

# Analisi delle reti sociali digitali

## [2025/2026]

Docente: Fabio [.] Giglietto [[@uniurb.it](mailto:@uniurb.it)]

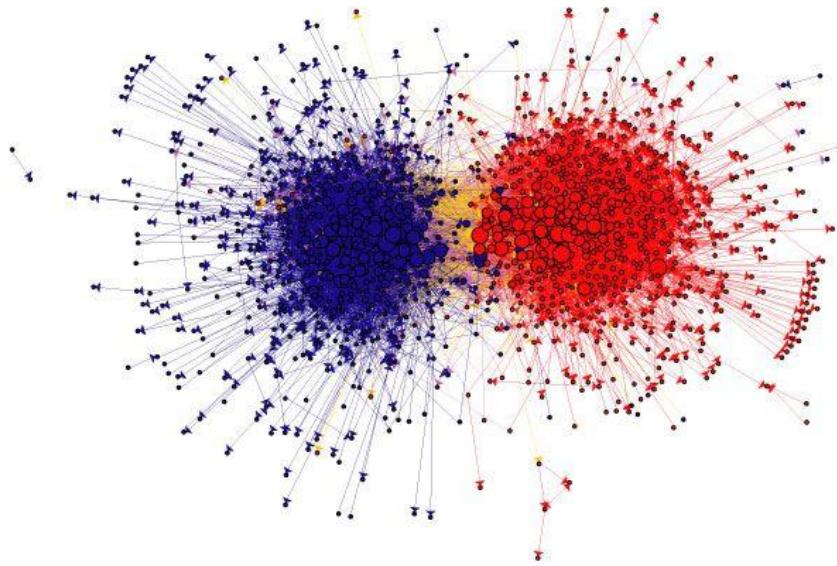
# Materiali didattici

Coscia, M. (2021). The Atlas for the aspiring network scientist. In arXiv [cs.CY]. arXiv. <http://arxiv.org/abs/2101.00863> (limitatamente alle parti: Introduction, II Graph Representations, III Simple Properties, IV Centrality, VIII The Hairball e X Communities)



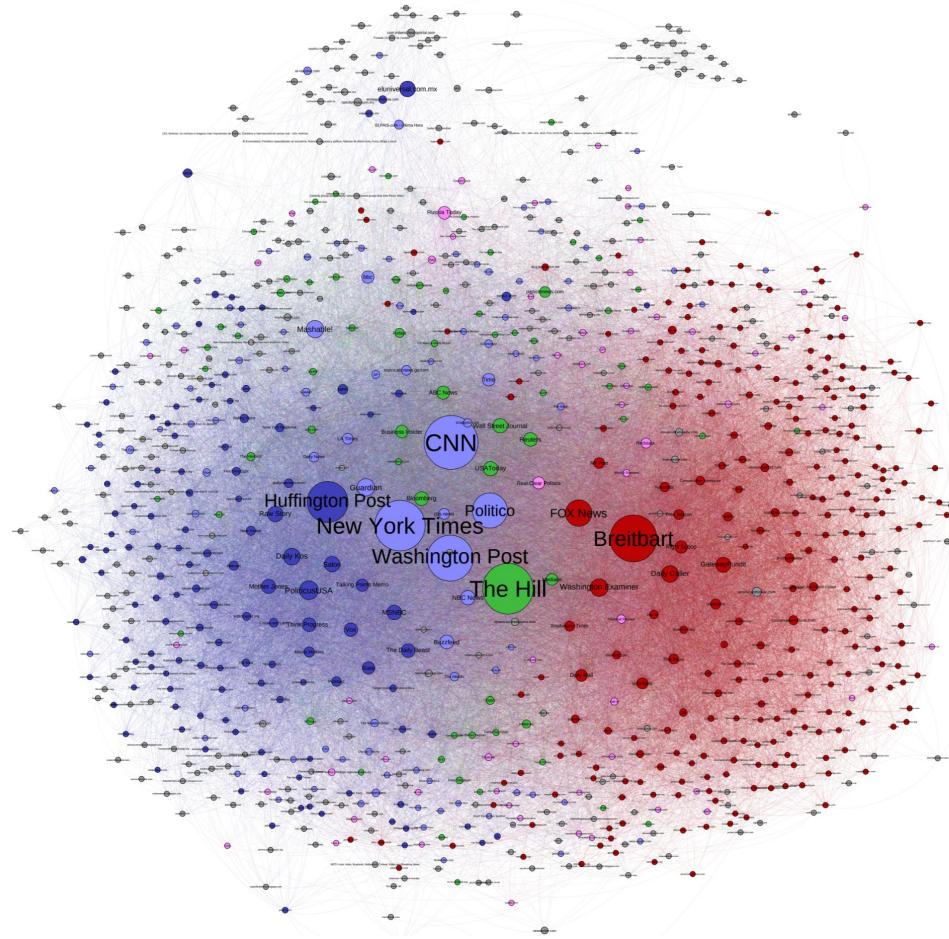
Approaches to analyze the social media account -> news stories/source relationships

## The political blogosphere and the 2004 election: Divided they blog



Lada Adamic, HP Labs, Palo Alto, CA  
joint work with Natalie Glance @ Intelliseek





Partisanship, Propaganda, and Disinformation: Online Media and the 2016 U.S. Presidential Election



# Mapping Italian News

in the lead-up to 2018 and 2019  
election for the European parliament.

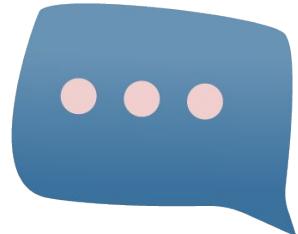


*Project on 2018 Italian election was supported [in part] by a grant from the Foundation Open Society Institute in cooperation with the Information Program of the Open Society Foundations*



# 84,815

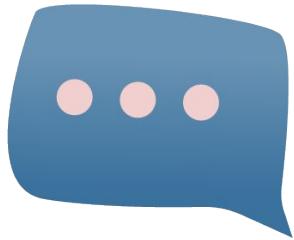
Italian political news stories with respective Facebook engagement  
published up to six months before March 2018 election





# 217,765

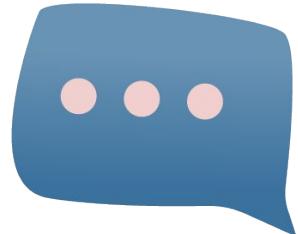
Retweets of Italian political parties and politicians during January 2018





# 4,385,877

Tweets created by top 5,000 retweeters of Italian political parties and  
politicians during February/5 March 2018





# MP-MPAS

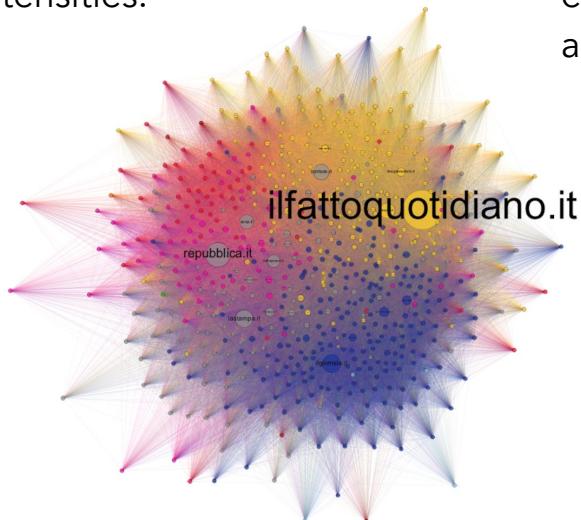
1. Multi-Party Media Partisanship Attention Scores
2. Inspired by the Media Partisanship Attention Scores developed by (Faris et al., 2017; Benkler et al., 2018)
3. Two phase process:
  - a. Estimates the partisanship of the users based on the proportion of their retweets for each political party
  - b. Estimates the partisanship attention toward a media source shared by these users on their Twitter timelines





# Insularity score

Different partisan communities tend to rely on different media sources with different intensities.

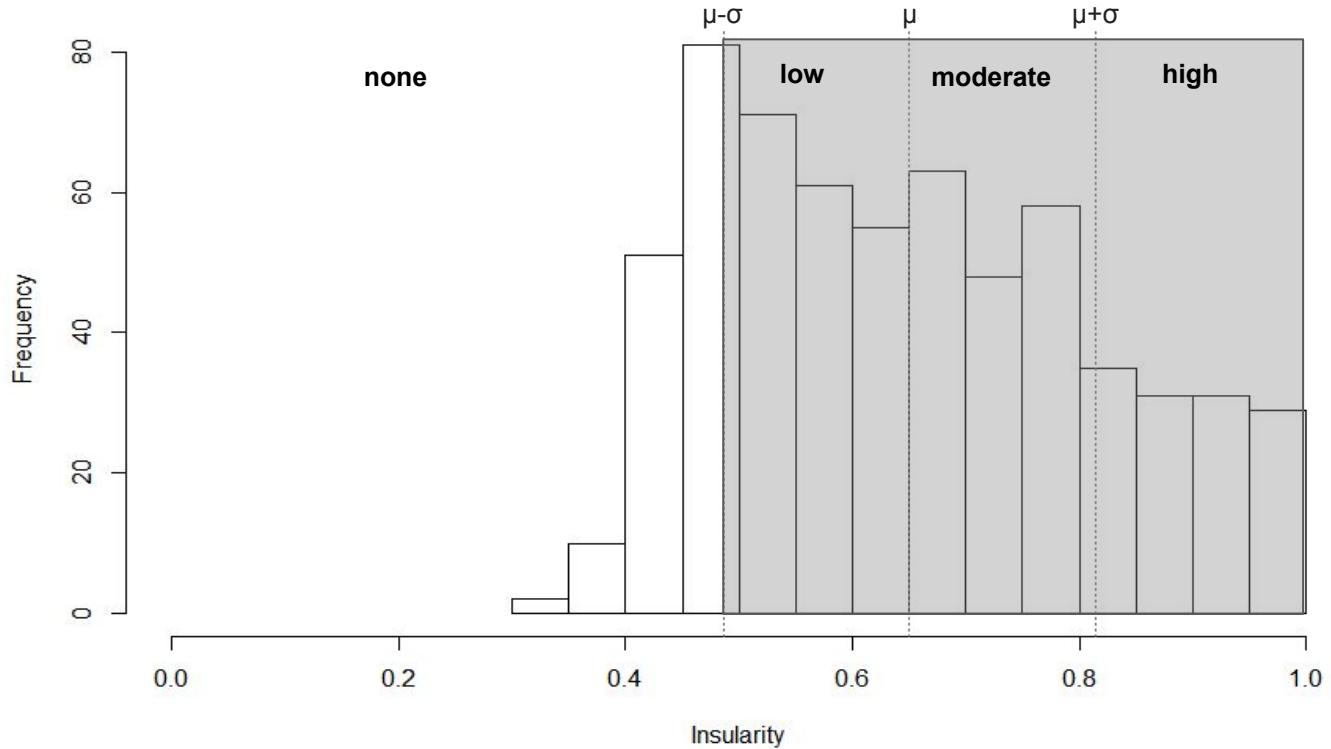


As a result, certain media are referenced by multiple communities while others are exclusively shared by online actors close to a specific party.

Using the sets of MP-MPAS scores of a news source we measured its insularity [0-1] defined as the degree at which an online news media is predominantly shared by a single partisan community.



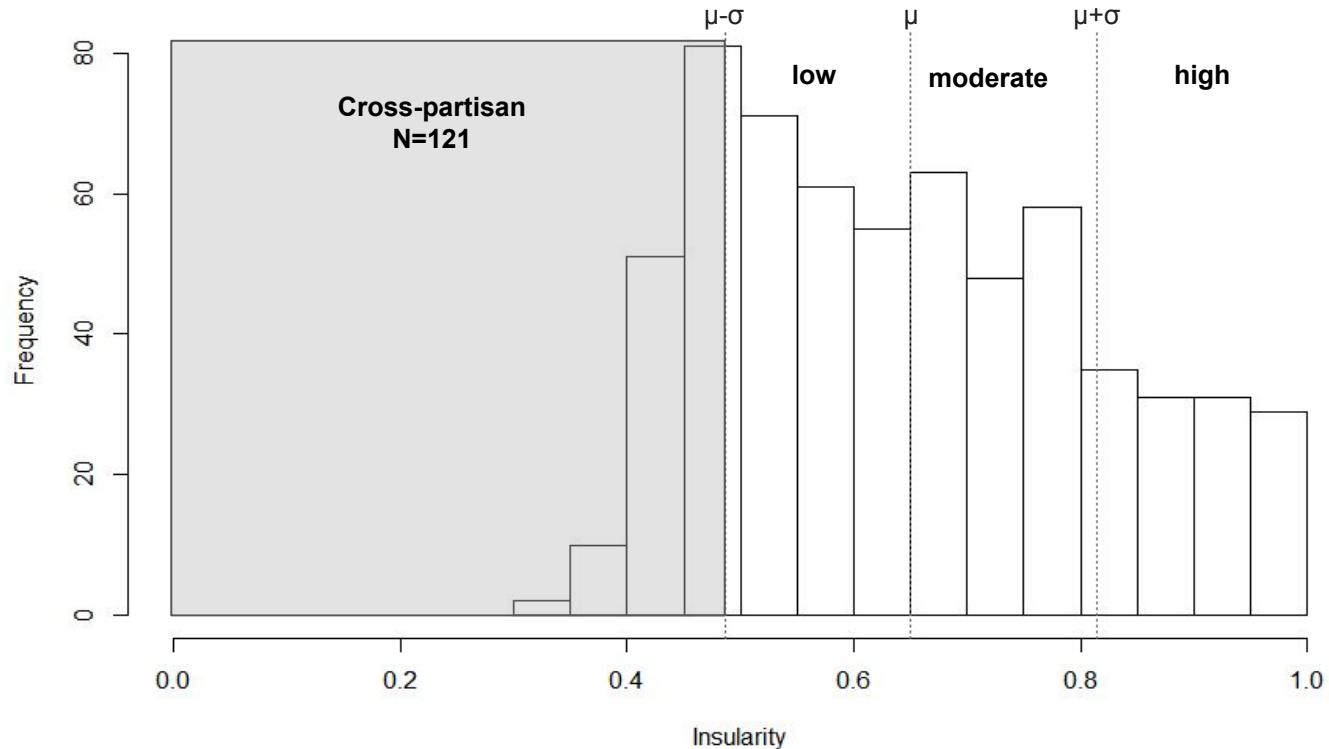
### Histogram of Insularity



The process of adjudication



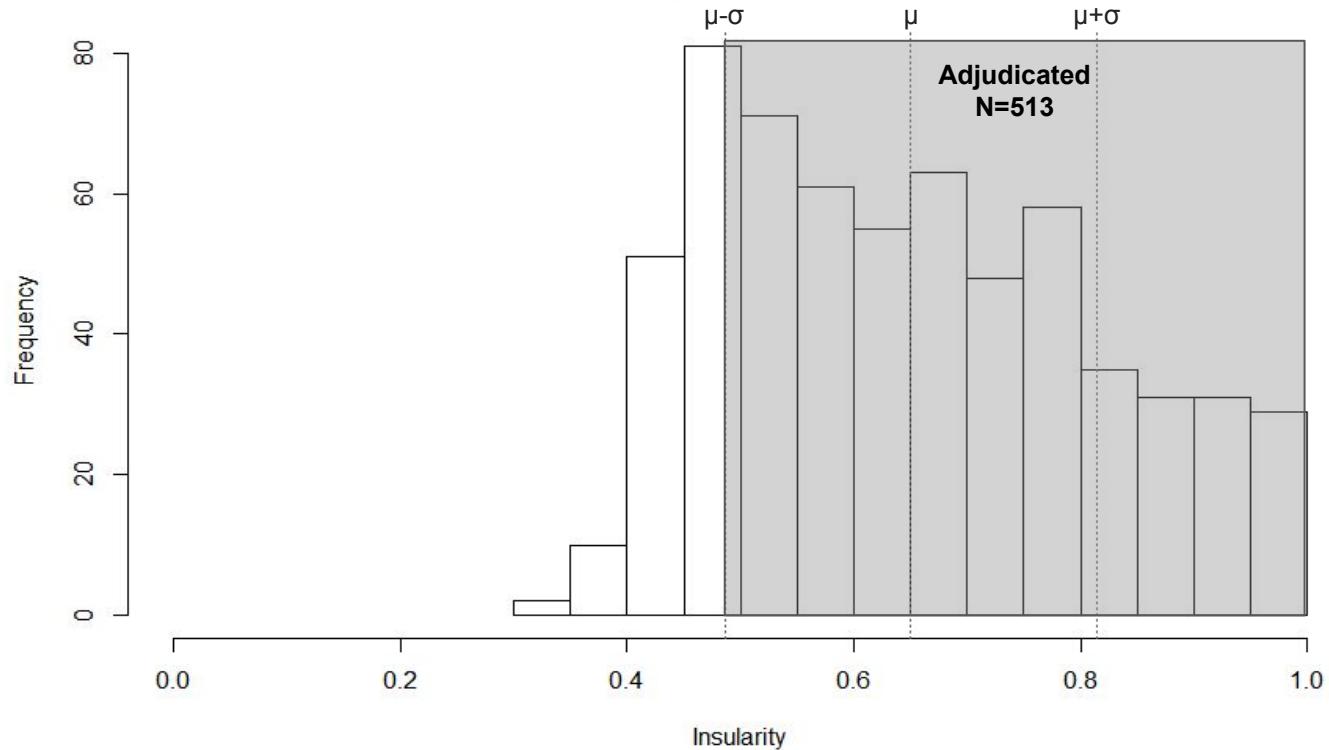
### Histogram of Insularity



The process of adjudication



### Histogram of Insularity



The process of adjudication



# Outcomes of the adjudication process (2018 election)

	Adjudicated news media sources	%
League	215	39.9
Five Star Movement	177	27.9
Cross-partisan	121	19.1
Democratic Party	60	9.5
Free and equals (LeU)	49	7.7
Other	12	1.9
All	634	100



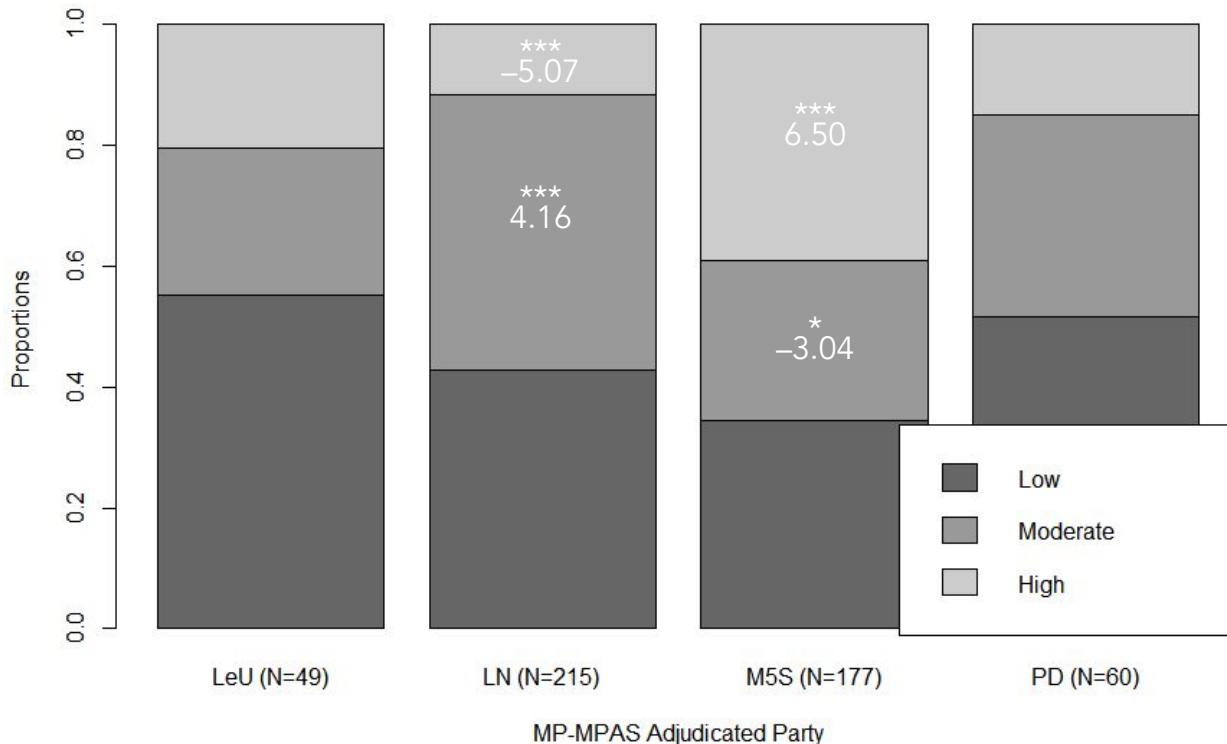


# Populist news sources are more insular.





### Insularity Class by MP-MPAS Adjudication



Pearson's Chi-squared standardized residuals (Bonferroni correction)  
\* p < .05; \*\*\* p < .001



# Insular news sources tend to get more shares than comments

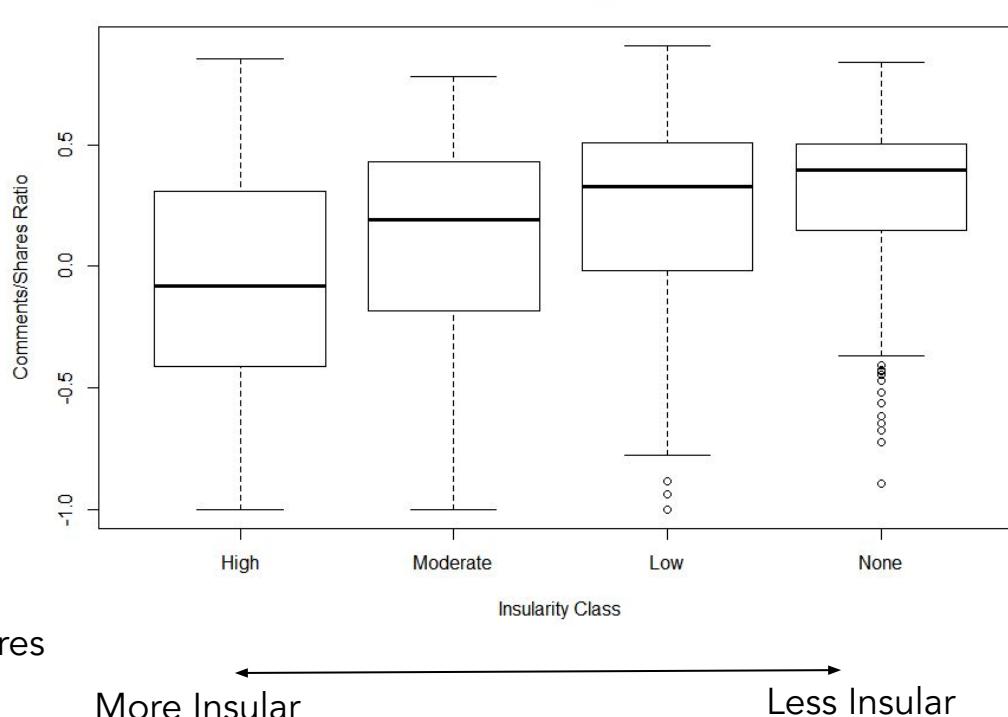


scan me to  
read more



More Comments

Comments/Shares Ratio by Insularity Class



More Shares

More Insular

Less Insular

News stories published by highly insular sources tend to receive an higher number of Facebook shares per comment

# Coordinated Inauthentic Link Sharing Behaviour

# Coordinated inauthentic behaviour: toward a definition

1. Often used, but only briefly defined by Facebook;
2. Marks a shift from content to process (actors, propagation, information cascades) in fighting disinformation;
3. Comprises of coordination and authenticity, both widely studied.



# Why do we care?

Personal influence is pervasive, reaches undecided voters and tends to catch the audience less prepared against influence (The people's choice, Lazarsfeld, Berelson, & Gaudet, 1944).

Causal exposure to political content on social media may catch us unguarded.

It is easier to build a follower base with entertaining/popular culture than politics. Once the follower base is established, political contents could be conveyed to a wide and largely unguarded audience.

# From CIB to CLSB

Coordinated Link Sharing Behaviour (CLSB) is a specific form of coordinated activity performed by a network of social media accounts (e.g. Facebook Pages/Groups) that **repeatedly** shared the same news articles in a **very short period of time** from each other.

The rationale is that, while it may be common that several accounts share the same URLs, it is unlikely, unless a consistent coordination exists, that this occurs within a very short period of time and repeatedly.



# Research Questions

## 1. Coordinated behavior

Were there coordinated Facebook networks that spread political news during the recent Italian electoral campaigns?

## 2. Inauthentic behavior

Were there, in the coordinated networks, inauthentic pages/groups? (entities that not openly present themselves as a venue for political discussions)

## 3. Effectiveness

Were these effective networks in spreading news?

# Detecting coordinated link sharing behaviour

We developed a relatively simple algorithm (r code available for reuse).

The method detects sets of Facebook/Instagram entities (public groups, pages, verified profiles) that repeatedly shared the same political news stories in a “very short period” of time.

1. Tool for Facebook shares data gathering: CrowdTangle (Links API endpoint)
2. URLs: political news stories shared on Facebook in the 6 months before the 2018 Italian general election (84,815) and before the 2019 European election (164,760)

# What is CrowdTangle?

CrowdTangle is a social media analytics tool owned by Facebook.

What posts it tracks:

1. public posts on Facebook, Instagram, Twitter\* and Reddit\*, made by public accounts or groups

What posts it does not track:

1. every public account and does not track private profiles or groups, so this data is not representative of performance across the entire platform
2. paid ads unless those ads began as organic
3. posts made visible only to specific groups of followers
4. comments text to tracked posts

# CrowdTangle API Links endpoint

Retrieve a set of posts matching  
(e.g. shared, mentioned in a  
post text, etc) a certain link.

Parameter	Default	Options	Description
count	100	1 - 100	The number of posts to return.
endDate	now	-	The latest date at which a post could be posted. Time zone is UTC. Format is "yyyy-mm-ddThh:mm:ss" or "yyyy-mm-dd".
link	null	-	The link to query by. Required.
includeSummary	false	true , false	Adds a "summary" section with AccountStatistics for each platform that has posted this link. It will look beyond the count requested to summarize across the time searched. Requires a value for startDate.
offset	0	>= 0	The number of posts to offset (generally used for pagination). Pagination links will also be provided in the response.
platforms	null (i.e., all platforms)	facebook , instagram , reddit	The platforms from which to retrieve links. This value can be comma-separated.
startDate	0000-00-00	-	The earliest date at which a post could be posted. Time zone is UTC. Format is "yyyy-mm-ddThh:mm:ss" or "yyyy-mm-dd" (defaults to time 00:00:00).
sortBy	date	subscriber_count , total_interactions	The method by which to order posts (defaults to the most recent). If subscriber_count , a startDate is required.

# Coordinated networks

2018 Italian general election

- N=10 organized networks
- N=28 pages/public groups



2019 European election in Italy

- N=50 organized networks
- N=143 pages/public groups



# Political, mixed and non-political networks

## Political

Matteo Salvini



## Non-Political

Che il degrado sia con voi  
Affare Fatto  
link CATTIVI

Aforismi e Link  
Professione

## Mixed





Professione

@ProfessioneBC

Home

Groups

About

Photos

Videos

Posts

Community

Create a Page



Follow Share Save ... Watch Video Send Message

Groups



Professione: 130 Si Volaaa

Closed group  
2,652 members

Join

See All Groups

Photos



PROFESSIONE MANTENUTO

@ProfessioneBC

See More

Community

See All

Invite your friends to like this Page

185,469 people like this

190,888 people follow this

Luca Negrono and 2 other friends like this



About

See All

Send Message

Community · Just For Fun

Suggest Edits

Page Transparency

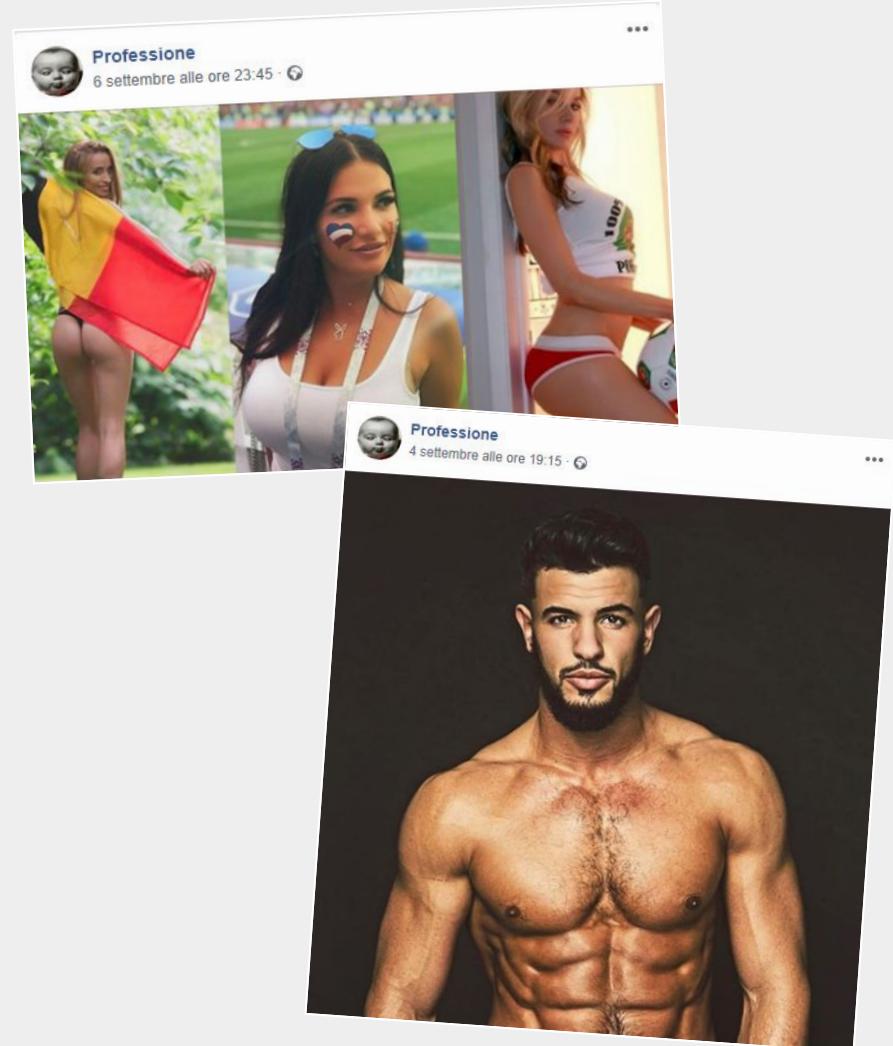
See More

Facebook is showing information to help you better understand the purpose of a Page. See actions taken by the people who manage and post content.

Page created - December 1, 2011

# Inauthenticity

The Facebook page  
“Professione Mantenuto” (>  
185k likes) mostly shares  
semi-nude and provocative  
pictures like...



# Inauthenticity

...however, from time to time it also posts political news (mostly about immigration or against Italian Democratic Party) and conspiracy theories

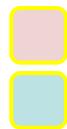
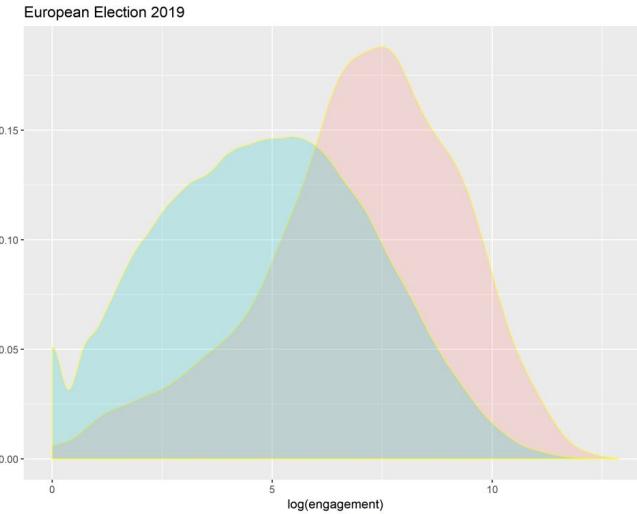
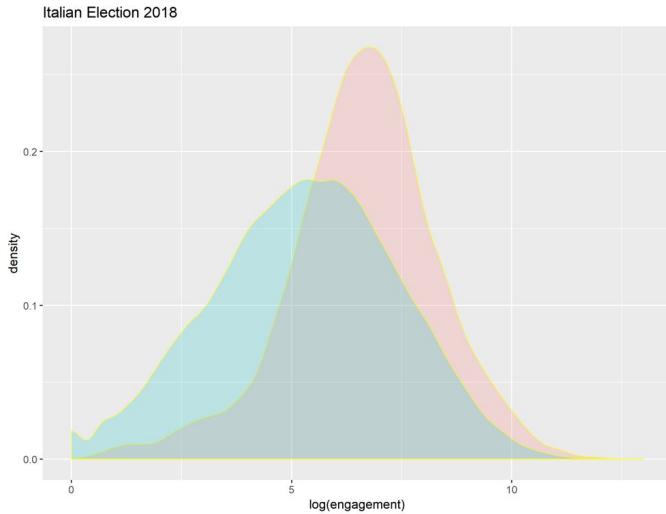


Share of a post from a politician' official fb page

EU Parliament: parliamentarian reports Bankitalia SPA conflict of interest

When Renzi said to Putin: "We are going to win the world cup"

# Effectiveness

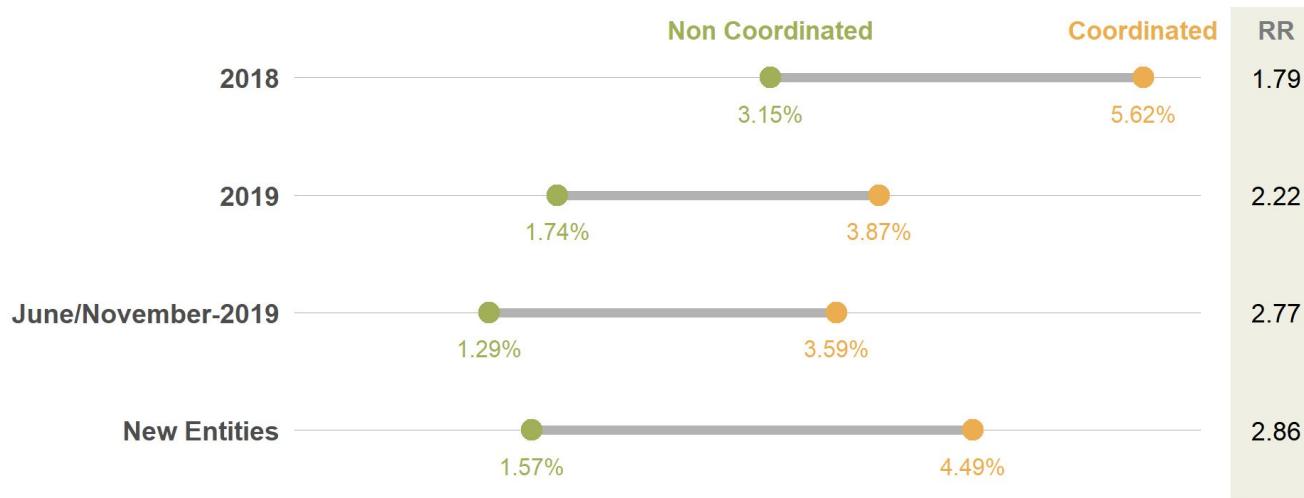


Coordinated entities



Non-coordinated entities

## Problematic domains and coordinated activity



**COORDINATED PAGES (JUN-NOV 20...**

**COORDINATED GROUPS (JUN-NOV 2...**

**COORD PAGES (JUN-NOV 2019)**

**COORD GROUPS (JUN-NOV 2019)**

**COORDINATED PAGES (2018)**

**COORDINATED PAGES (2019)**

Notizie.it 2 hours ago

ULTIM'ORA. Tremendo incidente ferroviario sulla Milano-Bologna. Frecciarossa deragliato, morti, feriti, persone intrappolate

Treno Frecciarossa deraglia e si ribalta, situazione molto grave. I NOTIZIE.IT

56.25k 4197+4095 279+248 4076+4,046

Notizie.it Donna 2 hours ago

Grave incidente ferroviario sulla Milano-Bologna. Frecciarossa deragliato. Morti, dispersi, persone intrappolate

Treno Frecciarossa deraglia e si ribalta, situazione molto grave. I NOTIZIE.IT

45.37k 947+933 35+25 1,241+1,233

Corriere della Sera 3 hours ago

ULTIM'ORA - Incidente sulla linea Milano-Bologna

Treno Frecciarossa deraglia nel lodigiano, soccorsi in azione

MILANO LODIGIANO

33.44k 3,762+3,625 166+97 2,866+2,046

Notizie d'oggi 2 hours ago

ULTIM'ORA. Tremendo incidente ferroviario sulla Milano-Bologna. Frecciarossa deragliato. Morti, dispersi, persone intrappolate

Treno Frecciarossa deraglia e si ribalta, situazione molto grave. I NOTIZIE.IT

20.87k 280+274 5+5 238+232

Tempoletteto - Quotidiano... 2 hours ago

Messina in gara con il giovane Alberto Urso, ma c'è anche il Festival in Lisi di Massimiliano Monedero. Il look targato Marco De Vincenzo è poi tantissimi siciliani protagonisti

Sanremo 2020, Messina e tanti siciliani sul palco dell'Ariston - TEMPOLETTETO

18.35k 322+319 18+15 81+78

Il Fatto Quotidiano 1 hour ago

FRECCAROSSA DERAGLIA! Il Frecciarossa 9595 partito da Milano Centrale intorno alle 5.10 è diretto a Salerno e deragliato a Lirriga, nel Lodigiano. Morti due macchinisti

Frecciarossa deraglia vicino a Lodi: morti due macchinisti. Ci sono sopravvissuti

NOTIZIE.IT

5.71k 198+170 41+10 60+50

CREMONA I FCA 1 hour ago

FRECCAROSSA DERAGLIA! Il Frecciarossa 9595 partito da

Gruppo Tutto TRAVAGLIO Fore... 3 hours ago - posted by FB User

Ricordati, caro fiorello, che quando predi per il culo il R.d.C., prendi per il culo anche milioni di poveri.

10.90k 229+303 189+175 169+160

Sostenitori delle Forze dell... 2 hours ago - posted by FB User

E oggi salutiamo i Baschi Verdi! BUONGIORNO A tutti buon lavoro

Treno Frecciarossa deraglia e si ribalta, situazione molto grave. I NOTIZIE.IT

56.26k 4,197+4,095 279+248 4,076+4,046

Notizie.it 2 hours ago

Grave incidente ferroviario sulla Milano-Bologna. Frecciarossa deragliato. Morti, dispersi, persone intrappolate

Treno Frecciarossa deraglia e si ribalta, situazione molto grave. I NOTIZIE.IT

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Notizie.it Donna 2 hours ago

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Treno Frecciarossa deraglia e si ribalta, situazione molto grave. I NOTIZIE.IT

45.37k 947+933 35+25 1,241+1,233

Gruppo LEGA 2 hours ago - posted by FB User

VORREI sapere se il PRESIDENTE MATTARELLA HA LETTO SENTITO VISTO TUO QUESTO... PRESIDENTE CI FACCIA SAPERE IL SUO PENSIERO

Treno Frecciarossa deraglia e si ribalta, situazione molto grave. I NOTIZIE.IT

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Notizie d'oggi 2 hours ago

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Treno Frecciarossa deraglia e si ribalta, situazione molto grave. I NOTIZIE.IT

45.37k 947+933 35+25 1,241+1,233

Emilia-Romagna, la leghista Borgognoni verso il ritorno in ELETTOGGIOMONDO

10.64k 702+656 143+134 78+66

Calciomercatoweb.com 2 hours ago

Buongiorno con la bellissima Diletta Leotta ❤️❤️

La precisione del rapper che ha offeso le donne: "MI RIFERIVO SOLO A QUELLE CHE VOTANO MATTEO SALVINI!"

E LA RAI LO PERDONA!!

4.48k 43+7 90+47 10+7

Matteo Salvini Leader 1 hour ago - posted by FB User

'A CHI INTERESSA CHE CASCHI UN PONTE?'. BUFERA SU OLIVIERO TOSCANI

18.55k 323+319 18+15 81+78

Il Fatto Quotidiano 1 hour ago

FRECCAROSSA DERAGLIA! Il Frecciarossa 9595 partito da Milano Centrale intorno alle 5.10 è diretto a Salerno e deragliato a Lirriga, nel Lodigiano. Morti due macchinisti

Frecciarossa deraglia vicino a Lodi: morti due macchinisti. Ci sono sopravvissuti

NOTIZIE.IT

3.68k 125+99 100+91 16+9

Governo Conte - M5S - Luigi... 1 hour ago - posted by FB User

RAGIONEVOLE PORCATURA Siccome non c'è più limite a nulla, neppure alla faccia tosta, tocca sempre agli avvocati difendere la "ragionevole durata del processo", come se molti di loro non facessero di tutto per renderla irragionevole... [Continua a

Alice 1 hour ago

Il Fatto Quotidiano 1 hour ago

MILANO DAVIDE

9.30k 173+169 8+4 5+3

Napoli Fanpage.it 2 hours ago

ULTIM'ORA - Treno deragliato in Lombardia Il Frecciarossa era diretto a Salerno fanpa.ge/67UQ

Deraglia treno alta velocità Frecciarossa: due morti, uno è

20.87k 280+274 8+5 238+232

Napoli Fanpage.it 2 hours ago

ULTIM'ORA - Treno deragliato in Lombardia Il Frecciarossa era diretto a Salerno fanpa.ge/67UQ

Deraglia treno alta velocità Frecciarossa: due morti, uno è

19.38k 1,629+1,610 57+44 745+727

Tempoletteto - Quotidiano... 2 hours ago

Messina in gara con il giovane Alberto Urso, ma c'è anche il



# The A-B-C Framework

The A-B-C framework (François, 2019) is an integrated approach to detecting misinformation that highlights the need to understand the interplay between manipulative Actors, deceptive Behaviour, and harmful Content.



# CooRnet and the A-B-C Framework



## Content

A set of URLs (news stories)

## Behaviour

Coordinated Link Sharing  
Behaviour (CLSB) around content  
(detected with CooRnet)

## Actors

Networks of social media actors  
that performed CLSB around  
given content.

## Harmful Content

URLs (news stories) coordinately  
shared on Facebook



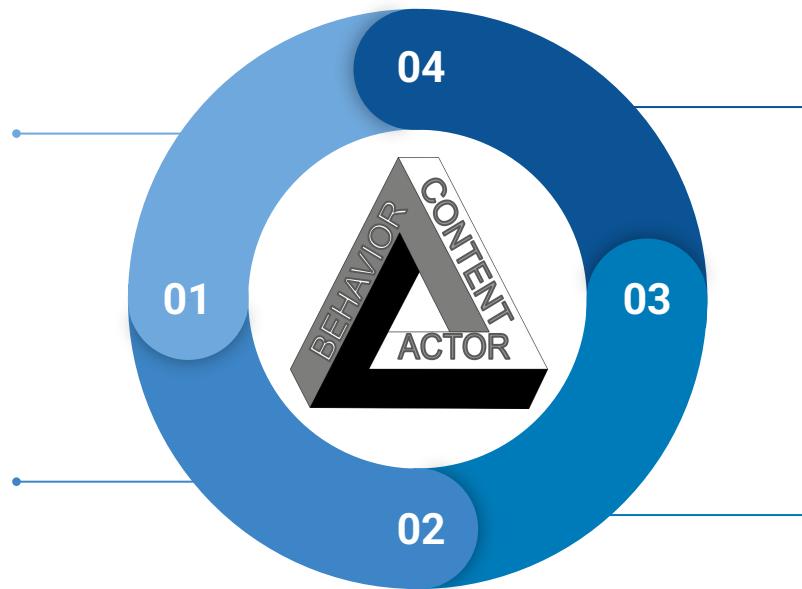
# CooRnet and the A-B-C Cycle: Covid-19 disinfo in Italy

## Harmful Content

IFCN Database provided a list of 212 false and misleading Italian stories identified by three Italian fact-checking organizations. We used the CrowdTangle to identify a dataset of related news stories, finding a total of 1,258 corresponding URLs

## Deceptive Behavior

Coordinated Link Sharing Behaviour (CLSB) detected with [CooRnet](#) on 13,271 Facebook shares of URLs in content



## Harmful Content

54,346 URLs (news stories) coordinately shared on Facebook by Manipulative actors during October 2020.

## Manipulative Actors

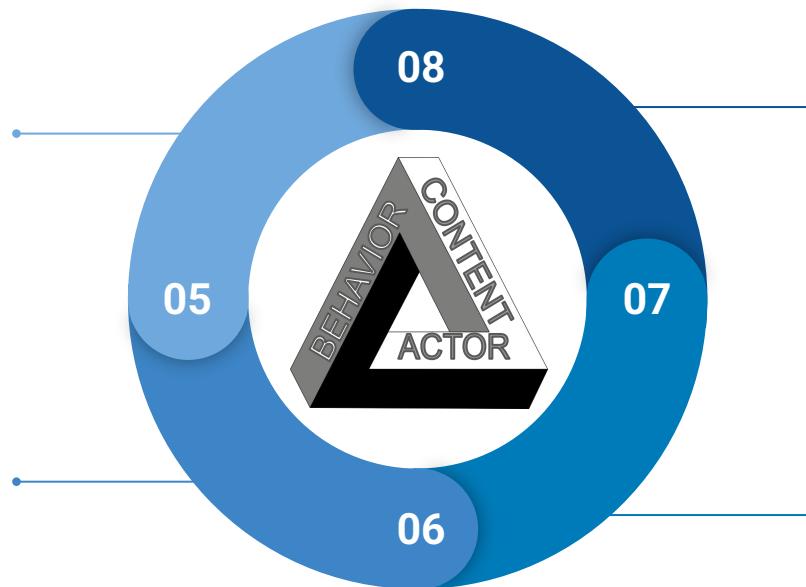
Networks of social media actors that performed CLSB around harmful content (152 accounts detected).



# CooRnet and the A-B-C Cycle: Iteration 1

**Harmful Content**  
54,346 URLs (news stories) coordinately shared on Facebook by manipulative actors identified during iteration 1 during October 2020.

**Deceptive Behavior**  
Coordinated Link Sharing Behaviour (CLSB) detected with [CooRnet](#) on 364,400 Facebook shares of URLs in content



**Harmful Content**  
(...)

**Manipulative Actors**

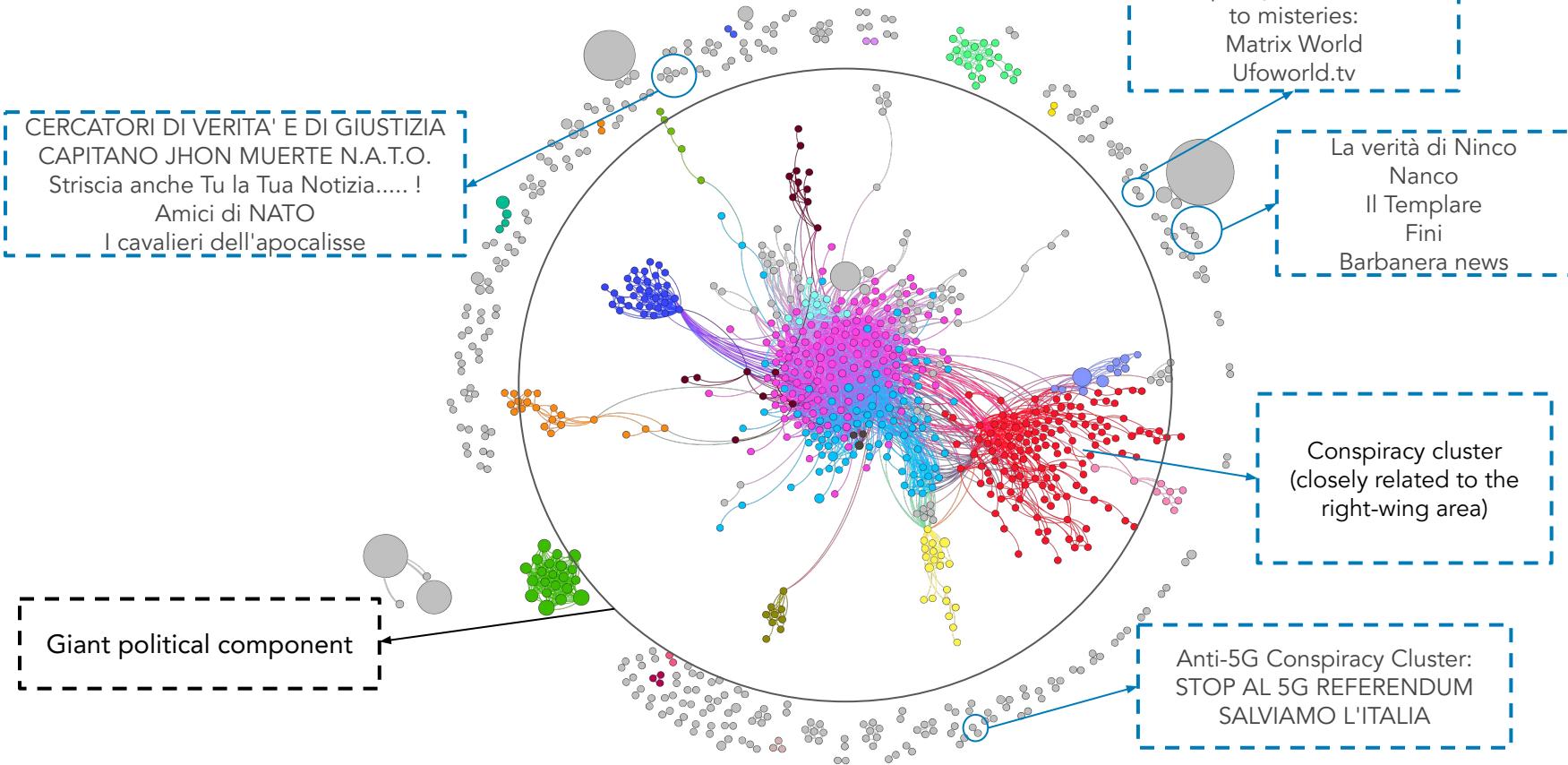
Networks of social media actors that performed CLSB around harmful content (344 accounts detected organized in 33 components).

# Macro level

Mapping the eco-system

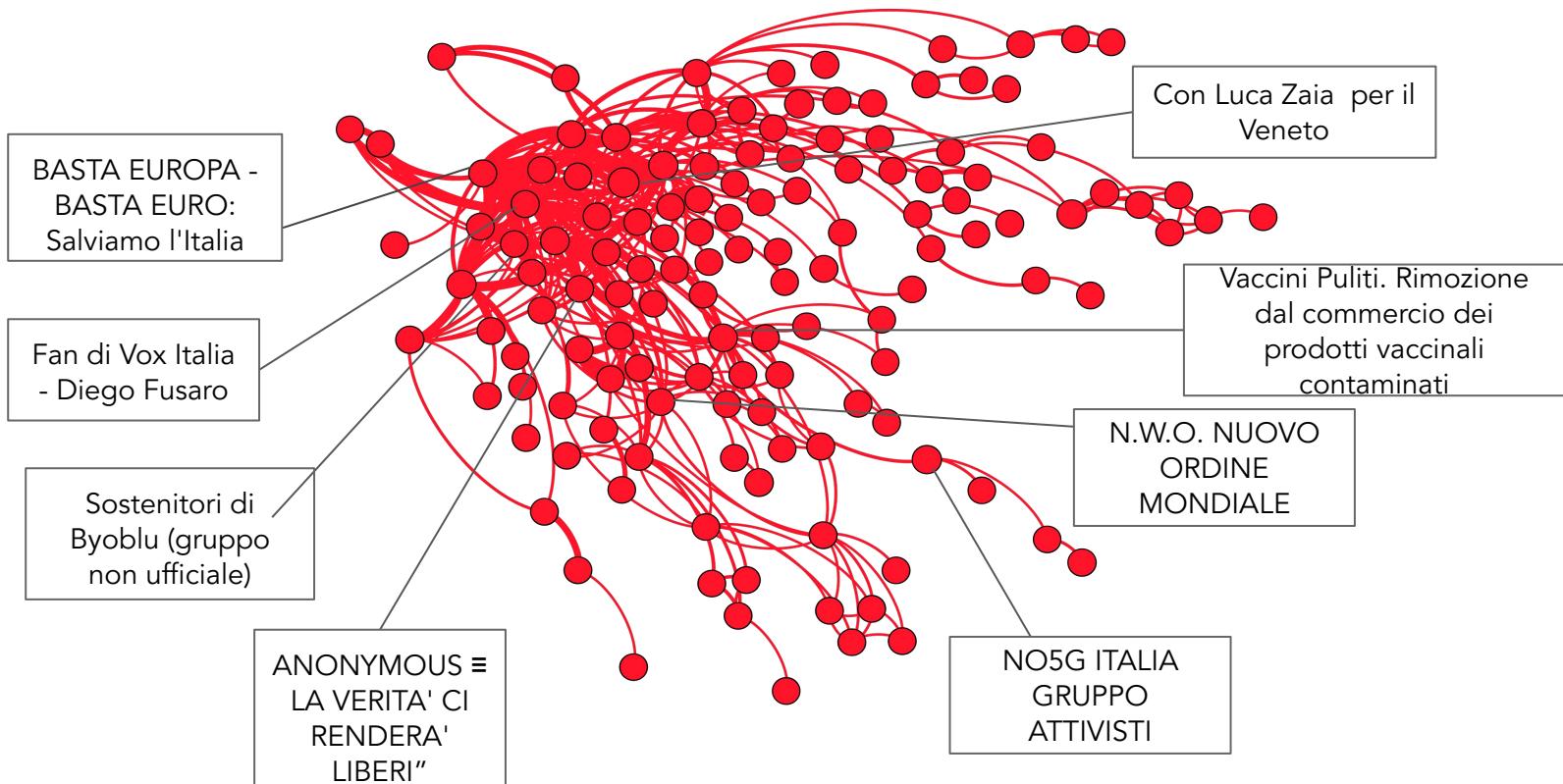


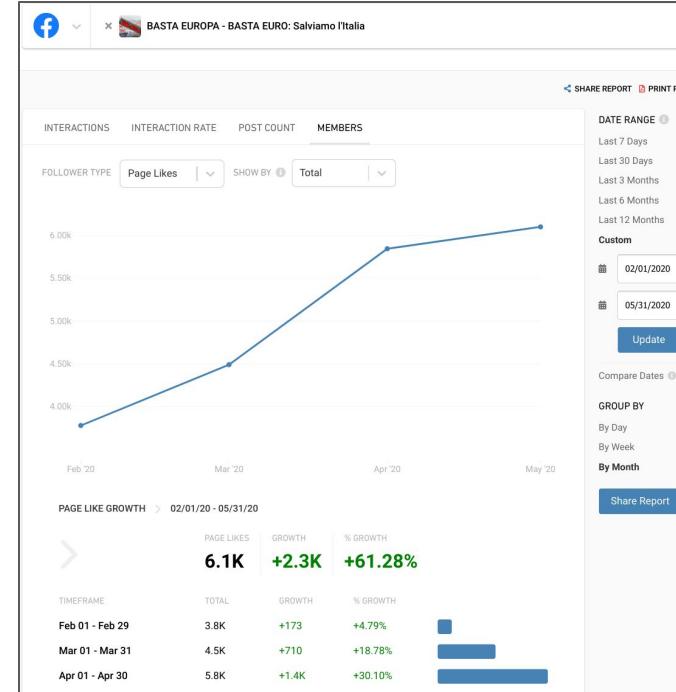
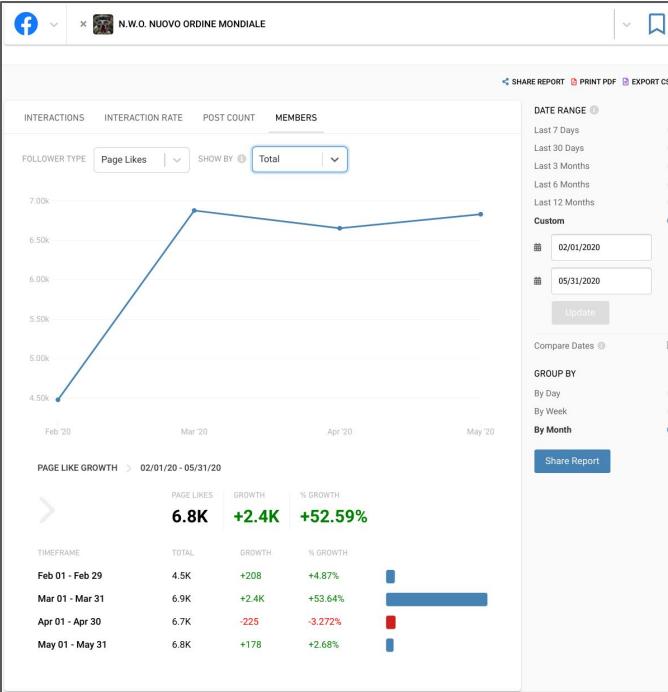
# Coordinated Entities During COVID-19

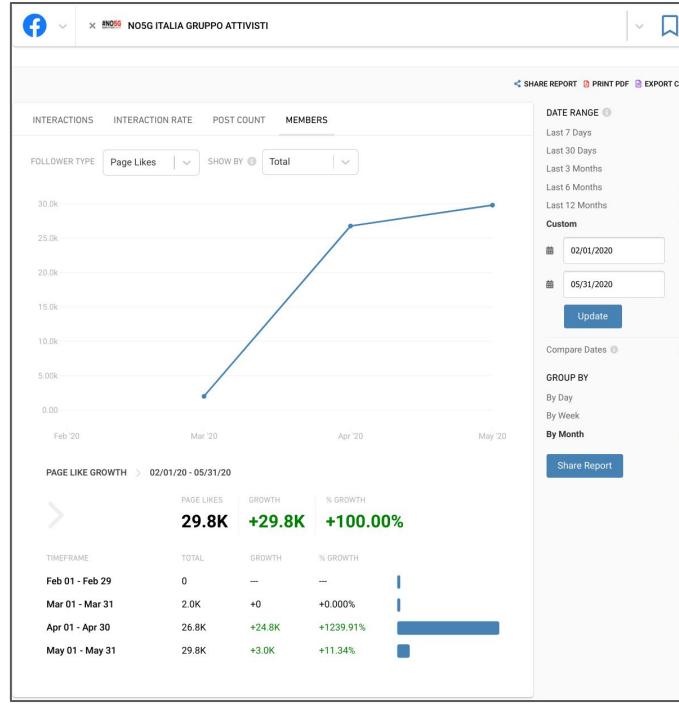
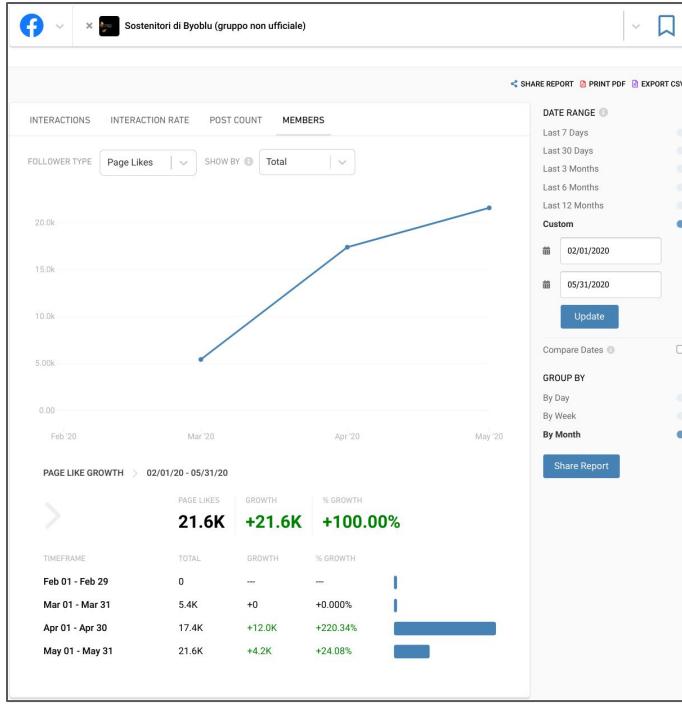


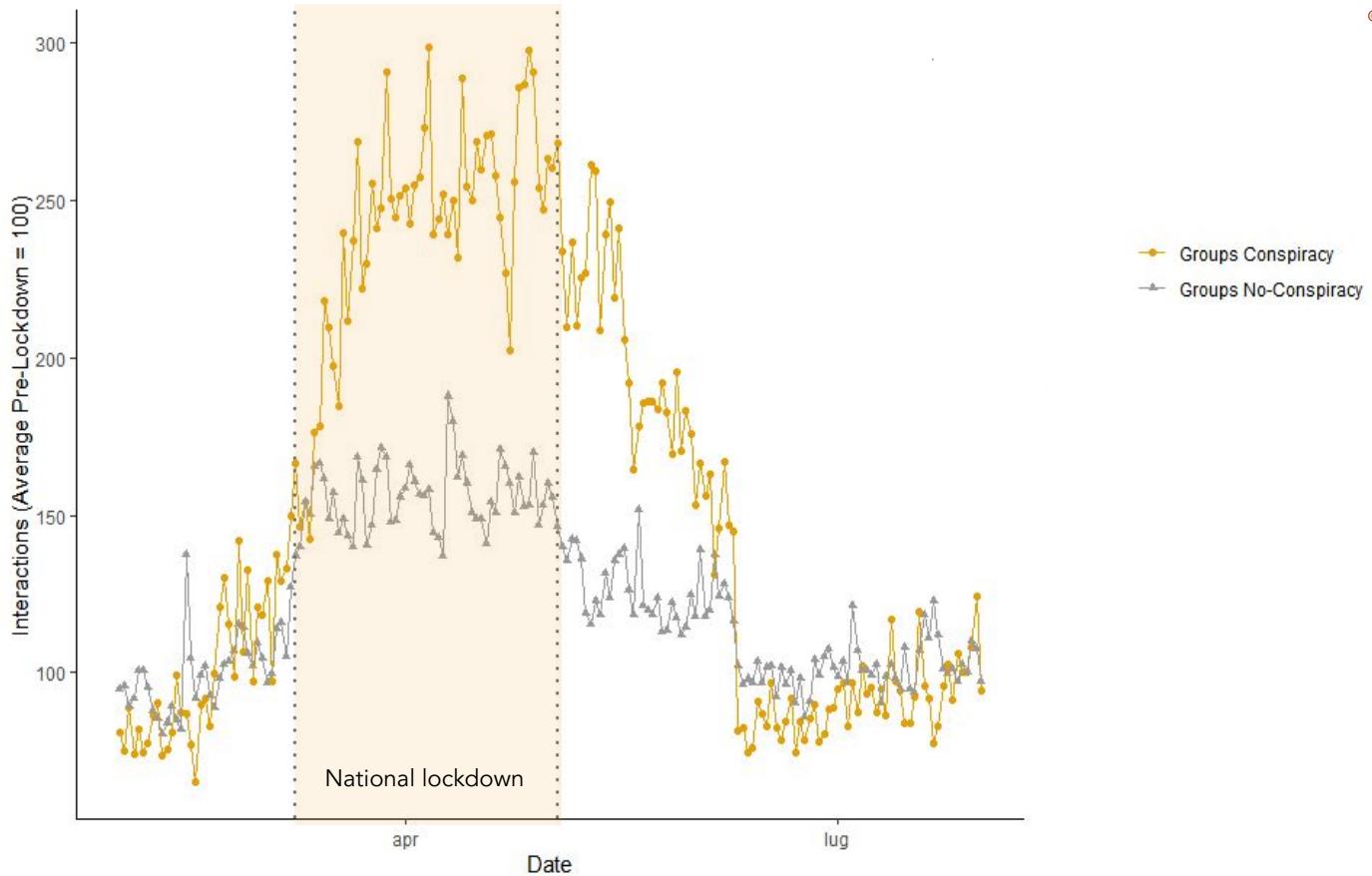


# Main Conspiracy Cluster





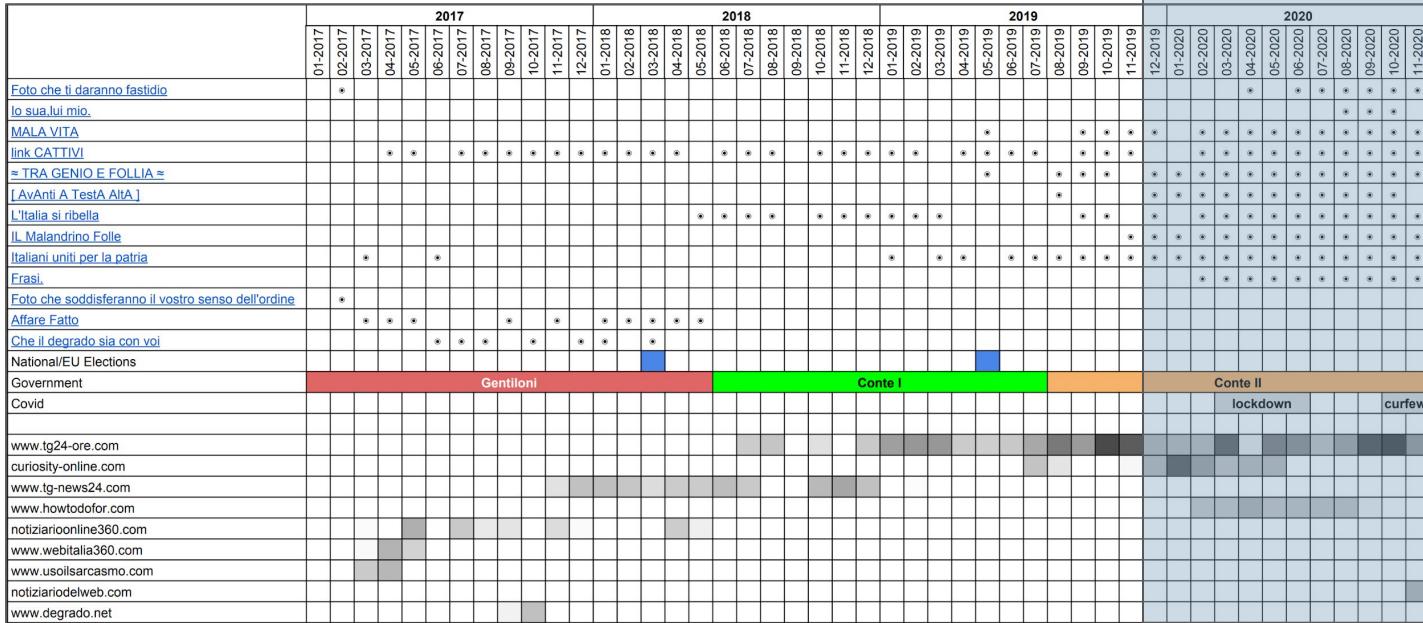




RQ1: Higher increase of interactions for conspiracy coordinated entities

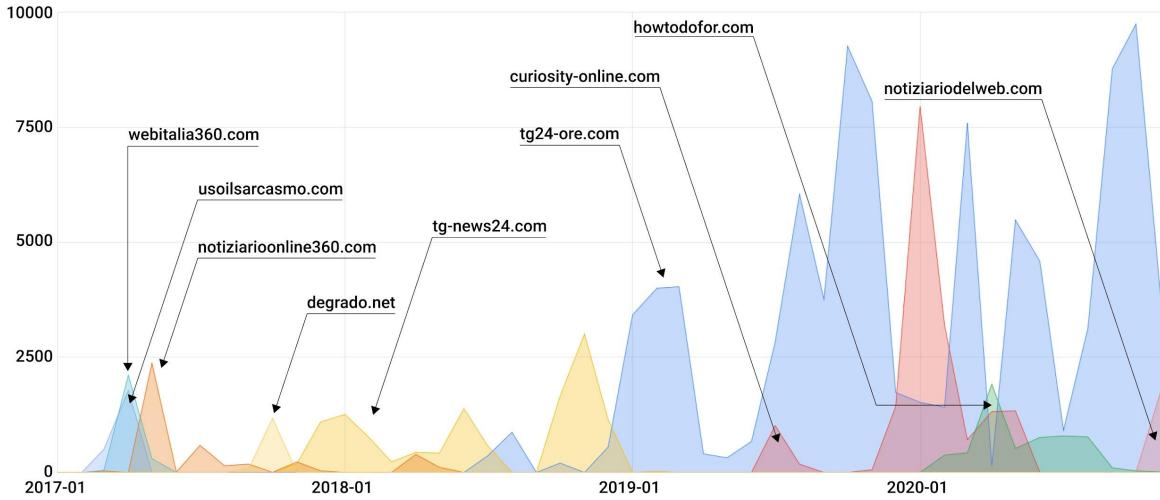
# Meso level

In depth analysis of one network



Increased coordinated activity of a network during Covid lockdown

Coordinated Link Sharing	<input checked="" type="checkbox"/>
Max volume of links	<input checked="" type="checkbox"/>
Min volume of links	<input checked="" type="checkbox"/>



Same network, different domains



**La donna acida** November 29 at 4:10 PM · **ULTIMO MINUTO**  
Morte di Maradona, indagini per omicidio: il clamoroso colpo di scena. Lo stanno perquisendo



24 23 Comments 10 Shares

Like Comment Share

Most Relevant

Write a comment...

**Author** **La donna acida** <https://www.howtodofor.com/maradona-colpo-di-scena-nelle.../>

**HOWTODOFOR.COM** Maradona, colpo di scena nelle indagini: si indaga per omicidio colposo

Like Reply 2w

**Tu il mio Re e io la tua Regina** November 30 at 12:28 PM · **CORONAVIRUS,**  
**SPUNTA LA ZONA "BIANCA": ECCO DI COSA SI TRATTA**



4 3 Comments 1 Share

Like Comment Share

Most Relevant

Write a comment...

**Author** **Tu il mio Re e io la tua Regina** <https://www.howtodofor.com/coronavirus-spunta-la-zona.../>

**HOWTODOFOR.COM** Coronavirus, spunta la zona bianca: ecco di cosa si tratta

Like Reply 2w

## Adaptation to mitigation efforts

# Micro level

Single news stories and individual path of radicalization



# Example of news stories identified in iteration 2

Home ACTUALITY FIRST FLOOR Dr. Mariano Amici won the appeal to the TAR against the ordinance...

Doctor Mariano Amici won the appeal to the TAR against the Zingaretti ordinance on compulsory vaccination

Of Mario - 2 October 2020 Last updated 17:01



STASERA ITALIA  
La mascherina è dannosa?

Is the mask harmful?  
"I'm more afraid of the mask than the virus".

00:00:03 - 00:02:01

CHRONICLE

Scandal engulfs NGOs, WHO and Doctors Without Borders: 51 Congolese women raped by aid workers

Menu

**IL PARAGONE**

Home ACTUALITY Tamponi, the accounts do not add up: Bruno Vespa unmasks "the error"

28 October 2020, 17:01

781 Views

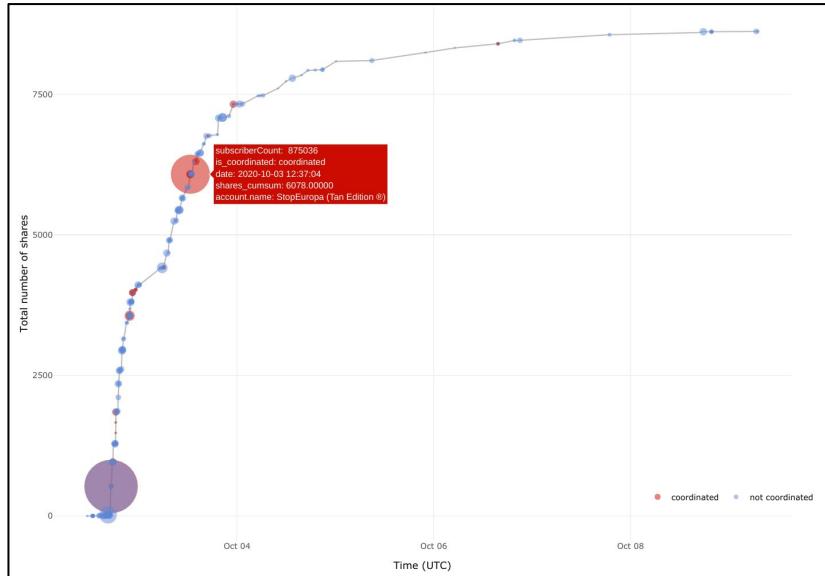


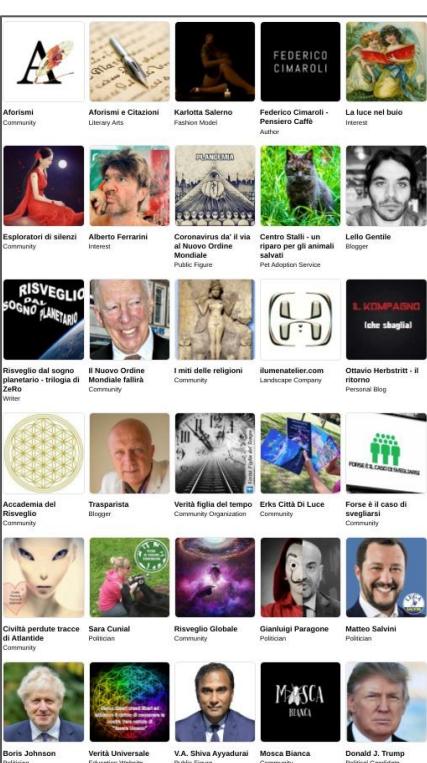
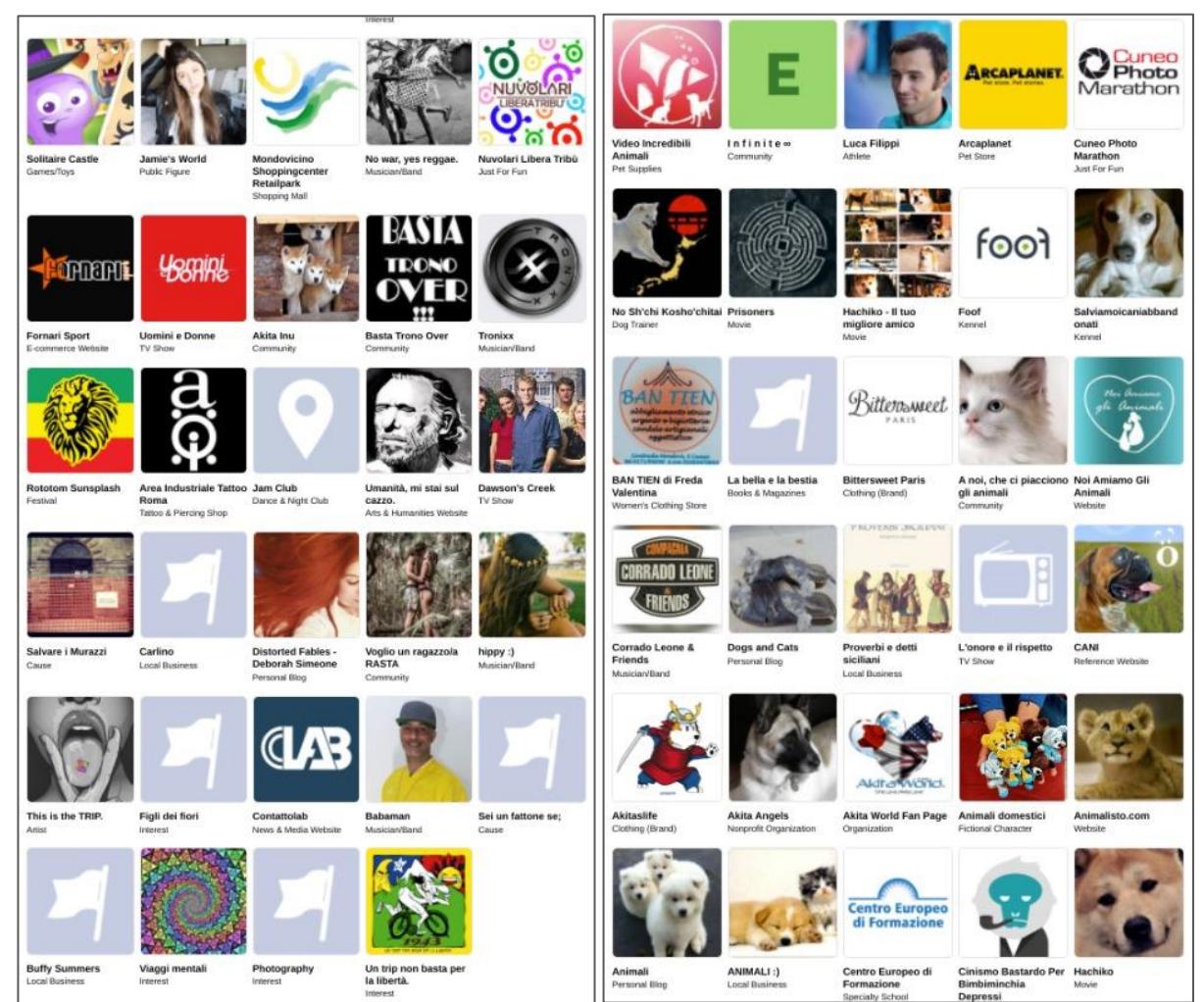
She walks without a mask, blocked by the police with her hands around her neck and arrested

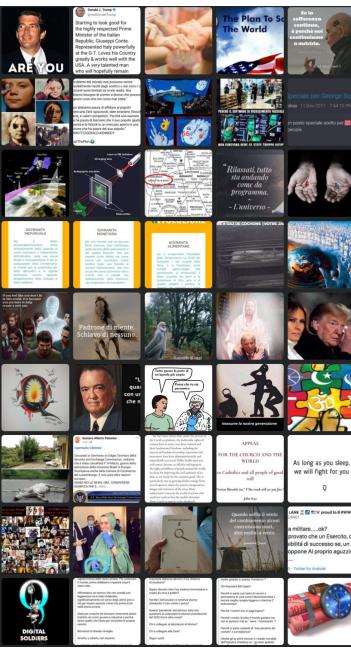
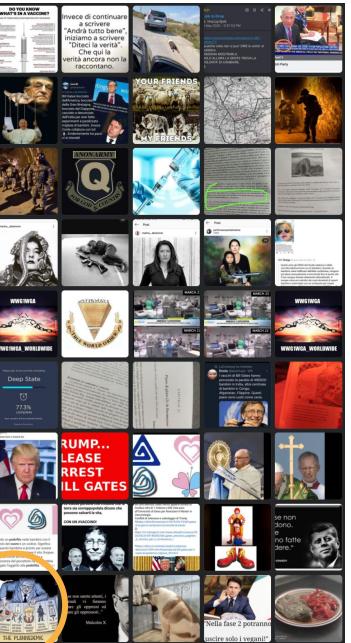
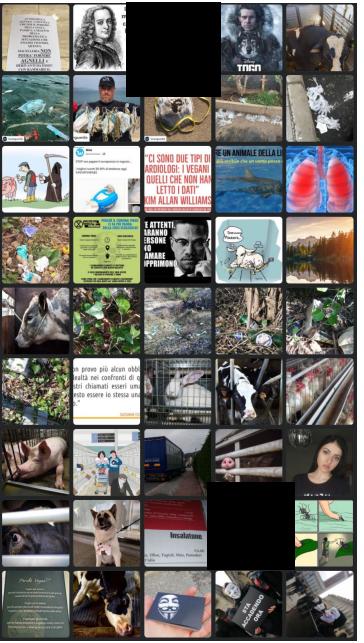
In Florence, a woman was arrested while she was walking her dog because she was not wearing a mask. The story of a witness: "They put their hands around her neck, it seemed that they were strangling her"



# Single URL in depth analysis





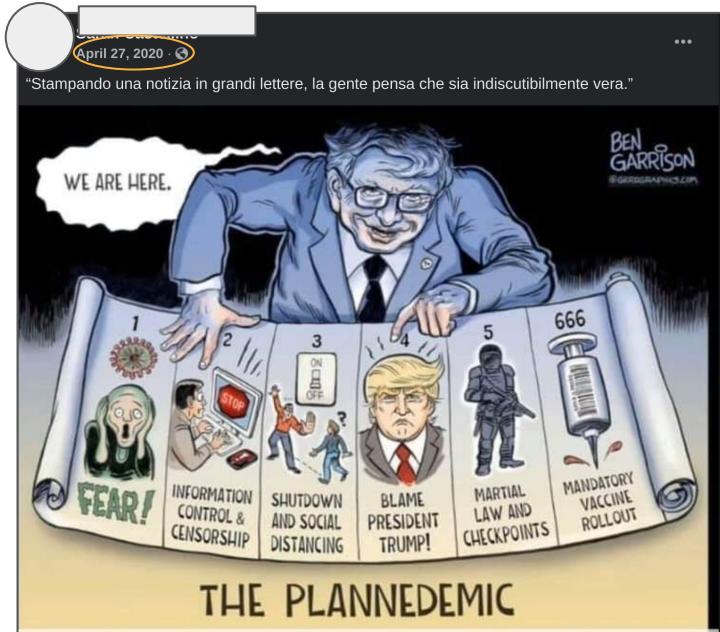


BEFORE

Path of radicalization

AFTER







# Detecting coordinated behaviour on social media

# Detecting coordinated behaviour on social media



(Fabio Giglietto, Luca Rossi, Nicola Righetti)

## Coordination Network Toolkit

(Timothy Graham)

## CooRTweet

(Nicola Righetti, Paul Balluff)

Targeted Behaviour

Link sharing

Retweet, tweet,  
similar text, link,  
reply

Retweet, tweet,  
similar text, link,  
reply

Programming  
Language



Targeted  
platforms



platform  
agnostic

# Toward a platform agnostic definition of coordinated sharing behaviour on social media



1. A *sharing action* on social media can be formalized as an account  $a$  posting content  $p$  at time  $t$ ;

$$a = (p, t)$$

2. Two or more accounts are defined as coordinated when they perform the “*same sharing action*” at least  $r$  times, within a predefined time interval  $\tau$ ;
3. This “*same sharing action*” can be operationalized in a variety of ways: sharing the same URL, using the same hashtag, retweeting the same tweet, ...