Deportivo* mentioned mostly the technical skills needed to be a data journalist. According to the interviewees' statements the technical skills were knowing how to use Excel, Tableau, Carto, Flourish, Datawrapper, Illustrator and also SEO. According to the statements of Ferran Morales from *Mundo Deportivo*, it was unnecessary to talk about programs to use. Morales claimed that the first skill a data journalist had to have was combining two professions which are infographic artist and journalist and explained:

> I believe that until they are merged, not much depth will be extracted. Because the journalist does have the structure, the narration, the infographic artist is clear about the visual part. The writer has the facility to search in data, but the fact of capturing data, optimizing it are different. It is not a priority now but I think it would be a very important part. In other words, the journalist should be trained as he has made freedom in the media so that the normal news editor knows how to capture data, synthesize it, visualise it better. This is a necessity. I think it would be quite interesting that the editor knows how to work with data more quickly every day.

Consequently, interviewees explained their expectations from a data journalist in different topics. Firstly, a data journalist had to like working with data and have a problem-solving skill. A data journalist had to have the characteristics of a journalist and an infographic artist to be a good data journalist. Lastly, when a data journalist combined the personal skills, s/he had to gain technical skills and learn how to use related programs such as Excel, Tableau, Carto, Flourish, Datawrapper, Adobe, etc.

5.4. Current Environment in Spanish Newspapers After Integrating Data Journalism

In this section, current working conditions and changes in the workload after the integration of data journalism in Spanish newspapers, current needs to create better data journalism articles, and newspapers' economic motivations were discussed with journalists, data journalists and infographic artists.

5.4.1. Working Conditions of Journalists in Spanish Newsrooms After Data Journalism

According to the statements of the interviewees, some changes were observed in the newsroom after integrating data journalism to the journalistic practice of the newspaper. Interviewees stated that the changes happened in daily schedule and workload but not in salaries. Most of the interviewees stated that they were satisfied with their current salary and working conditions when it's compared to the journalism environment in Spain. Jesús Escudero from *El Confidencial* mentioned that he was happy with his working conditions and salary according to the economical situation in Spain but he stated that the working conditions were lower than other countries such as the USA and UK and explained the reason of the lower conditions as the traditional journalism culture in Spain. Interviewees from *Marca* also stated that they were satisfied with the salary and working conditions however they had problems in time management for data journalism articles. Lorenzo Lara from *Marca* mentioned that he was happy with his conditions but he would like spend more time for data journalism and added:

> It is true that I miss having a little more time to be able to do true journalism of data. (...) Data journalism is what I do in my free time. But there are people who have different hobbies, mine is data . So it's a problem and an advantage.

Roger Guillamet from *Mundo Deportivo* supported the statements of Lara and mentioned the current problems in Spanish data journalism as precariousness in the sector and the time management problems in data journalism and explained:

> In general, I think there is precariousness in journalism, the working conditions are not what they should be and each newspaper has to see how it evolves. We know that the sales of the paper newspaper are falling and that means that the future of the newspapers is in question and it is not known what the model is. Then the conditions should be better. We are happy in the newspaper in the sense that there is a good working environment. We like the theme, we like to work on what we have studied, but there would be many things to improve and we will see over time to see how it evolves. And the

> other issue is that what we were saying was that we would like to do more data journalism and less daily paperwork, for example.

Fernando Robato from AS, Paula Guisado from *El Mundo*, Ferran Morales and Roger Guillamet from *Mundo Deportivo* and Daniele Grasso from *El Pais* also mentioned that they were satisfied with their conditions however they also mentioned that the working conditions in Spanish press needed to be improved. Daniele Grasso from *El Pais* mentioned that data journalists' salaries were less than it had to be however because of their freedom in *El Pais*, they were satisfied in this moment. Ferran Morales from *Mundo Deportivo* mentioned that the title "data journalist" became more common in Spain, the conditions will be better because according to Morales there were still two different positions were needed in data journalism in Spain: a journalist and an infographic artist, he also added:

> The salary of the data journalist will be higher, because they are specialized people and there will be less complexity, but currently this is not the case. It is still the conventional redactor. It will be charged more from the profiles that can be demanded of data journalism, data visualisation, infographics.

Interviewees who came from traditional journalism or graphic design backgrounds also stated that data journalism had changed their working conditions and current proficiency level. Carlos Forjanes from AS also claimed that their working conditions had changed because sometimes they needed to work in their free times because the working hours of sports journalism were variable depending on the leagues and tournaments. Tomas Alhambra from *Marca* also stated that data journalism was changing the working environment in *Marca* because in time there were more people involved in data journalism. Miguel Angel Lara supported the statements of Alhambra and claimed that the infographics section had more workload after integrating data journalism to the newsroom and explained:

> The infographic section has grown a lot. Since I joined the newspaper it has grown a lot. I rely a lot on them. I ask for a lot of data. I ask many things because for me it is fundamental. They are increasingly a priority element. The text can be good, but I think that a good graphic does a lot at the visual

> and informational level, because you can find many things with a glance. Since all the text can bore people, it can cost you more than one graphic to explain many things. So they're important for us.

Lorenzo Lara also claimed that data journalism had increased the workload but also made him a better journalist and added:

> Since I've been working on this, I think it has helped me improve. I am convinced that I see myself much more educated, much more with clearer ideas. And I would like to do many more things that I can not do.

Consequently, interviewees stated that their working conditions were changing, there were more workload but the organization in the newsrooms were also changing because in time there were more people involved in data journalism. Because of the increased number of data journalists their daily work plan was getting simpler and more organized. In addition, Jesus Escudero from *El Confidencial* and Daniele Grasso from *El Pais* stated that the fundamental integration of data journalism to newsrooms could be possible if the tendency of traditional journalism and connectivity to breaking news in Spain changed.

5.4.2. Current Needs in Spanish Newspapers for Better Data Journalism

It was observed that interviewees mentioned some necessities in their newsrooms to create better data journalism articles. All interviewees from 6 newspapers mentioned a web developer was the main necessity and more people who are dedicated to create only data journalism articles were needed. Interviewees mentioned specialized people in some programs or interactivity as a current need. Tomas Alhambra from *Marca* explained this need as:

> I believe that the main problem or lack that we have is technical people specialized in representation like programmers. We were the ones who had to redo our orientation and because before, the graphics were made in Illustrator and Photoshop. Now you need a lot more resources because there are a lot more tools. You need to handle a lot more tools than ten years ago.

Ruben Gimeno supported his colleague's statements and added:

> We need more time for things, but we don't. This means we need more people, someone who does programming. Someone that we give to him the idea and work with him and do our job more completely and faster I think.

Other interviewees from *Marca* also mentioned the lack of people who do programming and claimed that they could create better sports data journalism articles if they had extra people. Carlos Forjanes, a sports journalist from AS, pointed to the same necessity but Forjanes mentioned that AS needed to create a specific data journalism department for better articles. Forjanes explained this need with the sports journalism's irregular working hours and workload and according to him it was a challenge to create sports data journalism articles in this workflow:

> We can order from people in the data journalism department. For example we can say "the winter market closes on the first of February. So I need a very big article about crossing data with the spendings of Italy, Spain" etc. But If I need to do that, I have to spend so much time. If you're a sports data journalist, you can do it half the time than me, or even less. You will be really fast. You will be more accurate than me. You have the tools, you have the experience, you have everything you need to do that.

Fernando Robato from the infographics department of AS supported the statements of Forjanes and pointed to that they need to use more tools and web development to create better data journalism articles. According to the statements of Robato, there were only 3 people in the department, the workload was too much, and it was a challenge for them to spend more time in data journalism articles. Robato mentioned the necessity as people who are specialized in mapping, interactive visualisations, and coding. Marta Ley and Paula Guisado pointed to the same necessity in *El Mundo* and stated that if they had a developer and an interactive designer the workflow could have been better. Daniele Grasso from *El Pais* pointed to a person who is specialized in interactive design as what *El Pais* needs.

Ferran Morales explained the current needs in *Mundo Deportivo* as:

> I believe that a data analyst that helps staff like us, who are more visual, would be fine. And it would also be a programmer who is a specialist in Python and R who helps us optimize so much data capture. I think that these two aspects would go well to complement the visual part that we have totally assimilated.

Interviewees also stated that it was hard to follow new tools and there was a lack of time to follow new developments in data journalism. Because they had the daily work and they needed more tools to create investigative projects. Jesús Escudero from *El Confidencial* explained the reason as journalistic traditions in Spain. He claimed that, to create better projects, they needed more tools and more people. But to achieve this, Spanish journalism had to spend less time in breaking news. According to Escudero, the first thing that the newsrooms had to do was gaining a new vision and new ideas.

Consequently, it was observed that the interviewees from 6 newspapers mentioned the same necessities in order to create better data journalism projects. The starting point was adapting different points of views and then creating data journalism departments. To achieve this, newspapers had to hire programmers and web developers. This necessity was seen in the results of the level of interactivity of the selected newspapers. Especially the national newspapers had less than 10% interactive articles in the analyzed time period. In addition, programmers and web developers were needed for the articles with conversational interactivity which includes a two way communication with the reader through integrating the reader to the article with personalisation options. Conversational interactivity was not observed in *Diario AS*, *El Mundo*, El Periodico, and *El Pais*, while *Mundo Deportivo* with 5.88% of the articles and *Marca* with 1.28% of the articles. It was seen that statements of the interviewees were consistent with the results of the quantitative analysis.

5.4.3. Economic Motivations in Data Journalism

It was observed that the interviewees explained their organizations' economic motivations to adapt data journalism as advertising incomes and sponsored contents. Interviewees mentioned their ideas about subscription models in newspapers and claimed that subscription models were quite new in Spain. Jesús Escudero mentioned that *El Confidencial* had a subscription system but the main economic motivation was advertisement incomes. Escudero stated that increasing advertising incomes were coming from the increase content quality and added:

> Our bet is for quality. We can say "in data journalism we've got these great products". The thing is that when you have a lot of views, you earn more money with advertisements.

Paula Guisado and Marta Ley mentioned that a subscription model was started in *El Mundo* because data journalism added value to the newspaper. According to Gusaido's statements, the management team of *El Mundo* adapted data journalism as quality content they could sell. Marta Ley supported the statements of Guisado and added:

> With the payment strategy, which is very recent, we have been told that the type of information in our data section is more favorable to being paid because it is different.

Daniele Grasso mentioned the reason of creating a data department in *El Pais* as using data journalism as a source of income and they were starting a new subscription model:

> I think that the data unit is also a way to create different stories and let people pay for them. This is another reason that it was created.

Tomas Alhambra stated that *Marca* was preparing ad-free premium subscriptions but this was still an idea. His colleague Miguel Angel Carbonero claimed that subscription strategy was not necessary for *Marca* because when they

created a quality content, incomes came from advertisement or sponsored contents and added:

> Subscription strategy needs very dense data content. We are not very interested in very specific data content because it consumes a lot of time and being free gives us an added value. This is only used when the added value can have an advertising revenue. In that strategy, you have to give the reader something quality and something a little more. And you always try to enhance the visual.

Ferran Morales also mentioned that the economic motivation of *Mundo Deportivo* was advertising incomes and branded contents and subscription models were not a necessity for sports data journalism in Spain because sponsored contents had more potential than subscriptions. Roger Guillamet pointed to the same issue and claimed that when newspapers created a quality content, the reader engagement was increasing and became an income for newspapers.

Carlos Forjanes from AS mentioned that the motivation of doing data journalism was illustrating the article better without any economic motivation. Fernando Robato also stated that AS did not need a subscription model right now, but could be created for the future when the quality of data journalism increased more. According to Robato, the problem was that the companies' were trying to earn money from data journalism without created a special content and added:

> People always pay when you offer information with really high quality. I don't want to read the same thing in the newspaper that I can read in the blog or on Twitter. That is a huge mistake in the newspapers. If you want to build a paywall you need to offer quality to the people and the only way to get quality is to invest in people. So many organizations are trying to get rich without an investment in people and resources.

Consequently, interviewees from 6 newspapers presented their opinions about the economic motivations behind the adaptation of data journalism in the newsrooms. It was observed that the sports newspapers had no special economic intention towards data journalism and they were not seeing subscription as a

need. Sports newspapers' economic motivations to do data journalism were advertising incomes and sponsored contents with increasing reader engagement through quality content. Subscription models were seen in El Confidencial, *El Mundo*, and *El Pais* and it was observed that national newspapers were trying to adapt quality data journalism to the newsrooms to use data journalism as an income for the newspaper. In this point, a contradiction was observed in the economic motivations and investments. *El Confidencial* and *Diario AS* were using data journalism as an income source for the newspaper but they were not making the necessary investment to the education of the staff to publish better articles. It was observed that *Mundo Deportivo*, *El Pais*, *El Mundo*, and *Marca* were investing in data journalism and supporting the education of the staff and transforming the new skills of the staff to an income source with quality data journalism articles.

5.5. Reader Engagement in Data Journalism

In this section, reader engagement in data journalism was discussed with journalists, data journalists and infographic artists. Interviewees mentioned the changes in the engagements in traditional journalism articles and data journalism articles and how to catch the reader's attention through data journalism articles. Interviewees also mentioned their ways to measure reader interest.

The interviewees explained the engagement with readers through data journalism articles and differences in engagement between traditional and data journalism articles. It was observed that the interviewees mentioned a better engagement with readers through data journalism. Jesus Escudero from *El Confidencial* mentioned that the successful engagement was based on time spent in a piece and added:

> I think that data journalism projects are well valued by people. Not only from the number of visits, but mostly from the engagement time. They spend more time on data journalism projects. So it's easier to engage with readers.

Daniele Grasso from *El Pais* mentioned that the engagement was high if the newspaper was able to sell the story. According to the statements of Grasso, the

success rate of reader engagement was based on promoting the article in a correct way and level of deepness of the story and added:

> I have seen really great stories not really well sold on the homepage. So they didn't generate much engagement. And there were stories that have much engagement because they were sold. On the other hand, even if people don't read it, they can see a big investigation story. So the newspaper is looking for this kind of stuff.

Fernando Robato from AS also mentioned the effectiveness of data journalism articles and claimed that the engagement was more easy with visuals. According to Robato, people were likely to engage with the data journalism articles because it was easier to get information through visuals. Carlos Forjanes from AS mentioned that the higher engagement was seen in infographics and photo galleries and these articles were more likely to be shared by people in social media. Paula Guisado from *El Mundo* supported the statements of Forjanes and claimed that people were more likely to spend time in infographics and photo galleries. According to the statements of Guisado people were staying in the infographics very long and this engagement time was followed by photographs.

Lorenzo Lara from *Marca* also supported the statements of Fernando Robato and claimed that data journalism articles were getting more engagement than traditional articles and explained the reason as the convenience of the data journalism articles. Miguel Angel Lara pointed to the same ideas and added:

> I think people appreciate it. For people, it is a type of journalism that appreciates what they like, because, in the end, it is easier for them. It's more direct. You can tell them that a player shot with his left leg 30 times more than his right leg with a visual. It draws attention.

Marta Ley from *El Mundo* mentioned that the engagement of data journalism articles were generally higher than the traditional articles but the success were coming from choosing the right topic:

> When we publish a graphic that perhaps lends itself a lot to interaction. There is a lot of engagement with that information more than with plain text. But it doesn't always work the same either. It depends on the topic.

Miguel Angel Carbonero from *Marca* stated that the success of data journalism articles were coming from the design of the visuals:

> The infographics are much appreciated thanks to the web audience, but consumption is starting to be very fast. So we have to filter a lot of what to put in the infographic, because consumption is very fast.

Tomas Alhambra from *Marca* pointed to the same issues with Carbonero and claimed that the interactivity in data journalism articles decreased because it was a challenge to engage with readers through articles with high interactivity. Alhambra stated that data journalism articles transformed to a simpler style not to lose reader engagement and explained:

> I think interactivity and graphics were valued more. But now, with the appearance of the mobile screen, interactivity is not valued so much as it is information that interests you. I think that on the mobile phone it is more uncomfortable to press the buttons etc. Now what is being developed are many web pages that as they swipe, show you the information with gif, with small transitions. But you don't have to be clicking or doing anything interactive. Because now they value simplicity and immediacy more. 80% or 85% of *Marca* users, which is usually a very young audience, already watch the news through their mobile.

According to Ruben Gimeno from *Marca*, reader engagement in *Marca* between data journalism and other articles were not much different from each other, the engagement was regularly high because *Marca* was always a visual newspaper:

> I think that people are very used to seeing visuals in *Marca*. So the audience expects this from *Marca*. (...) If you see the social media accounts of different newspapers they do the same we do.

Dario Ojeda from *El Confidencial* claimed that when a newspaper presents a story with data, the article was looking more trusted and getting more engagement. Ferran Morales from *Mundo Deportivo* supported the statements of Ojeda and mentioned that the data journalism articles were looking more elaborate and this was getting more engagement. Because journalists needed to spend approximately 30 minutes to write a traditional data journalism articles while a data journalism article needs 2 weeks to 2 months:

> Whenever we have done analysis work on a lot of data, the user has predicted that we have taught concepts or data that without this differentiation would not have been achieved. We have had a lot of feedback from the user. They haven't asked us for more because they don't know what to ask for more, but the reaction is very good, always.

Journalists, data journalists, and infographic artists mentioned that they were not using specific tools to measure reader engagement. However, they were getting metrics from the related departments of the newspapers and also receiving feedback through social media, news comments, and emails. Dario Ojeda from *El Confidencial* mentioned that he was measuring the engagement through his Twitter account and sometimes he was receiving emails from readers. Jesus Escudero also mentioned that they were checking social media shares and comments, especially Twitter, to see the engagement rate of a data journalism article. Miguel Angel Carbonero mentioned that they have an old feedback system in *Marca* but the system was working for the registered users. Carbonero claimed that *Marca* was giving more importance to social media metrics to understand reader engagement. Carbonero also added that data journalism articles based on gamification were the most engaged articles. Ruben Gimeno from *Marca* supported the statements of Carbonero and stated that they were receiving briefings regularly but journalists were analysing the reader engagement individually through social media, comments, and emails and explained:

> In infographics, the first feedback is in the comments of the people. When people are writing about something which is not about your graphic, that means your graphic is okay. Because if you make any mistake, like a number or a spelling mistake, they're writing. So if they are talking about football this

> means good. The second one, we post on Facebook, in individualized sections. You feel that people like it or not, but you don't get a very intense response.

Interviewees from *El Pais* and *Mundo Deportivo* mentioned that they were following metrics regularly to connect with readers in a better way and to understand their expectations. Daniele Grasso explained the measurement of reader engagement in *El Pais* as:

> When we make big infographics, we always check the audience. I mean, how many people read the piece? How much time do people stay in the piece? And then we can check, for example, the maps. How many people actually used the maps? Not only looking and saying "Oh, what a beautiful map" but they start touching it to enter. So these are the main things. In a while, we will learn how many people subscribed to us, it will be sent to our newsroom.

Ferran Morales and Roger Guillamet also pointed to that they were following the feedback from social media, article comments, but they were also receiving the metrics for data journalism articles. Ferran Morales explained the metrics they received as:

> We know what they like is by the time they spend looking at the page, which is much higher than in a piece of conventional news that many people have, but after 10 seconds they go. On our pages, as there are more visualisations, more time is spent and it is one of the metrics for us. And I believe that metrics are becoming more and more important in the media.

Roger Guillamet supported the statements of Morales and exemplified the time spent on data journalism articles as:

> Users may stay in normal news items for around 20 seconds or 30 seconds. But for example, in some projects of Ferran, it reached 4 minutes or 5 minutes on average. And this is a very important average in these times when everything is so fast.

Consequently, interviewees from 6 newspapers explained their opinions and experiences about reader engagement through data journalism articles.

Interviewees agreed that data journalism articles were getting more engagement than traditional news articles. Journalists, data journalists, and infographic artists from *El Mundo*, *El Confidencial*, *Marca*, and AS were mostly based on social media, article comments, and emails to measure reader engagement while *El Pais* and *Mundo Deportivo* were using professional metrics and social media metrics. It was observed that reader engagement was affected by the design of the article and how a newspaper was selling that article. According to the design of a data journalism article, some interviewees claimed that they started to create simpler designs because the readers were using mostly mobile phones to access the article and it was easier to get information with simpler designs through mobile. It was also seen that readers were engaging more with the data journalism articles because giving statistical information with visuals was drawing attention of readers.

5.6. Journalists' Opinions on Data Journalism and Its Future in Spain

In this section, the current situation and the future of data journalism in Spain, negative and positive expectations for the future were discussed with journalists, data journalists and infographic artists. Interviewees' explanations were the basis of the workload in the newsrooms, difficulty in data access, and lack of formation to explain the current situation of data journalism in Spain.

It was observed that the interviewees stated different points of views about data journalism and its future in Spain. Some interviewees evaluated the current situation of data journalism in Spain and stated the necessities. Jesús Escudero from *El Confidencial* stated that a progress could be seen in data journalism in Spain however the problem is lack of time in the newsrooms. Escudero pointed to the increased amount of breaking news and mentioned that breaking news, as a traditional journalism environment in Spain, was an obstacle against the improvement of data journalism. According to Escudero, data journalism articles could be created by journalists everyday but the progress could happen with quality articles and daily data journalism articles were not in the desired level.

Escudero mentioned that the bright future was a possibility if the number of the data journalism articles decreased while the quality was increasing and explained:

> I think that we, data journalists, have to build our own databases to gather our own information to create original products. And I think that I would like to work for that. We don't have this ability in Spain yet. You can do many articles but from my point of view, in less articles you have better quality. In the quality and the quantity you must choose something. You can think that you must do some reporting, longform projects, and also daily projects. But you must give up one of them.

Miguel Angel Carbonero from *Marca* also pointed to the negative sides of data journalism in Spain and claimed that the problems were over information and the newspapers' point of views towards data journalism:

> Data journalism is a tool for the journalist to generate news. It is not interesting to have a large database. The interesting thing is to cross two databases, get news, draw conclusions and then you use visualisation. Because you're not interested in dumping so much data to an audience. Precisely the big problem now is about information. There is abuse of over information, there are problems that sources are contrasted. I think that instead of focusing everything on seeing who makes the most complete visibility with more colors, the important thing is to see who takes a large database and pulls out the fact which is really meaningful or gives you alarming news about an issue or a conclusion.

Ruben Gimeno from *Marca* supported the statements of Carbonero and stated that he was enjoying data journalism articles but sometimes he was not interested in the articles because every topic was not suitable for data journalism. Gimeno claimed that if the quality was not increased, interest in data journalism in Spain could decrease.

Positive and negative opinions for the future were seen in the statements of the journalists, data journalists, and infographic artists. Dario Ojeda from *El Confidencial* mentioned a bright future for data journalism in Spain, especially in sports, because the use of data was improving slowly, and was on the rise

recently. Lorenzo Lara from *Marca* explained the bright future of data journalism in Spain as:

> I think it is a specialization within our profession, which has a long history. I believe that many steps are being taken and each time I believe that we are better. We are improving, we are learning and we are progressing, but I think we have a good future.

Miguel Angel Lara supported the statements of Lorenzo Lara and claimed that there were good profiles in the sector and data journalism was likely to grow and consolidate. Fernando Robato from AS shared similar opinions with the interviewees from *Marca* and stated the development of data journalism in Spain. However, Robato explained the necessities to achieve better data journalism in Spain as:

> If you want to use data journalism, you need to have your own department like *El Pais* and produce your own visualisations, your own information. So in this direction is an open future, but not using only data visualisation. We need to integrate data journalism in other parts. It's like when you are the director of an orchestra. You can use the different instruments and the way you mix them for the symphony. You have to mix it, and then take the best one.

Ferran Morales from *Mundo Deportivo* stated that a significant increase towards data journalism was seen but this process was going slowly in Spain and explained:

> I think that every time the competition in quality goes up. So every time we have the obligation to do more data journalism content. In other words, it is not a fashion that has come and will go. That will be increasingly important within the media.

Roger Guillamet pointed to the increased interest in data journalism and explained the reason for this interest as the current environment of fake news. According to Guillamet, audiences were appreciating stories with data because it was more trustable.

According to Carlos Forjanes from AS, Daniele Grasso from *El Pais*, and Paula Guisado from *El Mundo*, the future of data journalism was based on the future of journalism in the world because journalism was changing and losing readers constantly. Carlos Forjanes linked the decreased interest in newspapers with technology and stated that data journalism was needing more engagement than the current average, which was approximately 20 seconds, and this was a disadvantage. Forjanes mentioned that the Spanish data journalism was not innovator and this was another disadvantage for the future and exemplified:

> For example, in TVs, they try to experiment. They're playing with that kind of stuff which is more creative. I think that the user is receptive to that kind of innovation. Even for somebody that is a more passive user. We need this in newspapers. For myself, I like to play with infographics. But I know that the engagement is 20 seconds, people are reading the first three lines. So you have a limited time to show the infographic.

Paula Guisado from *El Mundo* pointed to the future of journalism and claimed that it was unclear. According to Guisado, a progress in Spanish data journalism was based on the changing path of journalism in general and claimed that the future was not bright enough. Guisado mentioned that the data units in the newspapers will be continuing in future, however, there won't be data journalists in the newspapers and explained:

> A couple years ago, I felt that the logical path for data journalism was not to be in a unit to spread. So there will be people in sections who know how to deal with data. So they will do the normal job but also have this background. Because you need time for data, and I don't think that Spanish newsrooms can give that time to people. So probably there will be a data unit in some newspapers. But it's not a bright future.

Daniele Grasso from *El Pais* stated similar opinions with Guisado and claimed that data journalism will be an academic practice or a label for people in future. Grasso mentioned that he was expecting a philosophical change in data journalism than a practical one in future because data was important and in future data will be integrated to journalism in general and added:

> In four or five years, we are not going to talk about data journalism. We're going to speak about journalism in general without the data part, because data is so important that you can't have journalism without analyzing it. I mean, you will always have people in your newsroom that are more comfortable working with data., but that's it. But in general, I feel that the term data journalism is going to be used for an academic label or like a label to show your work to the other people. But then when you have data stories, you will just say that this is really good journalism, not data journalism. So I think it will go to that part. It's like more of a philosophical change than a practical.

Consequently, interviewees explained their opinions about the current situation of data journalism and its future in Spain. A conflict was observed in the opinions of journalists, data journalists, and infographic artists about the data journalism's future in Spain. Interviewees with positive opinions stated that data journalism had a bright future because there were good profiles in the sector and this was making a competition. According to the statements the competition was bringing an increased quality. They also mentioned that the era of fake news was an advantage for data journalism because data journalism articles were more trustable for the reader. Interviewees with negative opinions about the future of data journalism in Spain claimed that the journalistic environment of Spain was not suitable for data journalism because of the high amount of breaking news. The problem was the time spent for a data journalism article and the current workload in the newsrooms. Another problem was the future of journalism in general because the engagement time was decreasing in time and a reader had to spend more time than the average to engage with a data journalism article. According to the interviewees who stated negative opinions for the future, there will be data units and people who're comfortable to work with data but not special departments of data journalism.

SECTION IV: CONCLUSIONS AND DISCUSSION

6. Conclusions

6.1. Summary of Results

In the light of Meyer, data became an important element in daily life and developed media practices. Explaining the facts with data became popular in the digital world, converted journalistic practices as well, and data journalism emerged. Data journalism is a journalistic practice that prioritises data, research, and technology. Data journalism offered a chance to participation to passive readers and transformed newsrooms to follow and adapt new techniques. While the trustworthiness towards news was decreasing in recent years (Newman et al., 2020, p.14), presenting the article with data caught readers' attention and built a trust relationship between the readers and the newspapers.

Sports offers data in various topics and the sports data makes all branches simpler for the audience. Based on this fact, sports data journalism is a way to explain sports to the reader with data and research, and making it more understandable. In Spain, sports is a phenomenon and an inseparable part of the society. However, the sports journalism environment is still far from adapting data journalistic practices.

The origin of this thesis is based on the different levels of sports data journalism in the world and in Spain. While sports data journalism is a profession in most of the world, there are few organisations that adapted data journalism in a professional way in national media. Based on this view, this study sought valid answers to proposed research questions on sports data journalism in Spain. It has been observed that there are currently insufficient answers to these questions in the literature. The power of the literature to explain the topic remains incomplete due to the limited number of case studies. Although the literature answered questions about the development of sports data journalism in Spain, it remained incomplete in questions about the current state of data journalism, its advantages and disadvantages, obstacles and deficiencies to its development. In order to close the relevant gap, this study puts forward an argument different from the approaches in the literature by using qualitative and quantitative methods. This study explains sports data journalism in Spain in terms of technical aspects, journalistic practice, current situation of newspapers and newsroom conditions,

and also points to reader engagement. It discusses the topic through the content analysis of 3 sports and 3 national newspapers and interviews with journalists, data journalists, and infographic artists.

Research Objective 1: Technical features of articles.

The analysis of the articles from 6 newspapers presented the characteristics of sports data journalism articles in Spanish newspapers. These results were significant to understand the adaption of data journalism to Spanish digital media and changes in trends in time. The analysis of the articles from *Marca*, *Mundo Deportivo*, AS, *El Mundo*, El Periodico and El País also presented the variable attitudes of sports and national newspapers towards adapting data journalism to Spanish newsrooms.

According to the results, Spanish digital media was still in a process of adaptation of data journalism. Significant differences in the number of published articles in 2017, 2018, and 2019 proved the adaptation process. Newspapers were not publishing data journalism articles regularly. However, sports newspapers were more likely to publish data journalism articles than national newspapers. This result was supported by the interviews. Data and infographics departments of national newspapers were working with all sections, the workload was more than sports newspapers, and data and infographics departments had not enough background for sports data journalism. However, data and infographics departments of sports newspapers were publishing more articles because the newsrooms were just specialized on sports. A decrease in the number of published articles in 2019 presented a change in data journalism trends in Spanish digital media in terms of articles with more interactivity and more creators. Articles were created by more people and the interactivity of the articles were higher than 2017 and 2018. Newsroom stuff was spending more time for data journalism articles to increase the quality and the number of published articles were decreasing.

The effect of the footbalisation of sports media was seen in the analysis of the articles. Sports data journalism articles in the analyzed time period were mainly about football. For example, 61.14% of the articles were about football. This rate was 65.15% for sports newspapers and 51.72% for national newspapers. Cycling was the least visible sport in Spanish digital media with 4.31%. It was also

noteworthy that the reason of footbalisation of sports media were the huge amount of audience.

In addition, the analysis of the articles also presented the characteristics of sports data journalism articles in terms of story property, amount of visualisations, and interactivity. Between 2017 and 2019, data journalism articles were mainly based on comparisons and statistics. These two techniques were used by all newspapers to draw conclusions for readers. Articles in other category was also seen dominantly. Screenshots and maps were used for showing routes to access to an event, locations about games and tournaments in a static format and photographs and drawings were used for key moments of a game, injuries, scores or trophies of a player. However, the use of “other” as story property was also a result of lack of formation in the newsrooms. Articles in “other” category mostly based on simple designs, drawing, maps and static visualisations and the knowledge of advance data journalism tools were not necessary to create these types of articles. Lack of formation in newsrooms was causing more simple articles. Also, new tools for data journalism were emerging fastly and following the trends was a challenge for journalists, data journalists, and infographic artists. In addition, sports data journalism articles with 1 visualisation were common in newspapers between 2017 and 2019 with 40.54% in total. However, it was noteworthy that the preferred number of visualisations for a sports data journalism article showed a variety in sports and national newspapers. Sports newspapers were more likely to create a balance in the number of visualisations but also interested in using a couple of visualisations for a data journalism article. In the analyzed sports newspapers, articles with 1 visualisation were seen as 36.45%, articles with 2-3 visualisations were seen as 29.10%, and articles with more than 3 visualisations were seen as 34.45%. The balanced use of number of visualisations was observed in *Diario AS* with 30.39%, 37.71%, and 31.90%. While *Marca* was publishing stories mostly with 1 visualisation and more than 3 visualisations *Mundo Deportivo* was publishing articles with more than 3 visualisations dominantly, which is 66.67%. On the other hand, national newspapers were mainly using 1 visualisation in data journalism articles with 50.16%, 2-3 visualisations with 27.59%. The least preferred number of visualisations for national newspapers was more than 3 visualisations with 22.26%. In the analysis of national newspapers, *El Pais* was seen as the

newspapers with different style of data journalism articles. Published data journalism articles in *El Pais* presented a dominance of use of more than 3 visualisations with 42.14%, followed by 2-3 visualisations with 8.36%, and 1 visualisation with 19.50%. Opposite results were observed in *El Mundo* and El Periodico. In the analysis of *El Mundo* and El Periodico, articles with more than 3 visualisations were seen as the least preferred with 5.26% in El Periodico and 0 in *El Mundo*. El Periodico and *El Mundo* was using 1 visualisation dominantly. Qualitative analysis presented a conclusion for these results. Based on the interviews, spending sufficient time in a data journalism article was challenging for journalists, data journalists, and infographic artists because of the daily work and lack of staff. This was also the reason for the dominant use of static visualisations, which is 96.55%, in data journalism articles created by national newspapers. The same results of qualitative analysis also proved the reason for lack of interactivity in data journalism articles created by national newspapers. Lower number of visualisation numbers and level of interactivity were observed as the result of the daily workload of the staff and newsroom conditions and this situation was affecting the adaptation process of data journalism in newsrooms negatively.

Research Objective 2: Changes in journalistic practice and production process of articles.

Results of the analyzes drew a conclusion about the changes in journalistic practice in Spain after integrating data journalism to newsrooms. While the daily schedule and satisfaction rate were changing, working conditions did not show an alteration in Spanish news media. Data journalism increased the workload of the journalists, data journalists, and infographic artists and the qualitative analysis presented a time management issue in newspapers. Lack of data journalism departments was noteworthy and data journalism was the new duty of the staff in the newspapers. Qualitative analysis presented that data journalism was starting to change the journalistic culture in Spain because journalists were more likely to involve data journalism articles than traditional articles, even in their free times. According to the point of views of journalists, data journalists, and infographic artists, Spanish news media needed more data and visualisations to

tell a story better to readers, in general to increase quality. Sharp boundaries between sections were changing through data journalism, contents were getting richer because there were more people involved in data journalism in each newspaper in time. In addition, involvement of more people was decreasing the daily work, creating a collaborative environment and increasing the level of quality in data journalism articles.

The results of the qualitative analysis presented the creative process of a data journalism article in terms of decision-making and choosing the technical characteristics of an article. Interviews showed a double-sided decision-making process. Journalists from different sections were coming to the data unit and requesting visualisations for their articles or the data unit was proposing the idea to the related section. The decision was taken by both journalists and data units but they were working independently during the visualisation process unless it's an investigation or detailed project. Duties and topics were assigned by chiefs in meetings but the priority was given to the big stories or remarkable events. Topics were chosen according to 3 aspects as data based, topic interest based, and reader interest based. In this point, data journalists and infographic artists had a chance to took responsibility for breaking stories which is mainly based on reader interest. Newsrooms were trying to give the breaking news in first place and data journalists and infographic artists could find the information, make visualisations, write stories and publish without an approval. Decision-making process for double-sided except breaking news. Topics chosen data based were recommended by data journalists and infographic artists to discuss with related section and the chiefs of those sections to get an approval based on data that data journalist or infogprahic artist found. Opposite to this, data journalism articles were requested by journalists and section chiefs based on topics and data and/or infographic sections were finding data and making visualisations for the article. In addition, qualitative analysis showed the increased collaboration between sections in the analyzed time period because of the lack of staff and increased daily work. Since the separate data journalism departments were not common in newsrooms, articles were created by reporting, data, and infographic sections. Also, collaborations were used for international events and tournaments and the preparation for the project was starting from 3 to 8 months before depending on the event. Because the events were repetitive and the originality was challenging

newsrooms. Publishing articles that depends on big projects, investigations, and team work was challenging while the daily work was continuing. To publish better and original stories, the preparation was starting quite early. Long preparation time was needed to experiment and find the most original stories in order to increase reader engagement.

In addition, a similarity between the tools used in the newspapers was observed. Excel was the main tool to extract data in all newspapers. R, a programming language, was also used by some newspapers if there's a journalist who knows how to use R in the newsroom. Excel, OpenRefine, Tableau and R were observed as the tools to clean data in the 6 newspapers. According to the qualitative analysis, data analysis was the challenging part of a data journalism article and newspapers were using Excel, PowerBI, and Tableau to analyze data. It was proved by the qualitative analysis that the easiest part was the visualisation. There was a variety in the tools, and most of the tools were time saving. Flourish, Tableau, Datawrapper, R, Hype, Carto, Mapbox, and Adobe programs (Illustrator, Photoshop, Animate) were seen as the visualisation tools of Spanish newspapers.

On the other hand, journalists, data journalists, and infographic artists were free to choose the tools to work, and the narrative formats of their data journalism articles. However, there were some steps to follow in order to work freely. The staff of newspapers were choosing their data journalism tools freely if the tools had not a subscription or a licence price. In order to use a tool with subscription or licence they had to discuss with the management to request the tool. Journalists, data journalists, and infographic artists were also choosing the narration of their data journalism article. However, an approval from their chief was a necessity in the end.

Finally, qualitative analysis presented that Spanish newspapers were not in the desired level in data journalism. In considering the current situations of the newspapers, there were common needs in order to achieve data journalism to the desired level. It was noteworthy that all newspapers were facing lack of staff, especially a web developer and an interactive designer. People who are specialized in certain programs were an absolute need to increase the content quality. This result was supported with the content analysis. Lack of interactivity in sports data

journalism articles were based on this need in the newsrooms. Issues regarding lack of time and people could be solved by creating data journalism departments. Creating data journalism departments was the way to bring new visions and ideas to newspapers.

Research Objective 3: Internal and external effects that shaped data journalism.

There is a relation between available data and the adaptation of data journalism in newsrooms. Data journalism was becoming a bigger part of the newsrooms because the available data was increasing each year. However, qualitative analysis presented the limitations and problems regarding accessing data in Spain. According to the results, accessing data in certain topics, such as the topics related to economics or politics, was challenging for Spanish media. Qualitative analysis showed journalists', data journalists', and infographic artists' point of views towards available data. The first issue was the low trustworthiness of data. Confirming data from 2 or 3 more sources was a necessity for newsroom staff. Especially the data related to economic issues was not fully transparent. Low trustworthiness and lack of transparency were mainly observed in economic data in sports, especially in football. Minor sports had more transparent data than football because football was not just a sport and it was linked with different sectors. However, there were more available and open data for international events compared to Spain. In addition, Spain had different dynamics in available data because of the country's regime. National data was not sufficient, even regional data was the most challenging for journalists, data journalists, and infographic artists. In this context, an issue with the transparency portal was occurring because each region had different policies regarding the transparency portal and the portal was not sufficiently efficient in each region.

The results of the qualitative analysis presented another limitation regarding accessible data and its format. The data was not in a proper format predominantly and data cleaning and formatting were necessary. This issue was combined with time management problems in the newsrooms and presented a negative effect on Spanish data journalism. In addition, there was a monopoly in the sports analytics industry. Newspapers were making an agreement with Opta, a sports analytics company, to access detailed sports data about the games,

players, teams, and tournaments because the staff could not collect all sports data.

Working on sports data journalism articles had both negative and positive sides. Finding quality data was the most challenging side for journalists, especially in the topics related to economics and management. Also, boundaries and limitations were observed in the topics for sports journalism because the sector was economically dependent. Originality was a noteworthy issue in sports data journalism because the tournaments were repetitive and it was a challenge to create original content. This was explained as “the wheel of sports”. Also, narratives and trends were changing constantly in sports and adaptation had to be fast to new trends. In this context, lack of originality and new trends was affecting readers engagement in a negative way.

On the other hand, creating sports data stories had positive sides for newspapers. Except the accessible data in certain topics, analytics and advanced statistics about the games and players were available for sports data journalism articles. Sports data journalism articles with analytics and advanced statistics were making sports more understandable for the spectators and it was adding value to the competition. In addition, through the amount of sports readers, newspapers were engaging with them with less effort because sports were more likely to be clicked by readers. Sports data journalism articles were selling themselves and it was bringing more sponsored content and advertisement to the newsrooms. Economic intentions were one of the reasons for adapting data journalism in Spanish newsrooms.

According to the interviews, a significant difference between the reader engagement in traditional and data journalism articles were seen. Data journalism articles were providing more reader engagement to the newspaper and also well valued by readers. Number of visits and engagement times of the data journalism articles were proving the success rate of reader engagement. The reason for the higher reader engagement in data journalism articles was the effectiveness of getting information through data journalism pieces. Visualisations were giving the main message in a more eye-catching way and readers were engaging with the articles. In addition, data and visualisations were drawing a more trustworthy look to the article. Specifically in sports, data journalism was the most effective way to

engage with readers in terms of presenting analytics and advanced statistics in a visualisation in a more simple but also dynamic way for readers.

On the other hand, keeping the reader engagement stable for a newspaper was becoming a challenge in time because the consumption was fast. In the context of “the wheel of sports”, changing trends and narratives, choosing accurate topics for the data journalism articles were determining the reader engagement. In addition, narratives in data journalism were constantly changing because readers were more interested in reading from mobiles. In time, reader engagement through data journalism became linked with the simpler visualisations which work well in mobile.

Consequently, qualitative and quantitative analyzes of 6 newspapers brought similar conclusions. According to the results, characteristics of the data journalism articles of selected newspapers had similarities. In addition, qualitative analysis presented similar conclusions in open data and transparency, integration of data journalism to newsrooms and current needs, creative processes of data journalism articles, and reader engagement.

6.2. Discussion

In the light of all results, the interest of the public towards data journalism is undeniable. However, I believe that this interest is not sustained in case with the current quality of the articles. Data journalism is not seen as a significant qualification and opportunity in Spanish newsrooms. From my standpoint, few reasons can be listed to explain the slow adaptation of data journalism in Spanish newsrooms. The very first reason is the dominance of the traditional journalism environment in Spain. Because of the rapid change in the country’s agenda, newsrooms can’t devote sufficient time to new media practices. Newsrooms are publishing news for a rapid consumption but data journalism needs time, planning, and research. At this point, lack of formation in the newsroom staff is the second deficiency to create quality data journalism articles. Data journalism articles in Spanish newsrooms are mostly created by traditional reporters and infographic artists. However, data journalism is a profession that needs a background and research qualifications. To increase the quality of the articles, the job definition of the staff should be clarified. Because as it is seen in the pioneers of data journalism

which are the United States, the United Kingdom, data journalism articles are created by ‘data journalists’ who are responsible for all stages of the process. Because not all data tells a story or not all data needs a visualisation and a data journalist should know where to look and how to find story in larger databases. In Spain, a lack of data journalism departments is seen. While the reporters and infographic artists are working on daily work, breaking news and other newsroom duties, they can’t allocate time to data journalism projects and this directly affects the quality of the articles. Lastly, open data level and the transparency culture of Spain can be listed as another reason for the current level of data journalism. While the trustworthiness towards news is decreasing each year, data journalism is a great tool to inform society. Data journalism articles attract the attention of the reader in the era of disinformation. However, I see that there is not enough investment in data journalism to use the opportunity that this era offers. In my opinion, newspapers want to use data journalism as an income source with sponsored content or subscription model but the investment is not enough to offer the quality that people want to pay for. However, the adaptation of data journalism is still continuing and the journalistic environment of Spain values this profession more in time. More people involve data journalism in newsrooms and educate themselves in this area. I believe that data journalism will be on the agenda of the newsrooms in the years ahead and the quality will increase each year.

In the case of sports data journalism in Spain, it’s clearly seen that the quality of the articles are higher than other topics such as politics, culture or economics. In my opinion, the adaptation of data journalism in sports newspapers is at a higher level than national newspapers. Amount of the available data, public interest, and working on a specialized topic can be listed as the reasons for this adaptation. Spain has a sports culture and there’s a huge audience in sports. This situation causes more quality content produced by newspapers. Especially in the international perspective, not only Spanish people have a huge interest in sports but also the sports industry in Spain is more international. In this point, an interest to publish high quality sports data journalism articles is clearly seen in newsrooms. Publishing quality articles in sports newspapers is also the reason for working on a specialized area. Data desks, infographic artists, and reporters are specialized in sports and sports newspapers’ daily workload is not affected by Spain’s daily agenda like national newspapers. In the light of my observations and

conversations in the newsrooms, I can claim that the intention to work on data journalism in Spanish newsrooms is also based on the feedback from the reader. Official statistics, engagement levels and social media metrics are supportive causes to spend more time on data driven articles in sports newspapers because sports data journalism articles attract the attention of the reader more than traditional sports reporting.

Sports offers a huge amount of data and advanced statistics. However, not all statistics are comprehensible for all readers and data driven sports articles make sports more understandable. Accessible sports data is valuable when an article tells the story behind that data. In this case, sports data offers stories to Spanish newsrooms and decreases the chance of conflict. However, the sports industry in Spain also affects sports journalism negatively. Because the sports industry in Spain is international and linked with politics and economics. A challenge can be seen in searching data that linked other topics or topics can cause political conflict. In my opinion, sports data journalism articles in Spain are objective, have a higher quality than other topics but the originality and novelty are missing because of telling the same types of stories instead of investigative projects.

Consequently, the current level of sports data journalism in Spain is promising for the future since more newspapers are interested in publishing more data articles about sports because of its public interest. Sports data journalism in Spain has an opportunity to be one of the pioneers in the world because of the interest towards the industry in Spain, but this opportunity can be used if the newspapers tell original stories and discuss its relation with other areas.

6.3. Suggestions

This thesis presented the current level of data journalism in Spanish newsrooms and explained the opportunities and threats in its development. In order to adapt data journalism fully and follow journalistic trends in the world, some suggestions to the newsrooms were identified.

Firstly, newsrooms need to create specialized data journalism departments and use the expertise of professionals. Hiring specialised people for data journalism departments is a way to decrease the workload of infographics departments. Creating separate data journalism departments allows the departments' members to improve themselves, follows trends and news tools to adapt in the newsroom. This provides enough time for data journalism departments to spend time on learning new tools.

Secondly, data journalism departments need to collaborate with other departments to use their expertise in specific topics to create successful articles. Also, data journalism departments need a minimum of 1 data scientist, 1 data journalist, and 1 programmer. The data scientist needs to create a database for the newsroom to not depend on data providers to create a data journalism article.

Thirdly, newsrooms need to use the transparency portal more often to collect data and give feedback to authorities about their experience. Transparency portal's functionality increases as the portal is used oftenly.

6.4. Limitations and Further Research

The aim of this research was understanding data journalism in Spain from different perspectives and analyze the internal and external factors related to Spanish data journalism. Also, due to a gap in Spanish data journalism in the literature, this research leans to a descriptive analysis to open a way for more critical studies. In addition, because the arrival of data journalism was relatively late in Spain, the articles was determined by 2017, 2018, and 2019. However, to understand and analyze Spanish data journalism a wider sample is needed for future research.

Media and technology become inseparable and the need for data and new skills is an ongoing need in the current journalistic environment and will appear on agenda in the next years. Data journalism will be more important with the support of fact-checking and the need of the public in trusted news. In the light of this, it's necessary to carry this topic a step forward with a broader sample. Also, further research about the level of open data and transparency is a need to study the basis of data journalism.

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Annex I. Interview Questions

Production Process

1. Can you explain the decision making process in your organization? How do you choose stories and their techniques?
2. Do you work autonomously or work with a group during the creation process? (for group please explain)
3. What tools do you use to extract data?
4. What tools do you use to clean data?
5. What tools do you use to analyze data?
6. What tools do you use to visualize data?
7. Do you choose the tools to work on or are they chosen by the company?
8. Do you have any guidelines in your company for storytelling or are you free to choose your narration format?
9. What's the aspects of good sports data stories?
10. What are the main difficulties journalists face when developing data journalism pieces in sports?
11. Is there any challenging difference between sports data stories and others? (question for national newspapers)
12. How do you manage the workflow for the regular coverages and specific investigative production and also big events? How does the workflow and time management differentiate in these cases?
13. Is there any data journalism department in your company?

Access & Use of Data

1. Do you have any subscription or agreement with sports data agencies or other organizations to obtain and share data?
2. How do you find sports data? Can you name your main sources?
3. How long does it take to access necessary data?
4. Does data that you access in a proper format?
5. What do you think about the transparency of information in Spain?
6. What are the limitations and problems about accessing sports data?
7. Which one is harder to access data? International events or national events? Why?

Profiles of Journalists and General Work System

1. What is your educational background? Do you have any specific education in data journalism? If yes, can you please mention your education?
2. Does your organisation offer any training or convenience (paying for training, or giving available hours) to learn data journalism skills?
3. What type of skills are expected from journalists for data journalism practices?
4. Do your working conditions satisfy you in terms of salaries, working hours, and the overall journalistic practice you achieve?
5. Are there any significant changes in your working conditions after the change in your journalistic practice? If yes can you please compare your old and new working environment?
6. Can you describe the work system in your company?
7. Did data journalism change the work system? If yes, how? If not, how did you integrate data journalism to your traditional work system?
8. Is there any internal and external needs currently in your organization to adopt data journalistic practices in sports? Can you please name it?

9. What are the main differences and challenges in your regular journalistic practices and also in your organization after integrating data journalism practices in sports?
10. What is your organization's main economic motivation for data journalism practices? Advertising incomes or subscriptions?
11. What are the advantages and disadvantages of creating sports data stories?
12. How do you manage audience participation? Do you have any techniques to measure and increase engagement?
13. What are your tools to get feedback from your audience?
14. Is there any significant change in your audience participation after integrating data journalism to your work system?
15. Is it easy or hard to engage with readers through data stories in comparison to traditional journalism?
16. What do you think about the future of data journalism in Spain?
17. Is there anything you want to add?

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