

Uncovering the structure of the French media ecosystem ?

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We study the structure of the French media ecosystem using a dual approach. We distinguish between an internal analysis drawn from the perspective of information producers and an external analysis on the audience side, which we approach using Twitter data. Both analyses largely overlap, showing that the French media sphere exhibits a clear divide between legitimate media and counter-informational space, the former still attracting a very large majority of the attention. The ideology of news stories that are shared on Twitter is relatively homogeneously distributed. We therefore conclude that the French media ecosystem does not suffer from the same level of polarization as the US media ecosystem (Benkler et al., 2018).

Our results stem from the analysis of two different kinds of links connecting a carefully curated list of 460 news outlets. Firstly, we consider hyperlinks that are produced from one media website to another and we use the tool Hyphe to extract them systematically. Then we extract the network of co-citation between media that connects pairs of media which set of sharers on Twitter overlaps significantly.

We analyze the structure of both networks using the Stochastic Block Model (SBM) (Peixoto, 2014). SBM allows to decipher interesting patterns such as the propensity of a set of nodes (a block) to send links to media outlets belonging to another block. As a result, and in contrast with traditional modularity-based analysis algorithms, clusters that are being constructed do not exclusively show cohesiveness but allow for a larger set of structural properties. Additionally, the SBM builds a hierarchical representation of the blocks that provides a high-level description of the connectivity patterns of each individual media outlet.

A possible representation of the hierarchical block structure of our hyperlink network is shown below (see fig. 1). Our first observation is that that French media producers form a highly structured and pyramidal structure with most of the hyperlinks, pointing towards the two blocks (the *centre* and the *hyper-centre*) that form the *mainstream media* at the higher level. These two blocks receive attention from the entire media ecosystem. They reciprocate in a contrasted manner, hardly giving any credit (in the form of hyperlinks) to the *counter-informational space*. *Opinion journalism* larger blocks gathers websites that are defending a strong political line, which they divide into left- and right-wing blocks. They are not as cited by *peripheric* media as *mainstream* media are, but they are cited as equally as *counter-informational space* and *mainstream* media. *Counter-informational space* has the most striking connectivity pattern as it receives hardly any links from the rest of the ecosystem, despite its generosity toward them. It shows how the most legitimate part of the media ecosystem purposely ostracizes media outlets that share misinformation or try to impose their propaganda – the kind of content one can find in the three blocks of counter-information space which we labelled: *right revolutionary*, *alternative health* and *identitarian* blocks. Finally, the *periphery* attracts less attention overall and proportionally less than *opinion journalism*. When citing media outlets outside its own continent, it is mostly toward the *hyper-centre*. If we take a closer look at the media being grouped in the same block, we distinguish *magazines on leisure or well-being*, a block of specialized media

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on *IT*, and two blocks with *hyper-local information*. We think that the practices and inner norms followed by any journalists in the newsroom explains how the French media system achieves such a high level of gate-keeping.

The co-citation network, which is informed by Twitter citation behaviors, exhibits a comparable structure than the block structure emerging from the analysis of hyperlinks between media websites. We conclude that the symbolic frontiers drawn by information producers separating legitimate and illegitimate sources of news are largely embedded with user online behaviors in such a way that the circulation of information flowing from counter-informational sources to the rest of the ecosystem is limited. Additionally, the total share of news stories coming from the counter-information space falls below 5% on Twitter.

In an attempt to confirm this structural analysis, we aim to measure the ideological diversity of French news stories on Twitter. We follow the methodology of ideology scaling introduced by Barbera (2015) ; we build the follower/followee matrix of nearly 900 French elected representatives from the Senate and Assemblée Nationale. Using correspondence analysis, we compress the original matrix in 2 dimensions. The second axis clearly aligns with a right-left ideological axis which allows us in turn to assign an ideological score to nearly 360 thousand Twitter users. We then build the ideological score of URLs shared on Twitter averaging the ideology score of their sharers. In turn we can plot (bottom right) how visible news stories are according to their measured ideological orientation. French media ecosystem does not show, unlike in the US, any asymmetric polarization process.

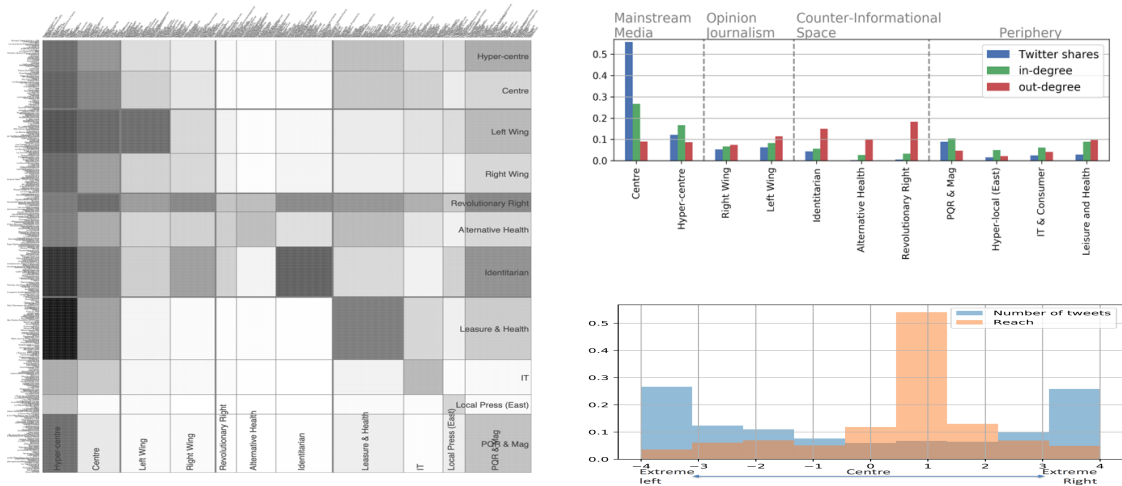


Figure 1. [left] Adjacency matrix as aggregated at the block level. The intensity of the cell scales with the number of links flowing from one (horizontal) block to another (vertical) block. Note that the matrix is highly asymmetric. [top right] Distribution of stories on Twitter, mainstream media and peripheric media sources are dominating counter-information, despite a large production of out-going links. [bottom right] The ideological distribution of ideology on Twitter is homogeneous as far as one considers the reach of tweets.

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