THE IRRESPONSIBLE SELF-REGULATION OF MEDIA IN SPAIN: HIGH-GRADE ALCOHOLIC BEVERAGE ADVERTISING IN SPORTS RADIO PROGRAMMES

Clara Muela-Molina, Rey Juan Carlos University
Luis M. Romero-Rodríguez, Rey Juan Carlos University/ESAI Business School, Universidad Espíritu Santo
Ana García-Arranz, EAE Business School

ABSTRACT

Media must behave ethically towards their audiences since the latter play a fundamental role in shaping reality and public opinion. In this sense, the conduct of all media must be based on social responsibility, with ethical values and in compliance with laws and regulations. The present study analyses the presence of advertising for high-alcoholic-content beverages in sports programs through mentions by the host radio stations or collaborators, taking into consideration that the European directive, as well as Spanish legislation, prohibits the broadcasting of this type of advertising through audio-visual media (television and radio) channels, particularly in sports programs.

To this purpose, three stations have been selected for analysis (COPE, Cadena Ser and Onda Cero) according to their daily audience numbers as reported by the General Media Study (a total of 9,000,000 daily listeners). The study was carried out between January and December 2017. A total of 355 mentions of high-alcoholic-content beverages were found, being the figure of the host radio the one that made more this type of advertising. Likewise, this research shows that most mentions of alcoholic beverages occurred in the afternoon (16:00–19:59), with rum (55.8%) and herb liqueurs (36.6%) being the most frequently advertised.

It is also important to note that COPE, a radio station that has been sanctioned by the Spanish CNMV for this type of advertising, is precisely the radio station that has the highest frequency of alcoholic beverage advertising in this study (91.8%), which is evidence of the failure of the media self-regulation system in Spain.

Keywords: Media Regulation, Radio Programmes, Advertising, Self-Regulation.

INTRODUCTION

Media are entities that must maintain a social contract with their audience, since the latter grants and legitimizes, whether actively or passively, the media's role of intermediation in the shaping of social realities, i.e. they look at events through their optics and setting a public agenda, as well as social approaches and discussions. The social responsibility of the media is not a new concept. In 1947, in the first documented mention of social responsibility in the media, Henry Luce, director of Time magazine and chancellor of the University of Chicago published a report in which he expressed his disagreement with sensationalism, excessive commercialization and political and ideological imbalance in the media (Christians & Nordenstreng, 2004).
Social responsibility is understood as an ethical framework by which an entity, whether an organization or an individual, has an obligation to act for the benefit of or in balance with society and its context (Invernizzi et al., 2017). This action of responsibility can be passive, avoiding committing acts to the detriment of society, or active, carrying out activities that have objectives of social benefit or are aligned with its needs (Bowen, 2013; Batko and Kreft, 2017).

The relationship between the media and society has always been problematic in two areas. First, the media control and influence society through priming, agenda-setting and framing, while second, the enormous changes and dynamics of information technologies make media standards and regulations obsolete (McQuail, 1977). Therefore, the media, like other types of organizations, are not exempt from committing faults such as fraud, theft, misinformation, broken promises and broken law regulations (Green, 2007), which generally result in a lack of social trust towards media corporations, although many of them invest in public relations strategies (Gulyás, 2011).

Distrust is increasing in the current times, as media corporations have been gradually growing, and even their ownership has been concentrated in giant international emporiums, whose financial and ownership structures are opaque in the light of society (Willenius & Malmelin, 2009; Valdéz-López et al., 2019).

The now-extinct “Media Corporate Social Responsibility (CSR) Forum” in the United Kingdom (2001–2008) and the information quality dimensions of Romero-Rodríguez et al. (2016), establish some sine qua non indicators for media organizations to comply with their ethical and moral commitments to society, among which are:

1. Transparency of the editorial sector (separation of information and comments or opinions);
2. Intervention of media corporation owners into edited content;
3. Protection of privacy;
4. Maintenance of the balance between the right of the society to be informed and the right of individual people to protect their privacy;
5. Responsibility for the publication of news/images that might be particularly drastic in their character or offensive to the feelings of the society;
6. Protection of privacy of the under-aged;
7. Responsibility of media for the advertisement they present;
8. Promotion of advertisement referring to sustainable consumption; and
9. Obligation to educate and to inform.

Thus, the social responsibility of the media can be interpreted both in terms of responsibility, with regard to the commitment of the broadcaster to society, and responsiveness, with regard to the way in which the media listen to and take into account their audience. Consequently, responsibility has to do with compliance with appropriate conduct, ethical standards of procedure and accountability (Bardoel and D’Haenens, 2004). It is not in vain that trust, the raw material of media credibility, depends on responsibility, integrity and inclusion (Schmidt et al., 2019). Therefore, the social responsibility of the media can be understood as a necessary element intrinsic to its own social contract (Sandoval, 2014) and credibility as a product of the relationship and the link between the audience and the media (Samuel-Azran and Hayat, 2019).

Terms such as accountability, responsibility and responsiveness of the media have been gradually included in the political and legislative agenda of many European countries, seeking to improve the formal and informal procedures used by broadcasters, regulators or self-regulated bodies to take into account the wishes and needs of the audience. This is primarily because the
media can have negative social effects and, consequently, must bear the social costs they generate (Baldi, 2007). These changes are being implemented at different rates in various European countries, although the trend of regulation and accountability is the most prevalent.

However, in Europe, and more specifically in Spain, media self-regulation has perhaps been understood as a carte blanche for the media and advertising sector to adopt ethical, legal and sub-legal standards to their own interests, especially with regard to the promotion of high alcoholic beverages on radio stations with informative content. In this sense, the present research aims to determine the degree of responsibility of radio owners with their audience when broadcasting advertising for alcoholic beverages, as products with a clear risk for the health of the consumer.

On the other hand, related to the source of the message, there are different advertising mechanisms such as celebrities, typical consumers, professional experts, company employees or anonymous spokespersons to imbue brands with personality. Thus, the use of endorsers to maximize the persuasive impact of the advertising message is a recurrent strategy among advertisers. The objective is to create a brand image through the person rather than the product itself, with a view to capitalise on the perceived confidence of the potential consumers (Kertz and Ohanian, 1992). Radio personalities can be understood as celebrity endorsers, defined as individuals who have public recognition and who align their image to a product or brand (McCracken, 1989). Aware of their greater effectiveness, advertisers seek to increase the return on their investment by leveraging their credibility, influence and trust from the audience. Thus, mentions are advertisements read live within the program by the presenters, team or co-workers. The use of journalists as brand spokespersons is a technique supported by many professionals. However, detractors argue that the dilution of the boundaries between editorial and advertising content makes the latter a pretext to influence the purchase decision while violating the principle of journalistic independence (Muela-Molina et al., 2018).

The starting point for this study is a complaint filed against a news/talk radio station in Spain about an advertisement for high-grade alcoholic beverages endorsed by a sportscaster in 2016. The National Commission for Markets and Competition (Comisión Nacional de los Mercados y la Competencia (CNMC)), a body independent of the government but under parliamentary control since 2013, is the only public body in charge of partially supervising the media (only in the economic field). The complaint was presented by the Association of Users of Communication (Asociación de Usuarios de la Comunicación (AUC)) to the CNMC, who after analyzing the case, fined Cadena Cope 150,000 euros.

The motivation for this research is to verify whether this particular station continues to broadcast advertising similar to that which is sanctioned and to extend the analysis to other generalist radio stations to examine the advertising behaviour of this type of potentially harmful products. In this regard, the research questions that this paper seeks to answer are the following:

**RQ1:** How far does the legal limitation in Spain on broadcasting advertising for high alcoholic beverages on radio stations apply?

**RQ2:** What is the level of presence of advertising for high-grade alcoholic beverages radio mentions endorsed by radio personalities in news/talk radio stations?

**RQ3:** What is the most prevalent type of spirit drinks?

**RQ4:** In which time slots are the most advertisements for this type of products broadcast?
The reason this work has focused on the radio is that it is considered the most trusted source of news from traditional media by 82% of Spanish people (Toharia, 2017) and 70% of European citizens (European Commission, 2018). In this context, this research aims to analyse the behaviour of radio owners with the audience who trusts them as a means of information, their liability when broadcasting advertising for products that are harmful to health and their liability to allow their radio personalities to endorse these types of alcoholic beverages. Besides, the present work contributes to the field through the establishment of the correlation between radio personalities as a reliable source and high alcohol beverages. Specifically, the main objective is to quantify the frequency of alcoholic drinks in news/talks radio mentions.

MATERIALS & METHODS

In the first instance, and in order to respond to the first objective of this work and RQ1, this research will present a legal and jurisprudential analysis of the advertising regulations for high alcoholic beverages in Spain, with special emphasis on self-regulation standards.

Secondly, and in accordance with RQ2, RQ3 and RQ4, the methodology chosen to develop this work follows a quantitative approach based on content analysis, which enables the objective and systematic content description (Berelson, 1952) of all radio mentions broadcast throughout 2017 on news/talk radio stations in Spain, since the programming’s contents are based on news and current affairs. The selection of the stations followed two criteria: national coverage and Spanish-language broadcasting. According to data from the “Estudio General de Medios” (General Media Study (EGM)) (Association of investigation for Media Communication (AIMC), 2017), the stations with the highest audience levels are Cadena Ser, Cadena Cope and Onda Cero, with a total of 9,000,000 daily listeners.

The data analysed was obtained from Arce Media’s database (joined since 2007 to Nielsen’s database), a company dedicated to the collection and analysis of advertising activity in conventional media. In this study, spirits include the following types of products: brandy, gin, rum, vodka, whisky and other liquors. Following this selection criteria, the final corpus is composed of 355 radio mentions providing the opportunity to work with the complete universe. The whole analysis and coding process were carried out by two trained coders who codified according to the variables and their attributes.

News/Talk Radio Stations

1. Cadena Ser;
2. Cadena Cope;
3. Onda Cero.

Role of the Radio Personality

1. Radio host-The director is a well-known journalist responsible for running the program. As a public opinion leader, he/she has a great influence on his/her audience and assumes the roles of editor, columnist and commentator;
2. Collaborator-Other journalists, commentators or columnists collaborate as guests in certain fixed sections of the program;
3. Both-Radio hosts and any collaborators take part in the description of the product.
Time Slot

Coinciding with the EGM (Estudio General de Medios (General Media Study)) classification, we have characterized this variable with the following attributes:

1. Early Morning (00:00-05:59);
2. Morning (06:00-11:59);
3. Midday (12:00-15:59);
4. Evening (16:00-19:59);
5. Night (20:00-23:59).

Products

1. Brandy;
2. Gin;
3. Rum;
4. Vodka;
5. Whisky;
6. Other Liquors.

The inter-codifier reliability was measured using Cohen’s Kappa (Cohen, 1960), which raises a variation between 0.927 and 1, calculated with SPSS v. 17. The structural variables (radio station, time slot and product) obtained a k=1. The variable role of radio personality obtained a value of k=0.927. To solve the few divergences detected (Kassarjian 1977), a third work session was made. After evaluating the situations, the final coding of the doubtful cases was decided by the two coders. The results shown below are based on a value k=1 for all variables. Furthermore, any crossed data of the coded variables have been submitted to relevant statistical significance tests using nonparametric $\chi^2$ analysis.

RESULTS

Regulatory and Self-Regulatory Framework

With regard to the limits on advertising for alcoholic beverages, Spanish legislation in Article 5 of Law 34/1988 of 11 November 1988, the General Law on Advertising (Ley General de Publicidad), expressly provides (§1) for the prohibition of any type of product capable of generating health risks and (§5) for the prohibition of advertising for beverages with an alcoholic strength of more than 20 degrees on television.

It should be noted that, although the “ejusdem” regulation (§5.5) limits the advertising of high alcoholic beverages on television, by not establishing or limiting means expressly or tacitly, section 1 includes all types of media, understanding that this type of liquor can seriously affect health and even generate addiction. In this respect, per Directive 2007/65/EC of the European Parliament and the Council’s amendment of Directive 89/552/EEC on 11 December 2007 regarding the coordination of certain provisions laid down by law, regulation or administrative action in Member States concerning the pursuit of television broadcasting activities with regard to commercial communication regulates only advertising broadcast on television.

However, the transposition of this law to the legal framework in Spain also extends its effects to the radio. Like the rule mentioned above, Law 7/2010 of March 31, the General Law of
Audio-visual Communication (Ley General de la Communication Audio-visual), states in paragraph 3 of Article 18 that:

“Commercial communication that promotes behaviour harmful to health is prohibited. In any case, it is prohibited: §c) Commercial communication on television of alcoholic beverages with a level higher than twenty degrees”.

However, as has been explained, the aforementioned regulations limit the exclusion of this type of advertising to television media, the prohibition not being-in the regulation-a rule for the radio media.

In this regard, since the legislative field does not regulate the advertising of high-grade beverages on the radio, the focus will be on advertising self-regulation. Like most European Union countries, Spain, since its transition to democracy in the early 1980s, has opted for a regime of self-regulation. Since 1995, the Association for the Self-regulation of Commercial Communication (Association of Auto regulation for Communication Commercial) (Auto control) has been in operation. This is a private civil entity, made up of advertisers, advertising agencies, the media and professional associations, which are responsible for monitoring and resolving complaints regarding advertising issued through the media. This organization has a code of conduct with ethical standards, inspired by the International Chambers of Commerce (ICC) Advertising and Marketing Communication Code (International Chamber of Commerce, 2018), which establishes guidelines for commercial communication.

In particular, Article 4 about honesty, refers that marketing communications should not abuse the trust of consumers. This rule should be breached when radio personalities endorse unhealthy products, and advertisers profit from their trustworthiness and credibility. Also, Article 13 states that marketing communications should not contain or refer to any testimonial or endorsement unless it is genuine, verifiable and relevant. In the case of high alcohol beverages, it would be worrying if all endorsements were genuine and verifiable. Lastly, Article 23 about responsibility establishes that marketers have overall responsibility for the marketing communications for their products.

However, such responsibility also lies in the hands of media owners who publish, transmit, deliver or distribute marketing communications because they should exercise due care in the acceptance of them and their presentation to the public. In addition, individuals employed by any firm, company or institution, who take part in the transmission of marketing communications are responsible, to an extent commensurate with their respective activities, for ensuring that the rules of the code are observed, and they should act accordingly. It should also be noted that, according to Article 13 of the Journalists’ Code of Ethics (International Federation of Journalists, 2019), journalists must avoid any collaboration with any advertising activity (Perelló-Oliver and Muela-Molina, 2017).

Radio Mentions

In response to the research questions (RQ), the results show, firstly, that Cadena Cope is the news/talk radio station that broadcasted the highest alcohol beverages advertisements (91.8%), followed by Onda Cero (7.3%) and Cadena Ser, which broadcasted only 3 of the 355 radio mentions comprising the corpus of the analysis. As Table 1 shows, it is also noteworthy that most mentions of alcoholic beverages are made during evening hours (16:00–19:59) (51.8%)
when many of the most important sporting events in Spain (football, basketball and tennis) are broadcast.

Table 1
NEWS/TALK RADIO STATION AND TIME SLOT

<table>
<thead>
<tr>
<th>Station</th>
<th>Morning</th>
<th>Midday</th>
<th>Evening</th>
<th>Night</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>COPE</td>
<td>23</td>
<td>7.1</td>
<td>76</td>
<td>23.3</td>
</tr>
<tr>
<td>Ser</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>33.3</td>
</tr>
<tr>
<td>Ondacero</td>
<td>1</td>
<td>3.8</td>
<td>4</td>
<td>15.4</td>
</tr>
<tr>
<td>Total</td>
<td>24</td>
<td>6.8</td>
<td>81</td>
<td>22.8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time Slot</th>
<th>n</th>
<th>%</th>
<th>n</th>
<th>%</th>
<th>n</th>
<th>%</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morning</td>
<td>23</td>
<td>7.1</td>
<td>76</td>
<td>23.3</td>
<td>183</td>
<td>56.1</td>
<td>44</td>
<td>13.5</td>
</tr>
<tr>
<td>Midday</td>
<td>0</td>
<td>0.0</td>
<td>1</td>
<td>33.3</td>
<td>0</td>
<td>0.0</td>
<td>2</td>
<td>6.67</td>
</tr>
<tr>
<td>Evening</td>
<td>1</td>
<td>3.8</td>
<td>4</td>
<td>15.4</td>
<td>1</td>
<td>3.8</td>
<td>20</td>
<td>76.9</td>
</tr>
<tr>
<td>Night</td>
<td>0</td>
<td>0.0</td>
<td>1</td>
<td>33.3</td>
<td>0</td>
<td>0.0</td>
<td>2</td>
<td>6.67</td>
</tr>
</tbody>
</table>

Note: Broadcaster and time slot; χ²: 71.517; Significance: 0.001

On the other hand, the Role of Radio Personality more prevalent used by advertisers is the Radio Host (93.5%) who mainly endorsed Rum (55.8%) and Herb Liqueurs (36.6%). Other spirits such as Sloe Brandy (6.47%) and Gin (1.12%) had almost no presence in the emissions analysed (see Table 2).

Table 2
NEWS/TALK RADIO STATION AND PRODUCT TYPE

<table>
<thead>
<tr>
<th>Product</th>
<th>COPE</th>
<th>Ser</th>
<th>Ondacero</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Gin</td>
<td>4</td>
<td>1.2</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Herb Liqueur</td>
<td>123</td>
<td>37.7</td>
<td>3</td>
<td>100.0</td>
</tr>
<tr>
<td>Sloe Brandy</td>
<td>1</td>
<td>0.3</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Rum</td>
<td>198</td>
<td>60.7</td>
<td>0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

Note: Radio station and product; χ²: 288.943; Significance: 0.001

Finally, the analysis found no mention of vodka or whisky as types of drinks considered spirit drinks in the coding process.

CONCLUSIONS

With regard to the broadcasting of advertising for high alcoholic beverages, this research has shwon that the informative radio in Spain and the journalists who work there show irresponsible behaviour with the audience that professes its confidence in them every day. In particular, one of these stations (COPE), which had already been sanctioned for this reason, repeated its malpractice by issuing 326 references to spirits the following year. This demonstrates the lack of a self-regulatory model in radio and that sanctions are not sufficiently effective.
It should be pointed out that repeated failure to comply with the law and the frequent occurrence of serious offences may lead to the withdrawal of the licence of the radio service provider. However, the work has shown that the law continues to be violated with total impunity and that self-regulation does not work in Spain, as previous studies have shown (Perelló-Oliver and Muela-Molina, 2017; Muela-Molina et al., 2018).

This study has also shown that:

“All the mentions that have made up the corpus of analysis have been broadcast in sports programmes, generally in the retransmission of matches and within the programme itself without making a clear separation of commercial content with editorials as is also required by law.”

Based on the data showing a high concentration in one of the stations analysed (COPE), an “ad hoc” study was carried out to deepen the level of collaboration of the radio hosts. In this way, we can add that only one sportscaster endorsed 326 (91.8%) of the 355 mentions.

The second station analysed also used another radio host in sports programs, but only in 26 mentions (7.3%). However, the station with the highest audience is the one that has broadcasted the least amount of advertising of this type; specifically, only 3 mentions, and all of them were made by a sportscaster’s collaborator. This shows how different stations belonging to different corporate networks operate. Also, this information should be the starting point for future research that analyses the social responsibility of the different radio stations through in-depth interviews with radio owners to find out about the existence of a self-regulation system or a pre-clearance system that filters advertising and checks it before it is broadcasted. In a similar vein, and since the vast majority of mentions of spirit drinks were endorsed by a radio host, it is also worth looking more closely at the ethics of the various sports journalists, both in that, some seem more respectful of the Code of Conduct that regulates their profession, while others violate it very often.

The findings of this work show the prevalence of certain high-grade beverages in these types of emitters such as rum, herbal liqueurs or brandy, while other popular beverages such as whiskey or vodka are not present at all. This is probably due to the profile of the audience listening to this type of programme.

With regard to the results of another of the variables analysed, they show that the evening time slot is when most advertising for high alcoholic beverages is broadcast; specifically, this accounts for more than half of the mentions analysed \((n=184 (51.8\%))\). At that time, children are usually already at home, so they should potentially also hear the programs their parents are listening to. This fact requires a great deal of reflection and even an investigation of the habits of those exposed to the environment and consumption of these sports programs, in particular, to identify public health problems and addictions that can be generated in minors exposed to this type of content. These results allow some considerations in terms of policy implications with the objective of protecting the audience of advertisements promoting products that can affect their health. There is also a demand for greater responsibility on the part of the media and a higher demand for compliance with the law on the part of public administrations.

It has also been shown that all the restrictions on advertising for alcoholic beverages that the law places on television must also be extended to radio, both as regards audio-visual communication. Also, with regard to the broadcasting schedule of certain editorial and commercial content, a more restrictive interpretation can be made of Law 7/2010, of 31 March, General of Audio-visual Communication (The General Communication Audio-visual), for high alcoholic beverages. In this respect, Article 7 on the rights of minors prohibits “the broadcasting
of audio-visual content which might seriously impair the physical, mental or moral development of minors”, which would clearly apply to the advertising covered by this study.

Furthermore, although the time slot for child protection is established from 6:00–22:00, others for reinforced protection are between 8:00–9:00 and 17:00–20:00. This last range is the one where the highest number of mentions in the analysed sample has been detected (n=184 (51.8%)). Moreover, since alcohol is considered to be a legal drug that is addictive and causes serious public health problems, alcohol advertising should be banned on the same terms as tobacco.

On the other hand, the media—in this case, radio—must be more respectful of their audience and more responsible with the content they broadcast. The results of this work highlight the absence of a self-regulatory system in radio, and television also proves the continuous sanctions and complaints it receives from the CNMC. The need to implement a compulsory pre-clearance system as-is is already a reality in other countries such as the United Kingdom, where all radio and television advertising undergoes a prior review before being broadcasted. This is a much more effective system because, given the dynamics of advertising, when the sanctions come after the claim of an ad, the damage is already done at the hearing. Hence, the focus should be on the pre-broadcast review of the advertisement. Likewise, journalists who violate their code of conduct cannot be held liable for the possible harm their conduct might cause to the listener.

For their part, regulators should establish more restrictive and prohibitive rules for the advertising of high-grade alcoholic beverages and also implement control and monitoring mechanisms and tougher penalties for infringing media. As contemplated in Law 7/2010 of 31 March, General of Audio-visual Communication [Ley General de Communication Audio-visual], one should consider withdrawing the licence of the audio-visual service provider who repeatedly commits infringements, as is the case analysed in this paper. If, as stated in Article 18 ejusdem in §3, “Commercial communication that promotes behaviour harmful to health is prohibited,” one of the three stations analysed, COPE, has violated the law on more than 300 occasions. This station also has the aggravating circumstance of having been sanctioned the previous year for the same reason and for an advertisement of similar characteristics.

The main limitation of this work consists in the decision to choose those stations whose informative programming is based only on news. So, for future research, the analysis can be compared with music radio. On the other hand, this research has also focused on a type of advertising that is carried out by radio personalities so other future work can analyse other formats, such as radio spots.

With regard to future research, and since the framework of this work is a Spanish legal norm that comes from a European directive, it is worth analysing in the future whether this practice also occurs in other countries in our region through comparative studies. It would also be interesting to inquire about a listener’s perception of this type of advertising and their attitude towards it. It would also be worth it to know their reaction or knowledge of the illegality of some cases already issued and sanctioned.

With the same approach of the receiver, and in view of the prospective of the investigation, it would be desirable to know the image and reaction of the “faithful listener” to a station once informed of the irresponsible behaviour of its most credible media. The same could be done with respect to how the image of the opinion leader and the host radio station is affected when they collaborate in illicit advertising and also promote habits that are harmful to the listener’s health.
Another line of future research should focus on the media and, in particular, on radio owners. Through in-depth interviews, it is necessary to investigate the existence of self-regulation systems, where and how they are implemented, the compliance of the media with its code of conduct, and the system of accountability.

ACKNOWLEDGEMENT

Financial Support

This work was supported by the Ministry of Economy and Competitiveness of the Government of Spain, State Program R&D Oriented Society Challenges, under Grant (CSO2017-82267-R).

REFERENCES


