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Expert construction during the Italian vaccination campaign against COVID-19: positional, reputational, and communicational spheres in comparison¹

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Abstract

The purpose of this article is to understand what mechanism leads specific actors of the scientific community to assume the central role of experts during the COVID-19 pandemic vaccination campaign. Thanks to the understanding of the world of narratives and self-constructed representations we will try to understand if the figure of the expert is influenced by the institutional role they play, the network of collaborations and the academic network as a proxy of their reputation and, finally, what figure emerges instead from the mainstream media such as the press and social networks such as Facebook and Twitter.

Keywords: *visible expert, media representation, COVID-19 vaccination campaign*

Introduction

The COVID-19 pandemic has been elevated to the top of the agenda setting since the first contagions in January 2020 and from early on identified itself as a challenge even for information systems called to respond with speed to the new needs the crisis had imposed (Thomas and Senkpeni, 2020).

The involvement of scientific experts in media coverage and public exposure during the Covid-19 pandemic recalls Goodell's (1977) concept of "visible experts". Their presence in public communication leads to new changes in the dynamics between science and society (Maasen & Weingart, 2005; Cheng *et al.*, 2008; Bucchi & Trench, 2014). In times of the Covid-19 pandemic, the role of expertise and the scientists becomes more and more crucial in the academic debate (Algan *et al.*, 2021), so with the symbolic launch of VaccineDay in Italy, we formulated a research question that became the main topic of this article.

¹ Although the paper should be considered the result of the collective work of the authors, Rosanna Cataldo was responsible for the coordination of the research analysis and the statistical structure; Gabriella Punziano was responsible for the coordination of the research work and for the methodological design, reflection and assessment; Barbara Saracino was responsible for the concept idea and the theoretical framework; Ferdinando Iazzetta was responsible for the data collection and organization and for the preliminary drafting of the reached reflections.

The goal is to understand the mechanism that leads specific actors in the scientific community to take on the role of experts and become central to the health policy agenda to effectively promote, through the mass media, interventions both in support of vaccine decisions and in response to instances of misinformation ready to raise social alarm of vaccine hesitation (Coleman *et al.*, 2002). In this study we intend to explore the centrality of the Italian public sphere of experts, assuming that it is constructed in the interaction among positional, reputational, and communicative spheres, and therefore it does not depend exclusively on communicative and media processes, but it is, in any case, stimulated by them. From the beginning of the pandemic emergency, in fact, communication played a fundamental role in providing citizens with information and indications on how to minimize the risks of contagion. Information was available through a variety of sources and media experts and, unlike other countries (Metcalf *et al.*, 2020), a plurality of perspectives with different expert emerged in Italy to the point of opening and shaping a new crisis in the emergency on the public and institutional communication point of view. Media exposure to the pandemic crisis is now forcing public communication, and thus various experts, to face new challenges.

Despite Italians' good level of trust in science and scientists, a 2020 survey conducted by the Observa Science in Society Observatory in April 2020 shows that one in two respondents is confused by the different opinions of experts (Saracino, 2020).

The Italian case, therefore, is interesting to analyze the role of experts during the pandemic for two main reasons: first of all, Italy was the first patient-nation of the Western world (Sfardini, 2020) as well as the first country in the world after China to have developed quarantine measures following the increase in contagions, attracting the attention of the world. Similarly, expert statements in 2020 and 2021 report information overload and different (from pandemic severity to judgments about containment measures) with no small amount of inconsistency among them. The suggestion of discordant diagnostic and prevention methods, instances in which the danger was underestimated or ultimately the discovery of multiple vaccines, lead to the opening of a new emergency, often causing delays in addressing the Covid-19 pandemic. Thus, communication, understood not only as the transfer of information but as that symbolic process through which reality is produced, maintained, repaired, and transformed (Carey, 1992) emphasizes the analogy between the evolution of the species and the evolution of scientific knowledge. Today, compared to the past and thanks to the introduction of web 2.0 along with the instantaneousness of digital media, communication has as its reference the vast popular audience and, therefore, it becomes necessary for the community to trust its country. It highlights both how the various medical subjects are all focused on the epidemic and the lack of criteria used by the media to select "scientific experts" to comment on issues that do not belong to their scientific community. The problem of talking people about scientific complexity without adopting a complex approach has highlighted the central role of data analysis by communicating accurately through a massive use of data and statistical decisions to support public policy activities, a theme addressed and emphasized by Parrott (2009, p. 21) in *Talking About Health* where she states that our perception of health occurs through numbers or through stories of various kinds. In this context, the relationship between science and communication once again becomes a strong point and, especially when science is used for political decisions, the role of transparency in communicating information about the vaccination campaign to citizens should not be underestimated. One of the key issues to reflect

on becomes the role of persuasion and trust in scientific discourse and communication between the expert community and society (Larson *et al.*, 2018). As regards the mechanisms of how one is led to believe or distrust science is an essential discourse to avoid further problems. The reputation of science and expertise has never been more important like today and, where the rapid timing of the epidemic and the crowding of disciplines and experts go hand in hand with their communication in this contribution to highlight the delicate relationship among science, media and public in the light of the online presence of experts.

Moreover, the scientific literature belonging to the line of public opinion studies describes a contemporary society whose knowledge is strongly influenced by the media and the representations derived from them (Katz and Lazarsfeld, 1955; Lippmann, 1922; Noelle-Neumann, 1984). The way an event is reported in the media, if highly dramatic and unpredictable like the case of Covid-19, can profoundly influence the public debate, helping to influence perceptions of risks and the ongoing crisis (Vasterman & Ruigrok, 2013), and thus inducing the population to follow certain behaviors and comply with imposed rules. The problem with explaining the complexity of science to an audience without taking a complex approach, without becoming a science communicator, is that even when all experts agree on the nature of the issue, each one could possibly tell a different nuance, creating misunderstandings or worse, giving a personal interpretation of the facts (or an opinion) in conflict with the others. Therefore, it is necessary to resort to the contribution of the social sciences to understand the problem of telling the public the scientific complexity related to the construction of the Covid-19 pandemic, on the contrary, the figure of the expert as an experience of joint and media self-representation.

Research Methodology and Objective

Since the symbolic launch of VaccineDay set on 27th December 2020 across Europe, the role of scientific communication experts has become increasingly central to effectively promote, through the mass media, interventions both in support of vaccine decisions (Casiday, 2007) and in response to cases of misinformation ready to raise social alarm (Diekema, 2012). Our research draws inspiration from the report *A year of Pandemic, 1st report of the project TIPS - Technoscientific Issue in the Public Sphere* that investigates the pandemic through media coverage in newspapers to monitor the quantitative presence and qualitative evolution of technoscience in the public speech, in this specific case with the aim of exploring the centrality on the public sphere of issues, experts and institutions during the Covid-19 pandemic.

The main interesting result in relation to the objectives of our work was the rank sharing of the thirty-three experts in the newspapers that somehow implies a media construction of the figure of the expert during this period. Starting with this explanation, the central research question that led our project aimed at understanding the world of narratives and self-constructed or inferred representations regarding the figure of the expert. However, as the Covid period was filled with crucial and decisive moments in the national health agenda and pandemic governance, we decided to focus our work on the emergence of the expert figure in connection with one of the most specific themes, that is to say those of the vaccination campaign.

Fragmenting the main research question, this article focuses on three sub-questions:

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Is the figure of the expert influenced by the institutional role they play such as their position?

Is their media relevance influenced by the academic collaboration and network as proxy of their reputation?

What is the social representation and which figure emerging instead from media mainstream like press and social like Facebook and Twitter?

To answer these questions, it is necessary to divide the investigation plan into three areas that cover the cognitive aim of this work focusing on the figure of the thirty-three experts.

The first dimension turns around the positional area that is analyzed here from the side of personal and biographical information.

The second dimension concerns the area of reputation here operationalized as data regarding public positions, academic esteem, and online influence.

The last dimension focuses on the area of communication processed as self-presentation on social media and representation in traditional media.

The thirty-three experts² who emerged from the Tips Project were selected according to the principle of inclusion, i.e., every expert who is in at least one of the groups selected by TIPS (both on articles with scientific content and on articles without scientific content) was included in the list, except for Luca Parmitano, who was considered an expert of the medical field of interest. The reference list retains the scores measured by TIPS of the share of scientists, obtained accurately through the ratio of the number of articles where a particular expert appears over the total number of articles in which he was mentioned at least once. For the construction of the empirical record, the selected experts were entered into two case-by-case matrices by variable to collect all useful characteristics for research purposes.

The useful tools for collection, processing and analysis are: FanpageKarma for social media, Publish or Perish for publications, Google Search for curriculum vitae, Volocom for newspapers and social news while Ucinet, Excel, Gephi, SPSS and T_LAB for analysis operations. The first one built to cover the first two areas that we will investigate with the following data: expert, age, sharing on all articles (scientific and non-scientific articles), disciplinary field, specialization, possible role of institutional leadership and political appointment in a technical-scientific committee (CTS); all functional data to apply network analysis paths. The second matrix built to cover the area of communication was constructed by extracting, thanks to keywords³, coming from the national newspapers *Il Corriere della Sera*, *La Repubblica*, *La Stampa* (newspapers chosen considering their circulation rates and centrality in the information scene) and, from the social networks Facebook and Twitter on which a content analysis was conducted. Specifically, 7,728 cases were extracted among articles and posts/tweets from 1/11/2020 to 30/10/2021 and subsequently organized period of collection of posts, type of media and content,

²Walter Ricciardi, Silvio Brusaferrò, Anthony Fauci, Andrea Crisanti, Massimo Galli, Roberto Burioni, Giovanni Rezza, Fabrizio Pregliasco, Franco Locatelli, Iliaria Capua, Alberto Zangrillo, Matteo Bassetti, Pierluigi Lopalco, Giuseppe Ippolito, Francesco Vaia, Mike Ryan, Massimo Andreoni, Nicola Magrini, Roberto Cauda, Giorgio Palù, Guido Silvestri, Antonella Viola, Maria, Rosaria Capobianchi, Alberto Mantovani, Giovanni Di Perri, Silvio Garattini, Giuseppe Remuzzi, Massimo Clementi, Paolo Ascierio, Maria, Van Kerkhove, Eugenio Gaudio, Luca Richeldi, Alberto Villani.

³The extraction used keywords such as vaccin* and espert* and covid*, vaccin* and espert* and coronavirus, covid and scientiat* and vaccin*, coronavirus and scientiat* and vaccin*, vaccin* and espert*, vaccin* and scientiat*.

presence, reaction, and followers on social networks. The selected period covers a year of debate around the vaccination campaign, from the time when the first news about the introduction of the vaccine in Italy was released, following all the discussion about the decisions on the allocation of vaccinations, the administration of the first, second and third dose, closing before the debate on the possibility of introducing a fourth dose. From the materials thus collected and organized, we will discuss below the main results that emerge for the three areas identified.

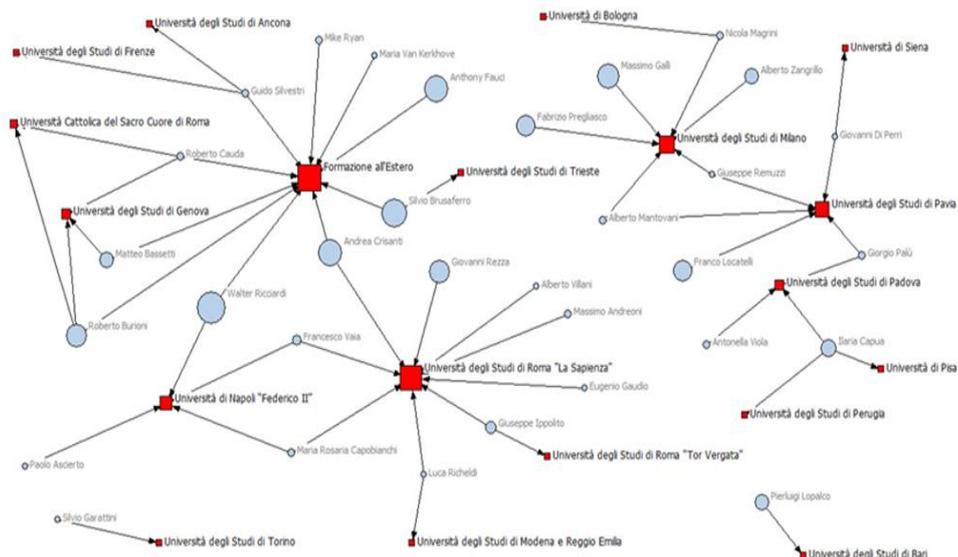
Positional area

Socio-demographic characteristics show that our experts consist of 4 women, including only Maria Van Kerkhove under 50, and 29 men. Only for six experts was possible to find a useful link to their updated resume. Among our experts, the average age is 64, and 30% have senior roles in public agencies. So how is the expert position built and accredited? To answer this question, our proposal has been to reconstruct the pathways understood as relevant institutional steps in education and in the professional sphere, studying centralities and roles in these specific networks, but also changes and characteristics that make the profile of the expert identifiable.

Thanks to the curriculum and the generation of an affiliation matrix, we reconstructed the university educational network, considering both the undergraduate and the doctoral paths. Thanks to this expedient, we reconstructed an institutional affiliation network of our experts' training. From Graph 1, where the largest nodes are the institutions mostly attended by our experts, it is possible to trace three large clusters. The first one with a predominance of training abroad, the second one with the University of Rome "La Sapienza" as the central node closely linked to the Federico II in Naples and, the last one, with the centrality of the University of Milan. Moreover, the largest nodes have a sharing value on the largest TIPS items where, in fact, most of the experts with high share value have a university connection/affiliation abroad. The network analysis allows us to view the most influential universities for our research and, we can infer how the geographical proximity among them tends to strengthen collaborative relationships (as in the case of Milan-Pavia-Padova-Pisa). Moreover, it is also worth noting that 10 of the 33 experts had an educational path that involved the achievement of academic degrees outside the Italian borders; in this regard, it is interesting to note that, following the ranking of TIPS experts, those with the highest total share (Ricciardi, Brusafarro, Fauci, Crisanti, Burioni) all had educational experiences in foreign universities.

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Graph n.1 Training network and PHD study



Elaboration with Ucinet, source online CVs. Minimum linkage: 1 Size by: Degree Centrality (University Nodes), Share calculated by TIPS on all articles (scientists' nodes)

The main disciplinary areas are infectious diseases with Di Perri, Ippolito, Andreoni, Galli, Bassetti, Cauda and microbiology with Crisanti, Palù, Rezza, Capobianchi, Clementi and Burioni. This is followed by a variety of different disciplinary areas, but also by a group of experts trained abroad. Table 1 shows how the multidisciplinary approach has covered and has concerned the entire period of the pandemic and vaccination campaign.

Table. 1 Disciplinary area

Disciplinar scientific Sector	Experts
BIO/14	2=Magrini, Garattini
BIO/16	1=Gaudio
Estero	5= Fauci, Silvestri*, Capua, Van Kerkhove, Ryan
MED/04 ·	2=Mantovani, Viola
MED/06 ·	1=Ascierto
MED/07 ·	6=Crisanti, Palù*, Rezza*, Capobianchi, Clementi, Burioni
MED/10 ·	1=Richeldi
MED/14 ·	1=Remuzzi
MED/17 ·	6=Di Perri, Ippolito*, Andreoni, Falli, Bassetti, Cauda
MED/38 ·	2=Villani, Locatelli*
MED/41 ·	1=Zangrillo
MED/42 ·	4=Preghiasco, Lopalco, Brusaferrò, Ricciardi
SECS-P/07	1 = Vaia* ⁴

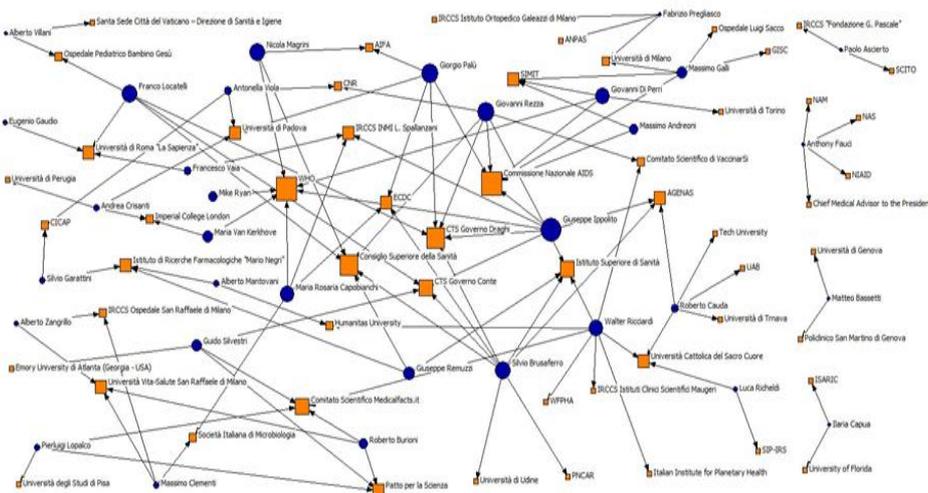
Looking at the side of the professional network conceived as roles in relevant institutions, all our experts have held top positions in Institutes and Agencies, except for Roberto Burioni. The visibility of a scientist becomes, especially in the period of

⁴ *Present in the scientific technical committee.

health crisis more than before, a credential that can be spent on the tables of policy research decision-making (Beltrame, 2007; Rubin, 2020) and likewise one can assume a dual role of policy advisor and public communicator (Roqueplo, 1997). One of the political responses of the Italian government to face the epidemic of Covid-19 was the creation of the Comitato Tecnico Scientifico (CTS) both during the Conte II government (until January 26th, 2021) and the Draghi government - with new appointments and various confirmations - which have been instrumental in the process of implementing the general rules established by the law and not with various criticisms received. The CTS, composed of experts such as virologists and epidemiologists, in recommending containment measures between the present and the future by translating them into provisions and ordinances, faced the choice of priorities between economy and health with different and contrasting opinions. The importance of maintaining roles has often diminished, creating an additional problem in addition to the fueling confusion for the people. The real mix of roles of different scientists, for example, led to various doubts about the actual usefulness of the mask at the beginning of the pandemic. The data collection for the reference matrix - updated to September 2021 - considers the offices and institutional roles of the CTS to report the presence within the CTS of 4 experts during Conte's government: Silvio Brusaferrò, Franco Locatelli, Giuseppe Ippolito and Guido Silvestri - with the confirmation of the first 3 plus the appointment of Giovanni Rezza and Giorgio Palù in the CTS during Draghi's government.

In this network analysis process, several associations and organizations in which scientists worked were identified. In detail, as shown in Graph N.2, the association with the highest centrality value is the National AIDS Commission (NAC). In addition to it, some public state agencies also have a high level of centrality, such as the Superior Health Council (HSC), the Istituto Superiore di Sanità (ISS) and the World Health Organization (WHO).

Graph n.2 Experts Institutions Network



Elaboration with Ucinet, source online CVs. Minimum linkage:1 Size by: Degree Centrality

Furthermore, it is important to note the fact that, in addition to the public and governmental issues, the Scientific Committee of Medicalfacts.it, an online magazine of scientific information and debunking of fake news directed by the virologist Burioni, also played a significant role. In this sense, the importance of this

association, created with the aim of correctly informing web users about science and health issues, may mean that even within the most traditional media, such as newspapers, there has been a selection of personalities who have a propensity for a type of communication and dissemination of information characteristic of digital platforms.

Reputational area

For the reputational area, we will proceed with the exploration of the coverage at the academic level, and, therefore, with the different scientific production and the network of collaboration among the various experts, and with the presence and centrality on social networks. On this side, unlike the previous one centered on the educational and professional network, the focus goes in the direction of academic relevance and distinctiveness on social platforms.

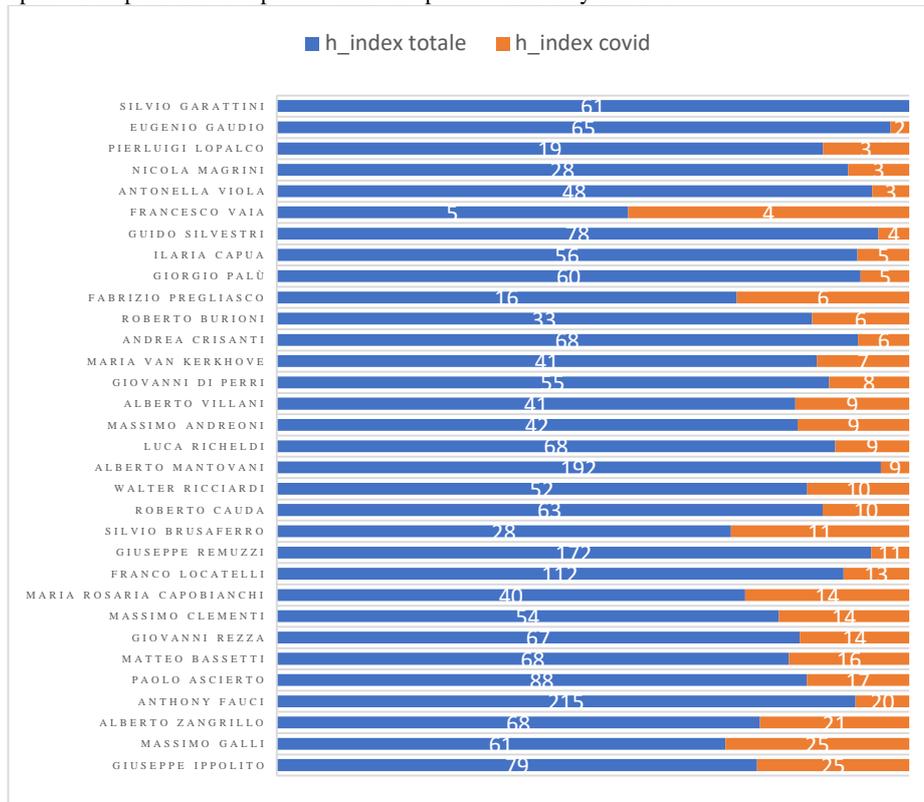
Taking into consideration the academic element, media coverage dominated by scientific actors and characterized by a diversity of experts took place focusing on those with high scientific expertise and often already recognized before the Covid-19 pandemic. This means reconstructing the academic relevance of the experts to be considered and comparing it to the media relevance in 2021. Therefore, two case-by-case matrices were created containing for each of our thirty-three experts the relationship between:

- Number of publications on covid/Total publications;
- Number of citations on covid/Number of total citations;
- H covid index/General H index.

The study was conducted through the automatic calculation of h-indexes based on the Publish or Perish database, a software that allows to browse the archives of other well-known search engines and scientific databases such as Scopus and Google Scholar. Internationally, the various bibliometric indicators are an important tool in scientific research. The new bibliographic databases show a significant increase in the number and variety of scientific productivity indices and, at the same time, the studies that evaluate their behavior and reliability have grown (Alonsoa, Cabrezizob, Herrera-Viedmac, Herrera, 2009).

In the reference matrix, thanks to the index of Hirsch (2005) we quantify the prolificacy and scientific impact of reference experts thanks to the number of publications (academic scientific) and citations on articles (received both from colleagues on the list and out). In this way, the academic relevance has been reconstructed considering both the entire span of their scientific career and during the pandemic period with Covid-19 theme. Among the authors with the highest total h-index we find Fauci, Mantovani, Remuzzi, Silvestri and Locatelli, while on topics centered on Covid-19 of the various experts that are also in the CTS we note the reconfirmation of Fauci among the best unlike, for example, Silvestri committed to follow and work more on pandemic governance. Following the h-index Covid-19, there are some experts such as Galli, Zangrillo, Bassetti and Pregliasco ready to exploit the topic scientifically but not only. Furthermore, thanks to Graph n.3 we can see how the figure of the expert visible in the pandemic era was built not only by the previous path of publications but also by the possibility of doing research using the central theme (Vaia).

Graph N. 3 Experts for total publications and publications only on covid

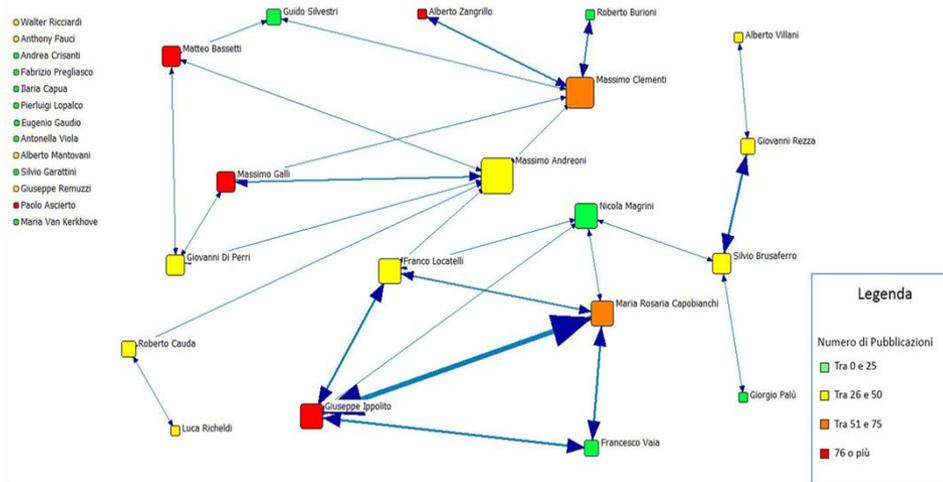


Bibliometrics, understood as that set of mathematical and statistical techniques to analyze the information distribution patterns of school publications and thus authors, articles, and journals, also provide a means to identify diverse relationships with respect to a research topic. Since the onset of the pandemic, the literature has advanced statistics on an exponential increase in the number of academic publications on Covid-19 and, often, an excellent set of interdisciplinary research. Scientific collaboration is a multidimensional concept, generally understood as a form of cognitive exchange, sharing of research procedures and ideas leading to the production of scientific knowledge. Goddixsen, (2014, p. 113) states that in science, co-authored publications of relevant scientific articles seem to be among the most important ways to recognize that a person has given a significant contribution to the development of a research field. Collins and Evans (2002) argue that the highest form of scientific competence is when the scientist can contribute to science in his or her field of research. In this direction, then, collaborative networks assume great importance, since, to borrow the words of Piselli (1995), the influence of a group or institution's relationships is evident on the opinions and actions of an individual. For this reason, the work and training networks explained above and the collaborative one is interesting to observe. And, as it can be seen in Graph N.4, there are relevant connections among scientists: the most obvious is the cluster of scientists working at Spallanzani Hospital, consisting of Ippolito, Capobianchi, and Vaia. Moreover, we can also observe a strong connection between Clementi and Burioni, both protagonists of the "Medical Facts" blog; and equally a remarkable connection between Rezza and Brusaferrò as collaborators both at ISS and at the CTS of Draghi's government.

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In our case, the list of reference experts allows us to place Zangrillo, Bassetti, Galli and Ippolito as nodes in the network with more collaborative publications, while Clementi and Andreoni as more prolific in a network of contacts. In fact, from Graph N.4 we can see that the last is a real link among the experts both in a multidisciplinary sense and for the centrality assumed.

Graph No.4 Network of expert collaborations - Covid-19 publications only.



Processed with Ucinet, online CV source. Minimum Link: 1 Size by: Degree Centrality. Color for: Number of publications

A second element must be taken into consideration, and it is the centrality of the social platform of our experts. The pandemic, in fact, has also shown the central role of communication within today's hyper-connected society, showing on the one hand a scientific debate shifted online, and on the other hand increasingly evident problems of misinformation and *infodemia*. Much of this misinformation spread primarily through social media leads to the question of whether it is a real duty for institutions and policymakers to be online. The question of whether social media fuels institutional distrust was at the heart of school concerns about fake news and misinformation years before the Covid-19 pandemic (Bradshaw and Howard, 2018, Lazer *et al.*, 2018). Exploring their presence on various social platforms, we found that most of the referenced experts are not online. The platform with the most members is Twitter, followed by Instagram and Facebook with only Burioni maintaining and updating his MedicalFacts blog, while the only CTS member active on at least two social networks is Brusaferrero. The idea of true public communication of science is based on the need for mediation between scientists and the public. The complexity of the scientific content moved to the platforms gave him the opportunity to communicate with short messages or photos, again taking up the importance of exposing the numbers of the pandemic. A language translation made necessary by the need to communicate risks by accurately identifying that "process of exchanging information among stakeholders about the nature, power, importance, or control of a risk" (Covello, 1992, p.359). Risk communication, in addition to monitoring an "ongoing risk" (Coombs, 2012), on the one hand has the task of performing preventive functions without leaving anything to chance, and on the other hand empowers scientists to proclaim themselves at the center of the communication process. As we know well from the literature (Colombo, 2015; Riva, 2016) each platform has its own target audience, and the fact of being followed on one of these

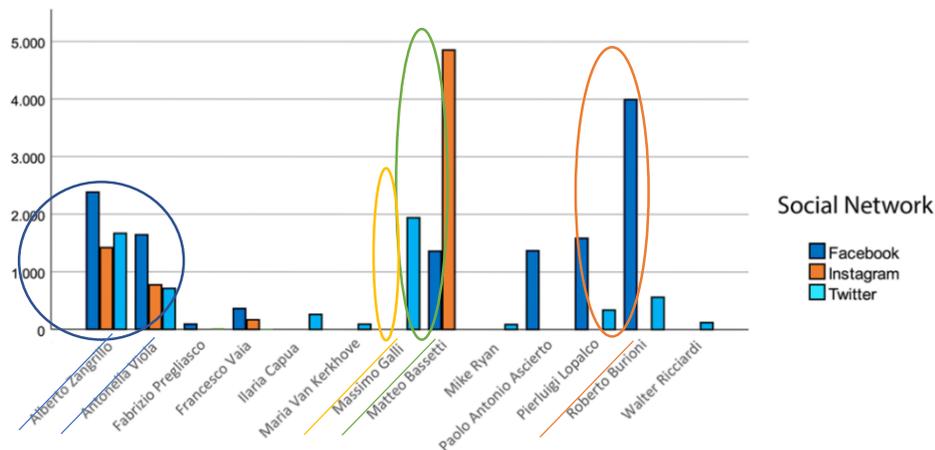
platforms clarifies the place of importance within which the individual expert fits. The data collected allow us to observe a different distribution of followers among the three reference platforms. Burioni, in fact, on Twitter and Facebook is the first to be followed with more than 100,000 followers, Bassetti (not present on Twitter) is the most followed on Instagram and, with only the virologist Ilaria Capua, achieves 100,000 followers. This highlights how, in the positional sphere, presence in mainstream media is reserved only for some of the experts considered and only for those who can create their own language, especially in a format characterized by a feature that sets them apart. At this juncture, it becomes legitimate to project these considerations also by virtue of their presence in television broadcasts (where each television channel with its own broadcast decided whom to address as experts). In fact, the most "followed" experts on social networks are precisely those characters that we have seen several times on TV.

If, from the point of view of content, a specific contribution is needed to enter the analysis and understand "who publishes what?" and with what style of communication they do it, we underline the lack of use of individual blogs by experts in spite of an increase in the number of Italians who obtain every day information about scientific content on blogs or websites (reported by *Annuario Scienza Tecnologia e Società*, 2021). The individual blog, which, from the point of view of content and communicative functions, is configured for scientists as an alternative channel for the publication of their research, has been replaced by the imposition and use of the most well-known and used platforms. Bucchi (1996) pointed out that in certain situations, often related to scientific controversies, experts prefer addressing the public directly, skipping the different stages of scientific communication. Looking at the Graphs 6, then, one can infer how the online mediation of science recalls the presence of few of the familiar faces. Marcinkowski (2014) argues that while the need for science to present itself to the public is evident, any kind of expressed communication must be understood as a real component of academic activity.

If we look, however, at how social platforms are used, as shown in Graph 6, we can see different types of use for different experts. There are those who use all platforms with the same intensity and tend to have a multi-platform profile of the content they produce, such as Zangrillo and Viola. There are some experts who use more visual and emotionally intense content, like Bassetti who dominates on Instagram. There are some experts who focus on the rational component and on public and political debate, like Galli, who makes Twitter his favorite platform. There are other experts who choose Facebook as their digital forum, also because it reaches a more generalist and varied audience, and among these Burioni stands out, followed by Lopalco and Ascierto.

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Graph N.6 Use of social networks by experts.



Burioni is the most followed on Twitter along with Capua, who however does not post much on it; Bassetti is consistently the most followed on Instagram as well as Burioni on Facebook. This means that the relational component, the public and political debate that passes through Twitter are connected to other dimensions of reputation and importance, probably dictated by the content conveyed and not by the way it is conveyed and not dominated by the amount of activity of the participants on the platform.

Communication area

To analyze the characteristics of the communication area of reference experts all contents extracted with Keywords are considered (espet*, Scienziat*, Vaccin*, COVID, coronavirus) from daily articles of national newspapers such as La Repubblica, La Stampa, Il Giornale and from social networks Facebook and Twitter. In this way, mass media are used as a proxy for representation in mainstream media and social networks as a proxy for representation via social. All texts were collected between the months of November 2020 and October 2021 for a total of 7,728 cases organized in a case matrix for variables such as: media type, date, the complete corpus (title plus article) and, the presence or absence of the reference experts in the corpus with 32 dichotomous variables (YES/NO).

The exception is that the only expert ever named within the dataset is Ascierio and, as a constant not included. Ascierio is among the first for h-index both general and on Covid-19 topics but at the same time it is possible to notice his non-presence in the collaboration network. We therefore hypothesize a construction and a figure of the expert here not centered at the national level but more at the local level.

The date was appropriately classified in three phases considering the debate around the vaccination campaign.

The first phase from 1st November to 30th March anticipates and describes both the entire phase of the vaccination campaign in advance with the vaccination day set for 27th December and where, therefore, there is a phase of information, discussion on decisions for vaccination and administration of the first doses.

The second from 1st April to 30th June, which is in the intermediate phase between the two doses of vaccinations, and the third from 1st July to 30th October with the third dose and the possibility of achieving herd immunity. From the Table

2 we can see that social networks cover more than 61% of cases compared to 38% of newspapers and, in all cases, differ in several factors and nuances.

Table 2. Type of media and Phase

Type of media	First phase (Nov–Dec–Gen– Feb–Mar)	Second phase (Apr–May – Jun)	Third phase (Jul–Aug–Sept– Oct)	Total
Newspaper	21,30%	17,85%	22,64%	61,79%
Social network	12,88%	16,63%	8,70%	38,21%
Total	34,18%	34,48%	31,34%	100,00%

In the construction and representation of experts on the two media types we find both similarities and contrasts from the most used keywords. Indeed, the main queries for both media types are *vaccin* and *expert* but, nevertheless, there is a tendency to create a space for representation that moves away from the specialist domain.

With Table 3 it is possible to notice how the construction of the figure of the expert using keywords is central to daily articles in the first phase and with a further increase in the second and then decline in the third. While for social networks, if Twitter follows the same line, Facebook with 18.52% concentrates expertise in the last phase.

From this we can deduce how the centrality of the expert for the area of communication has been dominated by the plurality of content produced on Web 2.0, often recalling interviews and products of other media.

Table 3. Distribution media o phase

Type of media	First phase (Nov–Dec–Gen– Feb–Mar)	Second phase (Apr–May–Jun)	Third phase (Jul–Aug–Sept– Oct)	Total
Corriere	4,97%	7,02%	3,70%	15,69%
Repubblica	4,37%	5,09%	2,43%	11,89%
Stampa	3,53%	4,53%	2,56%	10,63%
Facebook	13,23%	11,34%	18,52%	43,09%
Twitter	8,08%	6,51%	4,12%	18,70%
Total	34,18%	34,48%	31,34%	100,00%

Consequently, thanks to content analysis techniques and in particular co-occurrence analysis, it was possible to study the different associations among words by identifying those that appear closest to each other. Using T-Lab it was possible to study and explore the semantic relationships among words within the whole corpus and the network of experts.

From the outputs we can see a different centrality of the figures of the expert and the scientist differentiating the representation by type of media and elaborating

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through sequences of KeyWords, whose elements are lexical units in the corpus or in a subset of it.

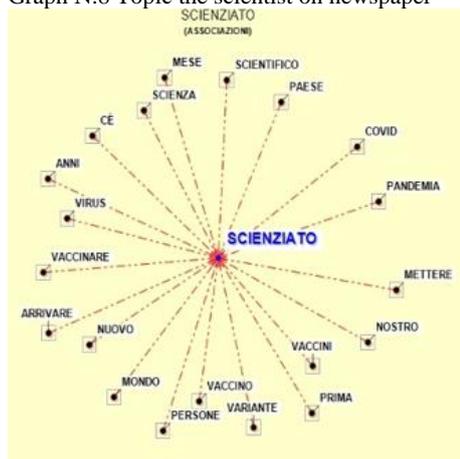
From Graph n.7 depicting the construction of the expert we note associations ranging from considering the period and, therefore, between the temporal distance of the administration of doses (words such as week, month, years), to explain in terms of efficient health the usefulness of the vaccine even during the arrival of new variants from Covid-19 (arrival, variant, explain, people).

In addition, for newspapers, in Graph n.8 we can clearly see how the construction of the "Scienziato" placed on the network returns an interconnection directed both to science (scientific, pandemic, vaccinated) and to people. Just the high frequency of the plural possessive form "our" is not a coincidence, in fact, along with the world and people puts at the center of the debate during the vaccination campaign a figure of the scientist inclusive and at the service of the public.

Graph N.7 Topic the expert on newspapers



Graph N.8 Topic the scientist on newspaper



Processing with T_lab, own extraction source

From Graph 9 we see how on social networks, the figure of the expert stands out with a different narrative and construction. We find words like Anti, doubts, Astrazeneca that we can explain by assuming that the topic and generic posts on social networks are more varied with a wide spectrum of topics and a lexicon often oriented to a specific type of target. Changing the communicative register also

automatically emerges a question/answer to uncertainties and the new (with the third word placed at the centre).

The lexical patterns in which words like use, anticovid participate, together with the previous ones show how the participation of the expert in the construction of knowledge for the audience has changed. Even for the figure of the scientist on social networks (Graph 10), the words identified are hardly surprising as they are the ones most echoed and known during the pandemic period.

However, interesting for interpretation purposes are the distributions of the keyword's death next to effective ready to recall the usefulness of the vaccine and, the figure of the expert Bucci the only one not present in the reference list and that the research on the corpus reported among the most frequent.

institutionally relevant position is not conveyed communicate. At the same time, the "celebrity" status assumed by several scientists may allow them to comment on areas outside their framework of expertise. So, what makes a scientist the expert of the moment? This increasingly contentious question may be resolved through future analyses of television presence and contents collected.

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