

# Characteristics and use of notifications on mobile applications: the case of the European public media

## *Características y utilización de las notificaciones en las aplicaciones móviles: el caso de los medios públicos europeos*



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### Abstract:

The media have incorporated mobile applications as another information channel for their audiences. This research analyses the features and use of public radio and television app notifications from Germany, France, the United Kingdom, and Spain. The study reveals that although features and possibilities are similar, notifications are not used equally, both from a quantitative perspective (number of notifications per day and the time each media sends them) and qualitatively (subject matter, elaboration, use of image, etc.)

### Keywords:

Audio-visual media; public broadcasting networks; content analysis; mobile alerts; news apps.

### Resumen:

*Los medios de comunicación han incorporado las aplicaciones móviles como un canal de información más para con sus audiencias. Esta investigación analiza cuáles son las características y utilización de las notificaciones de las apps de la radiotelevisión pública de Alemania, Francia, Reino Unido y España. El estudio revela que, aunque las características y posibilidades son similares, el empleo de las notificaciones es muy desigual, tanto desde el punto de vista cuantitativo (número de notificaciones por día y horas que envía cada medio) como en lo cualitativo (temática, elaboración, uso de la imagen, etc.).*

### Palabras clave:

*Medios audiovisuales; cadenas de radiodifusión públicas; análisis de contenido; alertas móviles; apps informativas.*

## 1. Introduction

“God, why did you bring this upon me? Pain and despair in a Ukrainian hospital” (Davies, 2022). “Russia gives Ukraine an ultimatum for the city of Mariupol to surrender in the next few hours” (RTVE, 2022). The *BBC* and *Radio Television Española* chose the headlines above to report on developments in the Russian invasion of Ukraine on the evening of 20 March 2022.

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Neither of the headlines refers to the news on their respective television channels or the openings of their digital editions but to the pop-up notifications sent to smartphone users who installed a media app.

Due to their geopolitical dimension, recent events of particular relevance such as the war in Ukraine, the takeover of the United States Congress after the presidential elections and even other issues of lesser global importance, although they impact citizens' daily lives, extreme meteorological phenomena or sports, or the coronavirus pandemic itself have contributed to the media's rapidly evolving relationship between the media and its users, to the extent that recent studies identify that notifications increase the self-reported use of apps by people who install them (Stroud, Peacock and Curry, 2019).

Authors such as Dimmick, Feaster and Hoplamagian (2011) have concluded that mobile phone news has replaced other types of news in the media. However, other theories suggest that mobile phone news and traditional media news coexist and complement each other because they are aimed at different audiences. Nguyen and Western's (2006) studies follow this second current.

Hill and Bradshaw highlight that although we are in the early stages of the app revolution, app development ideas should focus on the unique functionality of smartphones (2018: 186-209). Moreover, the media are aware of the need to renew their communication channels due to their readers' ever-evolving consumption habits, which the digital business development director of the *Times* pointed out almost a decade ago: "People stay on the website for five minutes if you're lucky and go from one story straight to the home page. They can spend 10 to 20 minutes on a particular page or section on an iPad" (Boyle, 2013).

### *1.1. Mobile notifications as a media information channel*

Wheatly and Ferrer-Conil believe that the distribution of news on mobile notifications, pop-up alerts, or push notifications –we understand these three concepts as synonymous in this study– is relevant for three reasons:

"Because (a.) it bypasses social networks and news aggregators, reaching readers directly; (b) it alters the agency and control of the temporal personalisation of news; and (c.) it reinforces mobiles as the locus of contact between news organisations and audiences" (2021: 694).

Moreover, Memon and Otho also highlight that one of the benefits of mobile alerts is that "people get the first information on any news everywhere through news alerts. And they don't need to wait for hourly news updates" (2017:192).

In this way, the media's evolution when transferring contents they produce to their audiences has first resulted in the rise of mobile media applications, among other issues (Schmitz, 2013; Westlund, 2013) and, more recently, in advances in these apps' specificities.

This evolution is linked to a positive perspective of notifications, identified by authors such as Licoppe:

"The transformation of the meaning of interruptions and notification devices. Initially perceived as interrupting tasks, the interruptions have gradually acquired a positive value as "notification" devices, and they are meant to be more subtle and incorporate some degree of "intelligence" to the recipient's context" (2010: 288).

Despite the timeliness of the subject matter, or possibly as a consequence of it, there are few studies about the app experiences of specific pop-up notifications. Authors such as Fortunati and O’Sullivan (2020) have recently highlighted the need to explore even more general issues such as how news is consumed on mobile devices or the spaces and times of consumption. In any case, Fidalgo’s research (2009) on the Portuguese media is noteworthy; Brown (2018) detects an increase in the sending of mobile notifications in two comparative studies on the mobile media alert model in the United States and points to two possible reasons:

“The growing consensus that [notification] delivery should not only be seen as a platform for breaking news, but also as a means to promote stronger newsroom journalism and build brand loyalty around exclusive stories [...]. More people in the newsroom “thinking digitally”, recognising the power of mobile alerts and getting involved in the process by submitting stories” (2018).

In the United States, 55% of citizens received mobile alerts about news content as early as 2016, although only 13% reported receiving them often (Lu and Matsa, 2016)

As Van Damme et al. report, mobile technology facilitates the consumption of news and, in the case of mobile notifications, even provokes responses from users to questions that had not been previously requested (2020). Therefore, there is an alteration in the relationship between the media and user since it is the media that approaches the user, not the latter who seeks the media’s content. Therefore, professionals must acquire specific competencies in mobile notifications, flash news, and other formats (Rom and Reich, 2017).

## *1.2. Research objectives*

However, the research aims to understand the uses and possibilities of pop-up notifications on mobile media apps in four European countries, given that the use of mobile phones for news consumption varies according to social and cultural context (Westlund, 2010).

This has two general objectives: on the one hand, to characterise how pop-up notifications are configured and can be used in public media’s mobile apps from Spain, France, Germany and the United Kingdom (O-1); in other words, to describe the possibilities offered by each app in terms of activating/deactivating notifications in general, whether these notifications can be activated/deactivated depending on the topics they address or the sections where they are found, whether it is possible to activate/deactivate a sound and/or vibration when receiving alerts, and finally, where the user can customise all these features on the app.

On the other hand, the research aims to determine how these media use these notifications- and whether they notify users of news media content correctly from the outset (O-2). This second objective is specified through other more specific ones, which are: to identify each public corporation’s use of notifications quantitatively (O-3); to establish the topics of the media’s contents, and their journalistic genres (O-4); taking into account the time slots each media outlet sends notifications and how quickly they send alerts compared to the rest of the media when the news item is not of its own making, but arises from a news event (O-5).

## 2. Method

Content analysis was the methodology used to achieve the research objectives. Firstly, as mentioned above, each mobile media app was analysed to characterise how the notifications are configured. Subsequently, a quantitative content analysis of all the notifications received in the analysis period was carried out.

The public media studied were from Germany (*ARD-Tagesschau*), France (*France Info*), The United Kingdom (*BBC*) and Spain (*Radio Televisión Española, RTVE*). Initially, it was relevant to include the channel *RAI* (Italy). It was later discarded after the pre-test phase showed that the notifications were not received correctly.

Regardless of the technical inability to study the Italian case, these five countries and their respective public media were chosen based on three main criteria: firstly, because they represent the five European states with the largest populations; secondly, because they have the highest nominal GDP on the continent (International Monetary Fund, 2022); and because they represent different public media budget and financing models (Peinado and Alameda, 2018; Campos, 2009) as to the credibility of their audiences (Pew Research Centre, 2018) or, as previous research has pointed out, each country's historical context and the ways of understanding how to do public journalism (Walzer and Retis 2008), which is also interesting in the search for similarities and differences in the results.

It should be highlighted that these five countries' journalistic models have already been studied and compared in previous reference research such as Fortunati et al.'s (2014), which was also related to mobile phone journalism, among other issues.

Regarding the dates, three observation periods were determined and randomly selected to avoid the researcher's influence on choosing those periods. Thus, all the notifications received from 1 January to 14 January 2021, from 2 to 15 April 2021 and from 23 August to 5 September 2021 were studied, regardless of when the notifications were received, their correct or incorrect functioning and any other parameter. Three different study periods were chosen to prevent any specific news event from disproportionately impacting the study's results; this is why two-week periods were also selected for each period. In total, 530 push notifications were studied.

A Xiaomi Redmi 7 mobile phone was used in the research, with an Android operating system. This decision is justified by the fact that the operating system is currently the most widespread: Android accounts for around 70.52% of the market compared to 28.62% for the iOS operating system, according to data from the IDC consulting firm (Ramírez, 2022). However, a Huawei P40 Lite was also used to verify that the notifications received were the same on both phones in the pre-test phase. Indeed, they were.

Chronologically, the procedure for the research started by downloading the *BBC News*, *France Info*, *RTVE Noticias*, *RAI* and *Tagesschau* apps. Next, the notifications and/or alerts and all their features were turned on, and the permissions to receive the content were granted on the apps. A pre-test phase was then carried out to corroborate the applications' correct functioning in the last week of 2020 –except in the case of the Italian media outlet *RAI* as mentioned above, as we decided not to study it to avoid alterations in the results obtained– and to finalise what would be the analysis code used in the research.

The analysis code is composed of twelve variables and had already been used in previous research studies limited to the case of Spanish media applications (De Sola and Ortiz-Sobrino, 2021), so its usefulness in similar research and its relevance for the study's objectives had been proven.

The analysis code is shown in Table 1 and includes twelve formal and content-related categories. The formal variables respond to the correct or incorrect working of the notifications sent by the media, the dates and times the notifications were sent and whether their content is displayed in the mobile applications or refers to the media's website. On the other hand, the content variables make it possible to establish the dominant topics in the notifications, the journalistic genres they are associated with, whether or not images and/or advertising are included in the content sent by the media: also whether the notification topics are content specific to the media that send them; whether they refer to live broadcasts of certain events/facts and the speed in sending notifications when the alerts are the same.

**Table 1. Analysis code**

Date of receiving the notification	Corresponding to the periods analysed (1-14 January 2021, 2 to 15 April 2021 and 23 August to 5 September 2021).
Media analysed	<ol style="list-style-type: none"> <li>1. <i>BBC</i></li> <li>2. <i>France Info</i></li> <li>3. <i>RTVE</i></li> <li>4. <i>Tagesschau</i></li> </ol>
Time notification is received	<ol style="list-style-type: none"> <li>1. Between 00:00h and 05:59h</li> <li>2. Between 06:00h and 11:59h</li> <li>3. Between 12:00h and 17:59h</li> <li>4. Between 18:00h and 23:59h</li> </ol>
The general subject matter of the notification	<ol style="list-style-type: none"> <li>1. Political or National</li> <li>2. International</li> <li>3. Sport</li> <li>4. Events and Courts</li> <li>5. Weather</li> <li>6. Economy and employment</li> <li>7. Society</li> <li>8. Culture</li> <li>9. Coronavirus</li> <li>10. Gender-based violence</li> <li>11. Lotteries and gambling</li> <li>12. Others</li> <li>13. Two or more of the above.</li> </ol>

Does the notification work correctly when I click to view it?	1. Yes 2. No
Where does the notification link go?	1. To the mobile app 2. To the media website 3. To the mobile app, but indicate that the content is to be viewed on the website.
Does the notification incorporate an image in the preview?	1. Yes 2. No
Is the notification an issue specific to the media outlet sending it?	1. Yes 2. No
If the answer to the previous question is “no,” in what order is the notification received about other media?	1. First 2. Second 3. Third 4. Fourth
What genre does the notification identify with?	1. News and Chronicle 2. Reporting 3. Interview 4. Opinión 5. News Flash <sup>1</sup> 6. Others 7. Two or more of the above
Does the notification refer to a live broadcast of an event?	1. Yes 2. No
Does an advertising window open when clicking on the notification before taking us to the news content?	1. Yes 2. No

Source: created by the authors

<sup>1</sup> In this research, we take on the researchers’ thesis: such as Rivas who argues that the news flash is a journalistic genre in itself and different from the news. This author affirms: “I think that no one can dispute its peculiar style, not easily definable, but which means that it cannot be considered in itself either a headline or a lead or a news item, implying something of each aspect mentioned. I believe that, therefore, the scientific thing is to recognise its peculiarity and admit that the flash is a news genre of its own” (1999: 163-164).

### 3. Results

#### 3.1. Customising notifications on the BBC, France Info., RTVE and Tagesschau apps.

As stated in the objectives sections, the research does not intend to be a study for characterising the four studied media outlets' mobile applications. Still, it does aim to analyse everything related to the possibilities of personalising the push notifications.

However, we believe it is relevant to highlight that the four medias' apps have been downloaded more than one million times, according to the data in Google's Play store. The users who have installed them have given the following ratings: 4.6 out of 5 in the case of *FranceInfo* with 81 000 reviews; 4.0 out of 5.0 for *RTVE* with 73 000 reviews; 4.4 out of 5 for *BBC News* with 415 000 reviews. According to Google's Play Store, there have been more than 10 million downloads of the British public broadcaster's app; finally, 4.6 out of 5.0 for the mobile app *Tagesschau* with 77 000 reviews.

Regarding their features, it should be noted that the *RTVE* app is quite limited since it only allows users to activate or deactivate them via a tab in the app's general setting menu, located on the left-hand side of the screen. There is no option to accept and/or reject alerts according to the apps' sections, topics, authors, or other filters.

On the other hand, the *BBC* app has limited customisation options and has a tab in the general settings menu located in the top right-hand corner. But, unlike *RTVE*, the *BBC* app then redirects users to the available settings on their phone, where the user can customise the sound, light, turn on the vibration and even make the notification appear on the lock screen. Four categories of alerts can be activated and deactivated: "Breaking news", "Notifications", "Audio playback", and "Top Stories".

Along the same lines of managing customisation according to each user's preferences, *France Info* includes a "Notification parameters" section in the settings menu-accessed via the silhouette of a person icon. The user can customise whether or not to receive alerts and activate or deactivate the mobile phone's sound and vibration when notifications are received without directly leaving the app. *France Info* also allows users to select the notifications from the following sections: politics, elections, events, society, sport, economy and consumption, world, culture, health, science, true or false.

It is worth noting that *France Info* has a very agile, intuitive and useful option for application users. A bell icon next to the aforementioned human silhouette in the top right-hand corner leads to the app's general setting menu; clicking on it takes you to the notification settings, where all the notifications sent by the media in the last few days are found. You can also read updated and extended alerts.

Finally, the *Tagesschau* app requires the longest route to customise notifications. The user must access the menu via the icon with three vertical dots at the top left-hand corner of the home screen, scroll down to the bottom of that page, click on "settings", and on the next page, there are three options for customising push notifications; turn them on or off, turn premium notifications on or off- they offer editorial information on live broadcasts, new tickers and exclusive daily news content- and turn the sound/vibration of incoming alerts on or off.

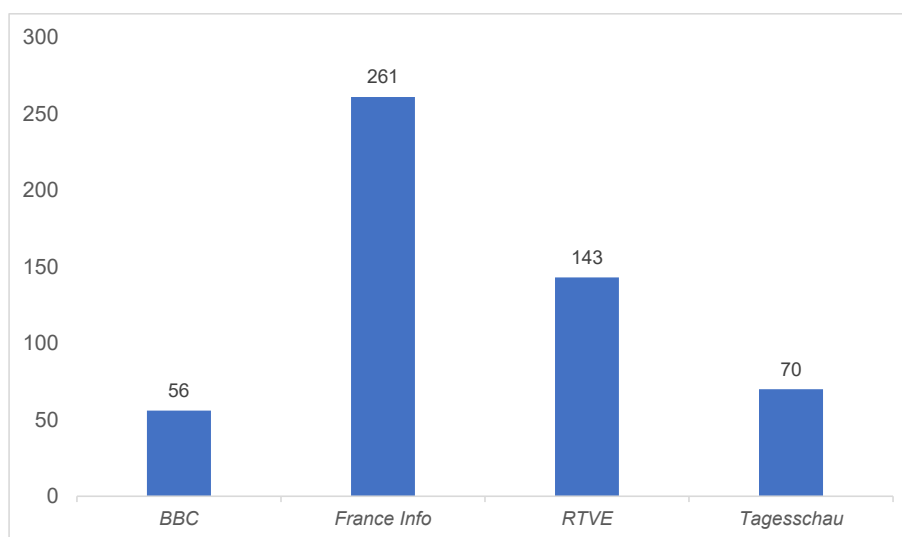
### 3.2. The use of mobile notifications in European media apps

#### 3.2.1. Formal aspects of notifications

The first significant result from the research is that a high percentage of the notifications sent by the four media analysed work correctly: absolute in the cases of *France Info* and *BBC*, almost all of them in *Tagesschau*'s (97.14%) and notably in *RTVE* (93.01%).

Thus, French radio and television is the media that most regularly sends notifications out of all those analysed. As shown in Figure 1, 261 notifications were received from *France Info* in the period studied, accounting for 49.25% of the total, followed by the Spanish channel *RTVE*, which issued 143 notifications, or 26.98%. *Tagesschau* and *BBC* used this tool far less: sending 70 and 56 notifications, respectively, or 13.21% and 10.57%.

**Figure 1. The number of notifications received by the analysed media**

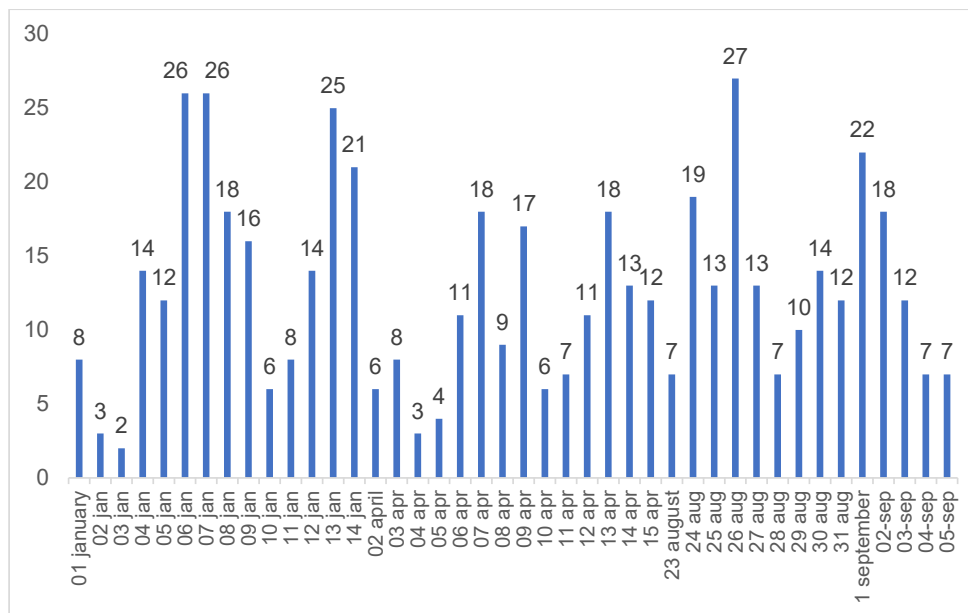


Source: created by the author



Two parameters were studied concerning the timing of the notifications: the day and the broadcasting time slot. Regarding the first aspect, a significant variability has been detected, although with one constant aspect: the media analysed send fewer alerts on the weekends, which could be related to a lower number of news events (there are hardly any agenda announcements on Saturdays and Sundays) and, on the other hand, human resources in the media are less available. As shown in Figure 2, this is repeated on the 2 and 3 of January, 3, 4, 10 and 11 of April, 28 and 29 of August and 4 and 5 of September.

**Figure 2. The number of notifications received per day was analysed**



Source: created by the authors

There is no specific pattern regarding the evolution of the notifications if we break down the three-time blocks analysed (January, April and August-September) by the media outlet. Those of *RTVE* are distributed in a downward trajectory: 39.18% in January, 31.5% in April and 29.39% in August-September; those of *France Info* in a sawtooth structure: 36.78%, 26.45% and 36.8%, respectively; those of *BBC* are mainly concentrated in the first block analysed: 46.45% in January, compared to 26.8% in April and also in August-September; and those of *Tagesschau*, on the other hand, generally in the last block: 30%, 20% and 50% respectively.

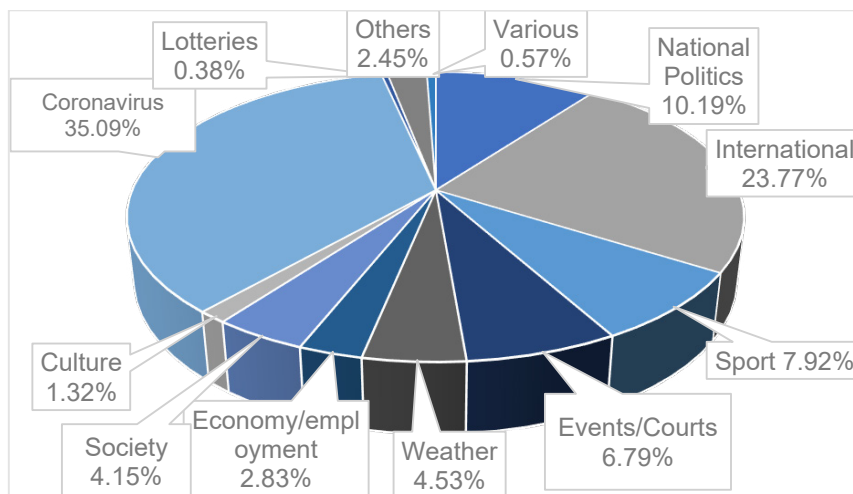
Following this timeline, the media outlets mainly send their push notifications between midday and five in the afternoon (39.06%) and, to a large extent, between six in the evening and midnight (35.09%). It is less common to receive alerts in the morning, i.e., from 6 a.m. to 12 noon (24.53%) and hardly any activity at night, from 12a.m to 6 a.m. (1.32%).

We can see that the only element common to all four media outlets is that they do not send notifications between 12 a.m. and 6 a.m. This seems obvious: citizens sleep at that time in the four respective countries. However, the trends are different beyond this. *France Info* and *Tagesschau* distribute their notifications evenly. However, they prioritise the evening time slot: in the case of the French public broadcaster, it broadcasts 30.27% of notifications in the morning slot, 36.78% in the afternoon and 32.57% in the evening; the German media outlet is similar, sending 27.14% of its notifications in the morning, 37.14% in the afternoon and 31.43% in the evening. However, *RTVE* and *BBC* do not send the news alerts until midday and only send 18.88% and 8.93% of their alerts in the morning slot. Thus, the Spanish public corporation concentrates its alerts in the afternoon (43.36%) and afternoon-evening (37.76%), and so does the *BBC*: 41.07% of its notifications are in the afternoon slot and 44.64% in the afternoon-evening slot.

On the other hand, it has been found that the user generally displays the content directly in the mobile application when clicking on the notification. In some cases, the user is redirected to the media outlet's website; this only occurs in 1.49% of the *RTVE* notifications, 1.54% of *France Info*'s notifications and 8.93% of *BBC* notifications. Finally, *Tagesschau*'s notifications are always displayed in the mobile application.

### 3.2.2. *The content of notifications*

Figure 3 shows the predominant themes in the notifications received. Due to the high rate of transmission of coronavirus, it is the subject that accounts for the highest number of notifications as was to be expected: over a third (35.09%). It is worth noting that this is followed by international news topics (23.77%), ahead of each country's national news (10.18%), sport (7.92%) and events and/or courts (6.79%). Weather (4.53%), social issues (4.15%), economy (2.83%) or culture (1.32%) are rarely the main topics of the notifications sent by the media.

**Figure 3. Dominant topics in the notifications received**

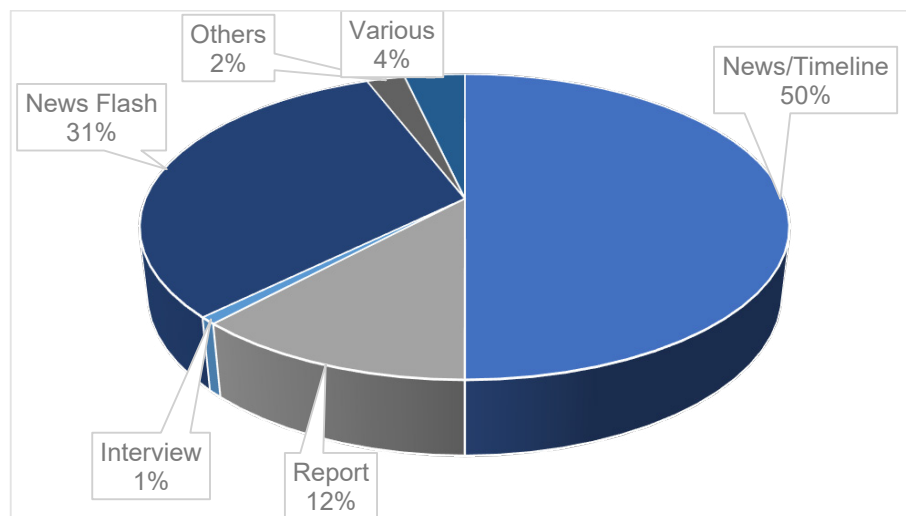
Source: created by the authors

Pandemic-related topics are not prevalent in all four media outlets; it is only the case for *RTVE* and *France Info*, accounting for 42.66% and 40% of all the alerts sent through their respective applications on this issue. However, the *BBC* (71.43%) and *Tageschau* (32.86%) send the most alerts in the International section. In the case of the *BBC*, the dominance of the international section is absolute since it only reports on social issues in 12.5% and on events or sports in 5.36% of the cases, respectively. On the other hand, the German media outlet distributes its alerts over a variety of topics the most, which go beyond international issues: 25.71% are related to the pandemic, 18.57% to national politics and 11.43% to sport.

Regarding *RTVE* and *France Info*, some points in common emerge; for instance, international political issues are the second most common topics in their reports, and Spanish and French national politics carry substantial weight. However, there are also differences: sports (11.54%) and events or courts (11.15%) are the most common topics on *France Info*, while weather (10.49%) and economics (9.09%) are the most common on *RTVE*. However, sport and courts hardly appear in *RTVE*'s alerts (2.8% and 1.4%, respectively), and weather and the economy scarcely appear in the French public broadcaster (3.08% and 0.38% in each case).

Concerning the journalistic genres, the results corroborate the purely informative nature of the notifications; 50% can be associated with news or chronicles, and 31% are news flashes. Between both categories, they account for more than four out of every five notifications, while publications identified as reports are rare (12%) and interviews (1%) and other journalistic genres (2%) are almost nonexistent.

**Figure 4. Dominant media genre in the notifications received**



Source: created by the authors

All the four media analysed primarily send alerts identified as a news item or chronicle. A high percentage of news flashes was found, which, however, is lower in the case of *France Info*: while 46.38% of *Tagesschau*'s alerts, 45.04% of *RTVE*'s and 35.71% of the *BBC*'s alerts are identified as news flashes, they made up 21.58% of *France Info*'s. However, 18.85% of the French public broadcaster's mobile notifications have the characteristics of a news item, compared to only 2.9% of *Tagesschau*'s, 6.11% of *RTVE*'s and 7.14% of *BBC*'s.

All the units of analysis identified with the news flash genre respond to mobile alerts linked to events or topics that the media were reporting on live. In other words, almost a third of the total received in the periods studied is related to broadcasting events.

One of the other most interesting elements to emerge from the research is that *France Info* not only reports more but also reports more on its own topics<sup>2</sup>: 44.23% of the news alerts sent are topics generated by the French corporation itself: a percentage that is twice as much as *Tagesschau* (22.86%) and *RTVE* (18.18%), and is more than three times higher than the *BBC*, which only has 12.5% of its own topics.

2 "Own topics" is understood in the study to be those publications that contain information exclusive to the media outlet sending the news alert. Therefore, "own topics" are not understood as publications based on agency press releases, or press conferences, or as a general rule, any derived from news events that are also reported by other media.

The research focuses on analysing *RTVE's*, the *BBC's*, *France Info's* and *Tagesschau's* capacity to respond to everyday news events, which are reported by all or at least several- of the media studied. It is worth noting that the media that issue the fewest notifications- those that could be concluded to have less internalised this culture of mobile notifications- report the fastest: thus, *Tagesschau* manages to be the first to report on 72.22% of the occasions in which both it and other media report something, the *BBC* does so on 50% of the occasions, *France Info* on 39.29% and *Radio Television Española* on 20.51%.

Mobile phone notifications can consist of only text or text and image as a preview before clicking to view the content. The study finds that images are currently underused: *Tagesschau* does not use them in any of its notifications, *France Info* in only 1.15% and the *BBC* in only 10.71%. The only media outlet interested in routinely exploring this option is *Radio Television Española*: the Spanish public broadcaster incorporates images in 65.03% of its alerts.

Mobile notifications that include advertising or promotions of other media-generated content from the four corporations studied is another resource to be explored and exploited. *France Info*, the *BBC* and *Tagesschau* do not open a window for advertising or promotion before progressing to the journalistic content. *RTVE* only does so in 0.72% of the cases studied.

#### 4. Discussion and conclusions

The use of mobile notifications by European public media is a consolidated phenomenon. This research shows that the four media analysed send journalistic content to the users of their mobile applications via notifications in a continuous, systematised and well-functioning manner. Despite the above, this is the general and common conclusion drawn from this research, showing that the models are very different and are implemented to a varying degree: *France Info's* is the most solidly developed from both a quantitative and, above all, qualitative perspective.

This research shows that the media pay attention to two factors that previous research has highlighted as determining factors in the successful evolution and implementation of technological innovations: ease and usefulness.

Both usefulness and usability of mobile news play a role in its use [...]. While ease of use may lead to earlier acceptance, transactional adoption is difficult without the perceived presence of usefulness (Chan-Olmsted et al., 2013: 140).

In this case, user-friendliness is absolute since the setting menus are straightforward. This innovation is useful because mobile phone notifications are understood by the four media outlets analysed as a purely informative element that enables real-time reporting of news events through live formats. This is shown through the association between content offered and how it is presented through journalistic genres such as news or news flashes, which was already noted almost a decade ago by authors such as Canavilhas (2013), and it has been corroborated in more recent research such as Rom and Reich's (2017). The use of the new formats' resources –live, in real-time– and the topics sent as push notifications nowadays lead us to conclude that the association between these alerts and breaking news is not accurate. And it is not, although the disruptive philosophy of suddenly appearing on our mobile phones in the form of an alert may invite us to think about it because definitions of breaking news such as the *BBC* itself –a reference media outlet with internationally recognised prestige– state that breaking news must involve, as Stănescu states, an “interruption of the broadcast with unusual, totally unexpected events” (2015: 82).

Along the same lines of this author, we also assume that breaking news must therefore have five characteristics: it must be extraordinary, unique, involve an absolute novelty, be of general interest and have a significant impact (2015: 82). And as our study reveals, sometimes the notifications received have none of these five characteristics.

On the other hand, advancing the possibilities of personalising notifications should be a priority since the options are still minimal according to the study results, except in the case of *France Info*, once again. Personalisation is key for users, who may view receiving alerts as invading their personal sphere (Mäkelä, Boedeker and Helander, 2019).

We can conclude that a third feature shared by the media outlets studied is the timing of the notifications. Moreover, this is understood in a double sense. On the one hand, because the common denominator is a drop in the sending of notifications at weekends, but beyond that, there is no defined pattern in the number of push notifications sent each day by each media outlet, which has also been detected in previous studies focusing on other media, such as those by Wheatley and Ferrer-Conill's (2020) and De Sola's and Ortiz-Sobrino's (2021).

The research finds that media outlets attempt to capture their readers' attention throughout the day. Still, it is in the evening slot when mobile alerts are sent the most often- which is in line with previous studies such as Read's (2017), which focused only on the UK- and also at key times of the day, such as the beginning and the end of the day, which revalues the production and brand of the media outlet (Pedrero-Esteban and Herrera-Damas, 2017).

From a thematic point of view, we conclude that mobile notifications are still a part of the Covid-19 pandemic "news monopoly", which is predictable given the context. This aligns with the initial idea of a predominance of news genres and live news updates. It is logical, under this premise, that content is abundantly linked to sports and politics, the media's second and third most used topics.

However, there is a notable and evident difference in using notifications from a quantitative perspective. While *France Info* (260) and *RTVE* (143) are quite committed to sending many mobile alerts, *Tagesschau* (70) and *BBC* (56) make much more limited use of this tool.

Although it goes beyond the objectives of the study, these figures lead us to reflect on the impact that events like this have on users and open up new avenues for research: where is the limit between the interest in being informed and what is considered to be over-information through a notification on a mobile phone? Can excessive sending lead to the loss of users, or on the other hand, attract them and make them see the media as the only source of information they need? It is precisely along these lines that studies such as Stănescu's state:

Nowadays, we create 10-12 breaking news stories per day, which leads to a decrease in journalists' credibility and may ridicule the journalistic concepts of breaking news or news alerts (2015: 81).

Stănescu adds that abusive late-breaking alerts "may work for the time being, but over time they can lead to a decrease in the overall audience of the media because [it] may lose credibility" (Stănescu, 2015: 90).

Finally, we return to the idea that the models for using push notifications are very different and have a varying degree of implementation on *RTVE*, *France Info*, *BBC* and *Tagesschau*. However, the study shows that these differences respond more to each media's development strategies than to the budgets available. In 2018 the German and British corporations had

budgets of over 6 billion euros and workforces of over 21 000 employees, while the French broadcaster had a budget of 3.215 billion euros and 10 400 employees. RTVE's reality painted a different picture: with a 974 million euro budget and just over 6 000 employees (Peinado and Alameda, 2018).

With all of the above the study faces a limitation; we took a snapshot of the year 2021 specifically; that is, it is difficult to determine whether the results obtained are circumstantial or respond to an established strategy over a long period, this is minimised with the study of three-time frames distributed over a year. However, we are aware of mobile journalism's constant and fast evolution. In this sense, the research serves as a starting point for future research that will further examine the development and evolution of mobile journalism and pop-up notifications from mobile media applications.

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