

Managing counter-knowledge in the context of a pandemic: challenges for scientific institutions and policy makers

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Abstract.

Counter-knowledge comes from unverified sources of information such as hoaxes, rumours or partial lies. It creates an atmosphere of lack of trust that often leads individuals into making risky decisions. In contexts of high uncertainty, the flow of counter-knowledge is likely to increase. Although scientists and scientific institutions can provide knowledge based on evidence and verifiable facts, they may find it difficult to react to the proliferation of counter-knowledge, and so their own credibility may be affected. This paper adopts concepts derived from the knowledge management field to shed light on this problem. Examples from the recent history of Italy are discussed. Useful lessons for the public and policymakers are derived. These lessons become particularly relevant in the context of a crisis such as the COVID-19 pandemic, as the world experiences a combination of factors that provide a fertile ground for the emergence of both scientific knowledge and social counter-knowledge.

Keywords: Counter-knowledge, healthcare sector, public science, knowledge management, case-stories, Italy, crisis, pandemic, COVID-19.

Introduction

As the COVID-19 crisis has shown, “non-evidence-based” information shared for tendentious purposes (Meiova and Kalimeri, 2020) can become a problem for healthcare services. This is particularly relevant when such information sharing is facilitated by so-called scientists (Ionannis, 2020). A significant part of society, often including disadvantaged groups who feel vulnerable and look out for some solution that can bring them back to their usual lives, can be prone to believe rumours, myths or urban legends (Van Beveren, 2003), while others may try to take advantage of this.

Scientists and scientific institutions are expected to provide reliable information and instructions for safe actions and behaviours. However, they are often confronted by individuals, groups, or companies who contest their “official truth” and propose alternative and even unsupported views and solutions (Lee, 2004).

Unfortunately, the knowledge base of individuals can derive not only from reliable sources, but also from rumours, unsupportable justifications, or even lies (Cegarra Navarro et al., 2015). This triggers a vicious circle of distrust that hinders all knowledge processes within and between organisations (Baskerville and Dulipovici, 2006) and challenges institutions in their effort to maintain objectivity and control when these are most needed. These negative effects are amplified by social media platforms in the current context (Sánchez-Casado et al., 2015).

This study aims to shed light onto the mechanism and effects of counter-knowledge, the role of social media, and the measures that can be taken by scientists and science institutions especially in times of crisis such as a critical situation like a pandemic. It adopts knowledge management (KM) concepts and models that can be useful to analyse the cognitive mechanisms of creation and dissemination of counter-knowledge and its potentially negative impacts on cognitive processes and decision-making. The study draws inspiration from

three paradigmatic cases regarding the Italian healthcare sector. They show the weakness of the “official” sources of knowledge when they must face the upsurge of counter-knowledge. Lessons for public institutions are drawn.

Counter-knowledge and its negative effects

The term *counter-knowledge* was coined by Thompson (2008) to refer to sources of unverified information, gossip, partial truths, or deliberate lies, which can be in certain contexts mistaken for true facts (Cegarra-Navarro et al., 2015). Counter-knowledge can be negative, i.e. can be “bad counter-knowledge” based on manipulated messages that are unverified or unverifiable, allegations or gossip, and intentional fake news. It can spread to a large audience and affect people’s view of reality (Lee & Pistole, 2014), behaviour, and decisions (Martínez-Ortiz et al., 2017). In principle, everybody should check their source of knowledge. However, counter-knowledge is part of the complex system of a person’s cognitive development, which is not only rational but involves emotions and spiritual needs (Bratianu & Orzea, 2013).

As an additional challenge to this problem, today social media platforms bring about new processes of knowledge construction and diffusion (Sánchez-Casado et al., 2015; Gelfert, 2018). In the crisis caused by the COVID-19 pandemic, these technologies contributed to spreading unverified news and “easy way-outs” to health and economic challenges.

Counter-knowledge can cause errors or negative attitudes (Hislop et al., 2014). It can affect the performance of organisations (Coombs et al. 2013) and pose challenges to liberal societies (Greenhill & Oppenheim, 2017). This is because counter-knowledge undermines the authority (Cegarra-Navarro et al., 2016) of leaders and decision-makers, key to any efforts to deliver a crisis management strategy in organisations and societies (Kirchner et al., 2021). In organisational settings, in particular, counter-knowledge may have an even more tangible impact (Martelo-Landroguez et al., 2019). From a change management perspective, Adler and Shenhar (1990) highlighted five elements defining the knowledge base of an organisation: skills, procedure, structure, strategy, and culture. Each of these could be directly affected by the emergence and spread of counter-knowledge in different three ways: 1) wrong beliefs relating to well-established rules, norms and belief can hinder the mobilisation of resources to address new business opportunities; 2) strategic decisions based on disinformation and manipulation relating to how uncertainty avoidance and short-termism at the institutional level can have a negative effect on shareholder value; and 3) rumours and gossips that hinder managers’ ability to address opportunities and capture value from changing the way business is done, by incorporating new skills and procedures into core business practices (Bolisani & Cegarra-Navarro, 2021; Cegarra-Sánchez, Bolisani, Cegarra-Navarro, & Martínez Caro, 2018).

There are different ways of classifying and studying counter-knowledge. We understand the concept as dependent both on who ‘owns’ the counter-knowledge and on the aims of its creation or the effects the owner sought to generate (Bolisani & Cegarra-Navarro, 2021). In both cases, there is a need for public institutions to understand this phenomenon and develop countermeasures on the basis that no expert is expected to act on the name of pure rationality, and that counter-knowledge is almost always present in the public debate. That is why the present study focuses on the social counter-knowledge which is both easy to transfer (e.g. between an organisation, institution, community or individual and its potential stakeholders) with the ultimate aim to manipulate perceptions or misinform any of the interested parties. Our research focuses primarily on scientists and scientific institutions in their struggle to maintain their credibility when facing the negative effects of counter-knowledge generated and shared by others. We see the public -mainly made of potential patients and their families, as the community directly affected by the negative effects of such counter-knowledge.

Based on Spender's (1998) classification, this type of counter-knowledge could be categorised as either tacit social counter-knowledge, for example, myths and unfounded beliefs about superfoods, or explicit social

counter-knowledge such as fake news and hoaxes. Universities, scientific research organisations and health organisations base their credibility on the recognition of professional competence and deontological ethics, and this credibility can be undermined by both types of social counter-knowledge (Hargreaves, 2005).

While knowledge growth is a driving force for socio-economic development, negative counter-knowledge created through both official and unofficial sources becomes a burden to society and businesses. Counter-knowledge may cause difficulties for individuals and institutions of all kinds trying to discern and absorb the knowledge that drives innovation and success. The negative impact of using unverified or outdated knowledge is varied: it negatively affects decision making and causes anxiety, stress and despair (Sánchez-Casado et al., 2015); and it even further affects our ability to absorb, store, and convey correct information and knowledge by triggering a process of distortion of clear thinking (Thompson, 2008).

When it comes to the COVID-19 pandemic, individuals and communities from every corner of the world have actively engaged in a search for information for several reasons: these have ranged from social and business activity to simply an imperative to be informed about the evolution as well as the effects of both the pandemic and its potential treatments. Unfortunately, when it comes to the impact of COVID-19 and potential treatments, there has been a significant volume of speculation, misinformation and fake news circulating across the Internet and in particular in social media.

Generally speaking, for the general population to learn about the COVID-19, there are three main possible sources and channels of knowledge and information. These are:

- Official sources, i.e. academic journals, press conferences, and official reports and press notes delivered by scientists and official scientific authorities;
- Unofficial sources, which include online and offline communities of various kind with a mix of experts, non-experts, self-declared experts, people making declarations for personal beliefs or ideological positions, organizations that promote their viewpoints, and also friends and relatives who share their experiences or opinions; and
- Self-learning, namely individuals who have sought to learn from their own experimentation or even as a result of their being directly or indirectly affected by the pandemic.

In principle, all these three sources can be affected by the counter-knowledge phenomenon, although it is more likely that major issues emerge concerning the second and third of those. In any case, as we will describe in the paper, in its relation to health-related knowledge, counter-knowledge is not a homogeneous type of knowledge, and can also derive from a combination (and misinterpretation) of all the three different sources of knowledge. Also, it may be argued that the production and diffusion of counter-knowledge not necessarily come from malicious or tendentious goals: for example, in the case of vaccination or other treatments, individuals do not respond in the same way and may have legitimate beliefs and fears, and in sharing our own views even with the best of intentions they can inadvertently generate counter-knowledge that is finally shared with their networks in all three channels.

Research issues and anecdotal examples

KM models can be useful to analyse the processes of counter-knowledge creation and dissemination, and to derive useful lessons for contrasting it. We report three paradigmatic examples concerning medical treatments in the recent history of Italy where the spread and misuse of counter-knowledge greatly impacted on the behaviour of the public and undermined the credibility of scientific institutions.

The “Di Bella Method” (DBM)

At the end of the 1990s, the media started to throw a spotlight on Doctor Luigi Di Bella and the supposed effectiveness of his “Method” to cure cancer (Nadeau, 2002). Di Bella’s home was invaded by patients looking for a cure, and journalists looking for first-hand insights. Di Bella’s virtuous lifestyle contributed to his credible image (Di Grazia, 2011).

Although Di Bella was not completely isolated in the medical community, the majority of researchers claimed that DBM had never been tested in a clinical trial, nor his proposer had ever submitted his works to “public scrutiny”. Di Bella and supporters claimed that the evidence was that “the method had cured many people”, blamed the official science as “untrustworthy”, and accused other famous physicians and even the pharmaceutical industry to exert their power for personal reasons or myopic visions. The public institutions, also considering some recent cases of malpractice or corruption, felt forced to play defensively, and the media didn’t help: the position of the “official science” in public debates was often presented as “one of the possible opinions” (Minerva, 1998). The case became a matter of “cheers and beliefs” rather than rational judgements. In 1997, a judge imposed the free administration of DBM, and the Government, despite the opposition of experts, declared that the “willing of the people” was to give DBM a chance. An experimentation protocol was implemented, which brought no tangible benefits. Di Bella claimed that the failure was due to a bad implementation of the trials (www.metododibella.org) but on the other hand, he was accused to have never provided complete and objective information. Later, a new government decided to re-open the case, but after an ultimate round of analysis, DBM was finally rejected (Vickers & Cassileth, 2001). Di Bella, up until he died in 2002, kept affirming that his cure was effective, and so are doing his heirs, family, and supporters (<http://metododibella.org/it>).

Stamina

“Stamina” refers to a medical treatment proposed by Davide Vannoni, an expert in media and communications (Lepore and Piana, 2013) and marketing of medicine (Vannoni and Tardivo, 2002). Vannoni claimed that he had been cured with a special treatment in Ukraine and wanted to bring this cure to Italy (Mautino, 2014). His involvement may have contributed to the construction of his reputation. Vannoni opened a “laboratory” in the basement of his marketing company (Mautino, 2014), hired two Ukrainian biologists, and started a communications campaign in local televisions. He gained the favour of public opinion and seriously ill people who, so far, had never found effective cures in the official medicine.

Public prosecutors started investigating Vannoni’s controversial activity, but he was able to involve some doctors and even a public centre for cancer treatment, where his cure was administered to a growing number of patients. All this increased the pressure on public authorities and helped Vannoni to obtain official permissions and public funds.

Cures and experiments with patients went on, but when Vannoni was asked to illustrate his therapeutic protocol and to provide evidence of the results, according to some observers, he just replied with a mix of contrasting messages (Mautino, 2014, Pini, 2013). In September 2013, a report of a special public Commission declared Stamina as ineffective and even potentially dangerous (La Repubblica, 2013). In 2015, Vannoni was condemned for fraud and administration of dangerous drugs. He settled with the court but, since he went on administering his treatment in another country, he was finally arrested in 2017 and died in 2019.

“No-Vax”

This term identifies those that oppose the compulsory administration of vaccines. Anti-vaccine movements had started after the pioneer of smallpox vaccination proposed his method, and in recent times have grown rapidly, and so did the websites, forums, and blogs related to “No Vax” topics (Weniger & Papania, 2012). Although some think that the No Vax position is just a matter of “prejudice, false beliefs, or ideological

opinions”, their motivations also derive from the “official science” itself (Kata, 2012; Mazzucco, 2016). In a paper published in a famous medicine journal (Wakefield et al., 1998), the authors claimed that there was a correlation between vaccines, autism, and other diseases. The study fuelled the protests of No vax communities, although after 12 years it was discovered that the study was a fake (Deer, 2010).

The No Vax movement has gained strength in Italy and has affected political decisions. A growing number of people are claiming their right to avoid vaccines, and despite pro-vax campaigns by doctors and authoritative physicians (see e.g. www.robertoburioni.it), they gained consensus also thanks to the massive role of social media. Considering the risk of epidemics, in 2017, the Ministry of Health promulgated a bill to impose vaccination to all children attending schools. This raised a turmoil of protests (Caporale, 2018) that were not sedated by the voices of the official science. Indeed, despite the claims that the Italian health system is, on average, good enough, some cases of malpractice and corruption may have contributed to suspicions towards the medical profession (Caporale, 2018).

A KM-based understanding of the counter-knowledge phenomenon

The phenomenon of misusing counter-knowledge can be examined under a KM perspective. Figure 1 outlines a model that considers the production and delivery of elements of unverified origins or misinformation (Baumeister et al., 2004). It also highlights the possible transformation of such elements into wrong pieces of information and knowledge that can be easily believed to be true and thus become an integral part of a person’s view of reality (Thompson, 2008). Finally, the model shows the influence that such a process can have on the public perception of decisions made by official institutions (Cegarra-Navarro et al., 2015). In terms of the sources of knowledge and counter-knowledge, we will consider all the three different possible sources mentioned in the previous section, both individuals and organisations. With regard to the potential effects of such counter-knowledge, we consider both the citizens whose decision-making capability may be affected by counter-knowledge, and scientific and government institutions that need to deal with the negative impact of counter-knowledge on the credibility of the messages they need to convey. Hence, our goal is to raise awareness and also to inform the work of both stakeholder groups in their efforts to deal with the counter-knowledge phenomenon effectively.

Please insert Figure 1 around here

The main ingredients of counter-knowledge can come from a mix of different elements: tendentious fakes, unsupported and unsupportable explanations and justifications, distorted factual elements, and partial truths. As the cases show, the strength of a counter-knowledge message is that it goes “straight to the core” of an issue and is “easier to get”. In being perceived as so, it becomes difficult -especially for the less informed sectors of society, to discriminate reasonably plausible facts from distortions or fakes. When authorship is linked to individuals and groups with a positive social brand counter-knowledge may be perceived as prosocial knowledge, which has a greater influence on the behaviour of individuals, groups and communities (Mariano, 2021).

In contrast, highly sophisticated scientific knowledge requires complex structures to be described and understood. This is a gradual process of assimilation and internalisation that requires a special attitude and constant application. This is hard to accept for the average citizens, especially when they are in a fragile situation and seek easy or prompt answers. The open scientific debate can be interpreted by the people as sterile. The efforts by the scientific community (like described in the DBM and the Stamina cases) to “explain” the rationale behind a scientific trial, conflict with simpler messages such as “patients have the

right to get any available treatment”. Rational, emotional, and spiritual implications of knowledge (Bolisani & Bratianu, 2018) are mixed and difficult to separate by some of those who join the debate with a limited understanding of the subject. Counter-knowledge can thus easily spread, either intentionally or not, across communities and societies. Similarly to the processes related to the creation and sharing of scientific knowledge, counter-knowledge emerges during the processes of acquisition, distribution and use of knowledge. Particularly when engaged in a public debate, counter-knowledge emerges from the lack of understanding of the message. We all have access to unverified or outdated knowledge that we either intentionally or not, explicitly or implicitly, share and use to inform our daily decisions.

Counter-knowledge can also derive from the “official sources” of science itself, either deliberately or not – as seen in the No VAX case. But contrary to scientists, most members of society may lack the time or capability to check a source of a particular piece of information, verify the information using source, cross-check data or verify the rigour of its analysis. Their final interpretations are based on a relatively narrow frame of reference and may result in abuse or improper use of the information. Later, these inappropriate interpretations spread and become established opinions and beliefs. In short, counter-knowledge is also “knowledge that we assume to be right” when, in fact, it is not.

Concerning the consequences of the spreading of counter-knowledge, different forms of manipulation can deliver true/false knowledge in varying proportions (i.e. truth plus intentional lies, unverified plus official information, objective information plus gossip, etc.). Its effects can be seen in the new knowledge constructions that individuals build based on the bad counter-knowledge absorbed and/or developed, and in the consequent decisions that are taken. Counter-knowledge is not, in itself, a guarantee for misleading decisions, but surely bad counter-knowledge can adversely influence the decision process, as shown in figure 1. As the cases show, many actors (i.e. researchers, doctors, pharmaceutical companies, politicians, and patients) have different cognitive backgrounds and even conflicting interests. The success of a treatment (e.g. a vaccine) requires that positive knowledge exchanges occur between all parties, and inappropriate attitude and distorted messages can easily be misunderstood by the others. Bad counter-knowledge is the result of misusing unsupported explanations and justifications, so potential triggers can be found on the level of subjectivity inherent to the misuse of this unverified information, and the pervasive influence of peer pressure in spreading and manipulation of information. For example, in the first case the DBM promoters believe their own opinions regardless of their “formal scientific demonstration” (i.e. unintended effect of misusing counter-knowledge). However, the “Stamina” case involves fraudulent or dilatory intent (i.e. intended effect of misusing counter-knowledge). In the “No VAX” case, social pressure accelerates the fears of side effects of vaccination and enhances bad knowledge creation (i.e. peer pressure effect of misusing counter-knowledge).

Counter-knowledge induced people to build their own “special knowledge” about an issue. In the “No Vax” case, they tend to build a sort of “alternative knowledge” about the problem of vaccines. This cognitive process, not necessarily based on a “scientific” approach, represents a base for decision-making. In the absence of a publicly recognized “authority”, there is no more “official knowledge”, and personal beliefs become central. Since the official scientific authorities may be affected by cases of malpractice, in the eyes of the public they are put on an equal footing of any other source - including gossips and false messages. In all the cases examined, the proliferation of counter-knowledge has been favoured by the lack of reciprocal trust between the parties.

A physician that refuses to support unverified treatments (as it happened for Stamina and DBM) may be perceived as “not empathic” with the people and their sufferance. Healthcare managers, though, need to be aware that patients and carers can be influenced by manipulated information. This means, for instance, that a doctor must not simply administer a vaccine, but should also “convince” a patient that the treatment is appropriate, inform about risks, and must “listen” to possible objections and fears.

Finally, counter-knowledge can easily circulate due to the “easy message” that it carries. For example, some felt that “doctors don’t want to cure us with DBM because they are paid by the “Big Pharma”, which was an easy message to carry. It also circulates easily through social media platforms, such as in the “No Vax” case, which in the COVID-19 pandemic has led to an increase in the spread of misinformation and sensationalism, as it is acknowledged that emotional content captures people’s attention, especially in critical situations (Cerdá-Mansilla et al., 2021). Any news and opinions -whether supported or not, move fast online, while scientific knowledge requires time to be understood, assimilated, and maybe even reasonably criticised. Internet companies, for their business purposes, can favour any message that attracts users, regardless of its truthfulness (Thompson, 2017).

Conclusion

Counter-knowledge comes from not only intentionally-created fake news but also information deriving from supposedly verified sources of information, or “honest” beliefs. Scientific activity can be misunderstood or even misused. This study provides insights into the possible implications for public science in future crises that resemble the coronavirus COVID-19 pandemic. Our study emphasises that scientific knowledge - particularly in the healthcare field, is not homogeneous, neither in its origin nor in its arguments, and this triggers the emergence and spread of negative forms of counter-knowledge. Furthermore, despite its heterogeneity, the negative effects of counter-knowledge lead to a similar problematic situation, one where the stakeholders of that knowledge face serious difficulties to make sensible decisions. This problem is further exacerbated by the fact that such decisions are health-related and often need to be made by patients and their carers.

The three cases presented -namely the “Di Bella Method”, “Stamina” and “No-Vax”, from different contexts and points in time, show how partially contrasted investigations could attract desperate individuals and groups, and cause a loss of credibility to the relevant scientific and government institutions, journals, etc. In these three cases, there was an intentional use of disinformation and manipulation for the benefit of others. In order not to get carried away by the fear of possible adverse effects of vaccines or new medical treatments, verified scientific experiments and continuous review of preliminary studies are necessary. It is important to highlight that counter-knowledge emerges during the processes of acquisition, distribution and use of knowledge, as does scientific knowledge. This adds a new dimension to the problem when it takes place in the domain of healthcare. Particularly when the public engages in an open debate of sensitive health-related issues potentially affecting each member of the community, counter-knowledge emerges naturally from the lack of understanding of the message being shared.

Thus, key recommendations for official science organisations on the whole and for the professionals who work in them, as is derived from our research, include:

- Doctors should be aware that medical problems are complex, and counter-knowledge can affect the decisions of people, which are based on a mix of rational, factual elements but also emotional and irrational aspects, beliefs, personal interests, etc.
- It can be hard, for scientific institutions, to develop a climate of mutual respect and calm debate. The continuous rebound of accusations between “parties” – exacerbated by social media – harms the credibility of public authorities and tends to poison decision processes. On the other hand, a “bureaucratic” attitude may be perceived as “technocratic arrogance”.
- When it is not possible to show the “true knowledge” conclusively and incontrovertibly, it may be appropriate to be open to honest reservations and fears. Also, any potential conflict of interest should be avoided.

- The scientific community is often unprepared for public communications: scientists and physicians may be easily falling in the perverse traps of social media. Education of doctors and scientists should include these competencies.

At the time of writing –early 2021, the world is experiencing the second wave of the COVID-19 pandemic. During this challenging period, the entire population of the world is avid for new information and knowledge on a daily basis. On the one hand, the emergence of new, more aggressive variants of the COVID-19 virus brings growing concerns to society, who feel frustrated by the short- and long-term implications of putting life on hold. On the other hand, new vaccines with different degrees of efficacy are emerging from developed economies, which brings a degree of hope to all. This combination of factors set the ideal ground for the emergence of new scientific knowledge and also for the creation, sharing and consumption of all types of counter-knowledge. Both of these have the potential to spread with a similar degree of ‘efficiency’. In doing so, scientific and political actors face the challenge of effectively engaging with all sectors of the population to put the right measures in place, from continuous lockdowns to the use of face masks in public places to the delivery of vaccination programs that cover all sectors of the society in all countries. This makes the argument on this research particularly relevant, as well as our attempt to inform all communities working to minimise the effects on counter-knowledge on the most vulnerable sectors of society.

This research draws lessons for public science and government institutions. Such lessons become particularly relevant as the world experiences a combination of factors that set the ideal ground for both the emergence of new scientific knowledge and also for the creation, sharing and consumption of all types of counter-knowledge to minimise the impact of the COVID-19 pandemic at the time of writing this paper. However, it also has some limitations. The cases highlighted the presence of bad counter-knowledge and its harmful effects, but different findings might have been obtained from a different sample. Also, direct sources have not been included, such as fresh direct interviews with key informants, etc. These limitations may, however, be addressed in future studies. COVID-19 is, indeed, another interesting terrain for this.

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