Performance analysis of fact-checking organizations and initiatives in Europe: a critical overview of online platforms fighting fake news

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Abstract

This study represents the first work integrating theory and practice from the field of fact-checking and combating fake news into a novel methodology for performance analysis of fact-checking organizations. It provides important insights into the efficiency and effectiveness of European fact-checking organizations. However, it is relevant for any fact-checking organization across the Globe. The methodology includes the development of a scheme of performance indicators and the definition of a taxonomy of fact-checking systems, supported by an existing conceptual framework. The practical part consists of piloting of the methodology into a set of implemented and working online platforms. The results from the study reveal huge space for improvements of the workflows and the functionality of fact-checkers and lead to the extraction of a set of recommendations in this regard.

1. Introduction

The advent of the information and communication technologies opened up a myriad of opportunities for people to create and disseminate content through multiple services and platforms. However, not always actors take advantage of this bright side of the Internet. In fact, very often they create and spread (purposefully or not) content of dubious veracity or unverified origin. This type of content is what has popularly become classified as "fake news". Fake news is often simply defined as *spreading false content for political purposes*. However, from a broader perspective, fake news may refer to rumors, gossip or generally, information that is not checked, is not objective and in the worst case, is completely misleading. The most controversial property of fake news is their potential to influence how society as a whole or groups within society behave and perceive reality. This not only impacts the quality of contents

on the web, but undermines the trust of the users in the platforms, in the applications and in the other users creating and sharing content. As reported in the Reuters Institute Digital News Report[1] (Nielsen 2017:10), only a quarter (24%) of the respondents think *"social media do a good job in separating facts from fiction, compared to 40% for the news media."* The data cited points out that "users feel the combination of a lack of rules and viral algorithms are encouraging low quality and allowing fake news to spread quickly." In that regard, Vertesi (2016) also calls for the need to pay more attention to the topic of digital information technology in daily life and in knowledge work within science and technology studies.

These developments in the online world, however, do not imply that traditional media are immune to fake news reporting (Edelman Trust Barometer 2018). Media presentation of reality and journalism work have in particular been largely questioned because distrust in media as a factor for social progress is on the rise. Thus, it is of little surprise that we have witnessed the emergence of dozens of fact-checking and debunking organizations in Europe over the last several years (Stencel 2017; Brandtzaeg and Følstad 2017; Graves and Cherubini 2016).

Although many journalistic articles and academic studies report on some aspects of these activities, tools, organizations and their work[2], there is no study, let alone a holistic one, that either determines factors for measuring performance or inspects the influence of those factors on any aspect of the performance of fact-checking efforts. Yet, the relevance of this particular issue seems to be approachable by a multitude of disciplines:

- Economically, one can speak about the efficacy of the efforts, their social impact, return of investment, value for money, effect on consumer behavior, risk assessments of potential failures, or their contribution to the media development in general.
- Politically, one may concentrate on investigating either general questions like: Which entities deserve public/civil support and how is this provided in the most transparent and sustainable way? What are the practical implication of their functioning? or some more specific questions, such as: What is the correlation between information disorder and the political developments in a country? How can regulation impact and be impacted by these efforts? How are fundamental rights affected by the success or failure of these initiatives?
- Psychologically and inter-disciplinary, investigating these issues may provide deeper and novel insights into the human bias phenomena, the role of social behavior and groupthink (echo chambers) and the formation of social networks in the proliferation of a certain piece of information, the urge to lower the human cognitive dissonances as a factor in the formation of information disorder, etc.

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[1] https://goo.gl/7jkJQ1
[2] See list of recent studies in Ordway, 2017; report on activities in Wardle and Derakhshan, 2017; list of tools in Stearns and Kille, 2015. There also is Open bibliography of relevant, evidence-based research on problems of misinformation available at Google docs that lists around 150 sources.

Research has, nevertheless, provided arguments for negative perceptions on the general usefulness and trustworthiness of these organizations by social media users (Brandtzaeg and Følstad 2017). Economic theory suggests that any organization pursuing special goals must apply performance measurement to follow its progresses towards the achievement of these goals (Epstein et al. 2010). As Caruntu and Caruntu (2012) point out, the measurement of the economic and financial performance has started to receive even greater importance than before. It is therefore recommended that companies, organizations, or any goal-oriented project use a combination of financial, economic and non-financial indicators to measure their performance.

This paper aims at developing a methodology for performance analysis of fact-checking and debunking organizations[3]. Europe as a case study was chosen to provide a counter-weight to the US dominated discussion on fake news, but also as a market with historically strong regulatory approaches to information infrastructure (e.g. Privacy regulation). However, the same approach is applicable to a non-European context as well. The methodology integrates the development of a scheme of performance indicators and the definition of a taxonomy of fact-checking systems, supported by an existing conceptual framework. An empirical study is then performed and piloted into a set of implemented and working online platforms to provide a proof of concept of the methodology and, moreover, to allow for the extraction of a set of recommendations for performance evaluation and improvement of the fact-checking processes and organizations. The results from this research are analyzed and structured into a proposal for a general research and assessment framework of the performance of fact-checking organizations.

The next section introduces the basic concepts and definitions employed throughout the work in this study. Related work and state of the art are also part of that section to support the overview of interconnected initiatives. Basic features of fact-checking organizations are elaborated in Section three. Section four proceeds with the methodology of work, introducing the guiding principles for designing and carrying out the theoretical and the empirical parts of the study. An empirical study is then built and its piloting in 50 EU fact-checking organizations is discussed: the discussion moves from the description of the field work through the presentation and the analysis of the results, to the final recommendations and conclusions. The paper wraps up with pointers to future directions on the work on developing trustworthy information infrastructure, of which fact-checking organizations are becoming an integral part.

2. Background Concepts and Related Work

Developing and arguing over a case concerned with fake news (see Rubin et al. 2015), hoaxes, fact-checking, clickbait (monetization and traffic attraction), is often encumbered by the absence of a conceptual common ground on the concepts underlying that context. Some suggest

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[3] From this point on, by 'fact-checking' we imply 'fact-checking and debunking'. For clarity and compactness, only 'fact-checking' will be used.

novel terms, such as *attention hacking* (Marwick and Lewis 2017). Others introduce additional terms to come to consensus on the definition on fake news, such as *information disorder*, *information pollution* or *disinformation campaigns* (Wardle and Derakhshan 2017:5). Others again prefer more general terms, such as *distribution of harms*, as coined by Rubin et al. (2015). Bounegru et al. (2017:5) argue that "*fake news is not just another type of content that circulates online, but that it is precisely the character of this online circulation and reception that makes something into fake news.*" According to Marwick and Lewis (2017:44) it "*generally refers to a wide range of disinformation and misinformation circulating online and in the media.*" In media markets' theories fake news is defined as "*distorted signals uncorrelated with the truth*" that emerge in the market because it is "cheaper to provide than precise signals" (Allcott and Gentzkow 2017). From a political economy perspective, fake news has a long history that is bound to the commodification of journalism in a market economy (Hirst 2017).

However, there seems to be a consensus that the current communication environment within and between many countries worldwide is much more politically and socially challenged than in the past periods of grey[4] and black[5] propaganda, conspiracy theories and fabricated content[6]. Although Collins Language has announced „fake news" on the 2017 Word of the Year shortlist, some researchers like Wardle and Derakhshan (2017:6) oppose the use of the term "fake news". In their view, it is a conceptually inadequate and politically abused term. In the same vein, Marwick et al. (2017) call for a larger focus on *attention* and *frame hacking*, providing a perspective that is more oriented towards data infrastructure manipulation sensitivity rather than vague discussions on veracity, truth and objectivity. Therefore, Wardle and Derakhshan introduce a new conceptual framework, defining what they prefer to call *the key terminology of information disorder*: misinformation, disinformation and malinformation, and distinguishing between information that is false and information that is designed to harm. In this paper, we follow Wardle and Derakhshan's conceptual framework for information disorder and adopt the following definitions:

Definition 1: Misinformation occurs when false information is shared, but no harm is meant.

Definition 2: Disinformation is when false information is knowingly shared to cause harm.

Definition 3: Malinformation is when genuine information is shared to cause harm, often by moving information designed to stay private into the public sphere.

Clearly, fake news can be of a detriment to the social momentum the Internet is gaining. Moreover, it can equally bring harm to the public as any other type of harmful content. Recognizing this, a political intervention was undertaken by the EU in this regard: European External Action Service East Stratcom Task Force that ran the 'EU vs Disinformation'

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[4] Information of questionable origin that is never sourced and whose accuracy is doubtful
[5] False information and material that purports to be from a source on one side of a conflict, but is actually from the opposing side. It is typically used to vilify, embarrass, or misrepresent the enemy.
[6] Invented or produced some false messages in order to deceive someone.

campaign[7]. The Task Force was established after the EU Heads of State and Government stressed "the need to challenge Russia's ongoing disinformation campaigns in March 2015". Between September 2015 and November 2017, the Task Force with partners have identified and debunked over 3.500 disinformation cases. Despite these concrete efforts, research on whether fact-checking is effective at correcting false beliefs (and under what conditions) has been contradictory at times (Chan et al. 2017). Nyhan and Reifle (2015) argue that misinformation can be very difficult to correct and may have lasting effects even after it is discredited. Therefore, only debunking it is not sufficient - it must be replaced by an alternative causal explanation (Nyhan and Reifle 2015).

Some scholars implicitly or explicitly point to the contextual and cultural dimensions of spreading hoaxes and fake news[8]. Different interests are involved in the process, and speech contexts bare a lot of ambiguity. In order to understand properly the digital discourse, it may be important to identify and elucidate the practices of communication that go well into the need for historical, cultural, contextual and comparative analysis (Bird 2003). This is in part a global issue that requires a global approach. Therefore, several global tools have been developed by the IT companies to verify and reestablish trusted sources of online information, such as the Google fact-checking and the Facebook repost-verification. Rather than establishing the veracity of a certain piece of information, these tools only offer news and facts on more aspects of the piece of information, allowing users themselves to decide on 'what would be their own truth'. Furthermore, tech-industry players may not have their interest tuned to laying out a critical approach to the use and manipulation of data infrastructures, or to ensure transparency of such use. As a result, very often they may even defeat the purpose of fact checking just by their nature of operation. For instance, in late 2017, fake news stories were accidentally promoted with prominent ads served by Google on websites like PolitiFact and Snopes, which are fact-checking sites created precisely to dispel such falsehoods (Wakabayashi and Qiu 2017). Hence, it is not surprising that the public in many countries is also worried about the proliferation of fake news across the different media and the rise of distrust in the news in general (Cellan-Jones 2017; Newman et al. 2017).

Considering the variety of stakeholders concerned by the problem, several initiatives and organizations were also established with the common objective of raising awareness and addressing challenges related to trust and truth in the digital age: the NGO *First Draft*[9] (in 2016), global *Partner Network* of journalism (e.g. BBC, Reuters), human rights (e.g. Amnesty International) and technology (e.g. YouTube) organizations, to name a few. To join these efforts at a European level, in November 2017 the European Commission (EC) announced its next step in the fight against fake news: setting up a High-Level Expert Group and launching a public consultation[10]. Interestingly, the action of the EC also includes "assessment of measures already taken by platforms, news media companies and civil society organizations to

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[7] https://euvsdisinfo.eu/about/
[8] http://www.worldvaluessurvey.org/WVSContents.jsp?CMSID=Findings
[9] https://firstdraftnews.com/about/#network
[10] http://europa.eu/rapid/press-release_IP-17-4481_en.htm

counter the spread of fake news online, as well as positions on the roles and responsibilities of the relevant stakeholders" (Ibid.). However, no details have been disclosed about the methodological framework to be applied and whether effectiveness and efficiency of fact-checking initiatives will fall within the scope of the evaluation.

Some EU member states had already taken measures to combat information disorder. For example, the Czech Republic set up a specialist "anti-fake news" police unit called Centre Against Terrorism and Hybrid Threats**,** which have been operating since 2017. Both Italian and Slovak police announced fight against fake news in January 2018. Simultaneously, Sweden engaged in plans to create a new public authority tasked with countering disinformation and boosting the population's resilience in the face of possible influence operations, called "psychological defense" (psykologiskt försvar) authority. Similarly, in January 2018 the United Kingdom revealed plans to establish a new "national security communications unit" to curb the presence of hoax news stories online and stop social media campaigns from foreign adversaries. These initiatives have currently no special institutional or legal background. A debate could be open here on whether any effort to make them institutional would result in approval by the public and what repercussions would it have on human rights, national security and public safety.

3. Characteristics of fact-checking organizations

There is no single definition of fact-checking organizations summarizing their basic features. A variety of approaches among scientists exist to determine and describe these organizations. By and large scientists take into account the different traits and features to devise their models of fact-checking organizations. Thus, a recent study by Brandtzaeg and Føolstad (2017) divides the universe of fact-checking services into three general categories based on their areas of concern: 1) political and public statements in general; 2) online rumors and hoaxes and 3) specific topics, controversies. particular conflicts or narrowly scoped issues and events. Most recent data counted 137 active fact-checking projects around the world - up from 114 in early 2017. A third of them is located in the USA (Stencel 2017). In Europe alone, 34 permanent sources of political fact-checking have been identified as active in 20 different European countries, from Ireland to Turkey (Graves and Cherubini 2016). These organizations are categorized in terms of their mission and their methods. By this categorization, Graves and Cherubini found that fact-checking outlets occupy a spectrum between *reporters*, *reformers* and a third, overlapping category including organizations which have cultivated a role as independent *experts*.

Fact checkers around the globe have also formed an entire professional network. The International Fact-Checking Network (IFCN) is a unit of the Poynter Institute dedicated to bringing together fact-checkers worldwide. The IFCN was launched in September 2015 to support fact-checking initiatives by promoting best practices and exchanges among

organizations in this field. The association also adopted a Code of principles in 2016[11]. It addresses *"organizations that regularly publish nonpartisan reports on the accuracy of statements by public figures, major institutions, and other widely circulated claims of interest to society."* The principles represent professional commitments to nonpartisanship and fairness, transparency of sources, transparency of methodology and open and honest corrections. These comprise the principles and values on which the activities of fact-checking organizations are premised; notwithstanding the fact that these organizations are similar to journalistic and other associations (like non-governmental organizations), they have not adopted criteria for the self-assessment of their performance. Moreover, only part of the European fact-checkers joined this global network.

Analyzing more in depth these organizations, some scholars explore the methodology they use. Rubin et al. (2015) provide a map of the current landscape of veracity (or deception) assessment methods, their major classes and goals. Two major categories of methods exist: 1. *Linguistic Approaches* in which the content of deceptive messages is extracted and analyzed to associate language patterns with deception; and 2. *Network Approaches* in which network information, such as message metadata or structured knowledge network queries can be harnessed to provide aggregate deception measures. Interestingly, most of the insights on deception research originate from disciplines without detection automation in mind.

Despite their diversity, the functional characteristics of fact-checking organizations are denoted by their names. Experts have (rightly) observed that, while mis/dis/mal- information spreading is mainly dominated by very active users, the fact-checking is still a more grass-roots activity (Chengcheng et al. 2016). Furthermore, as Rubin and Conroy (2012) and Wineburg et al. (2016) demonstrate, one serious drawback of the fact-checking and debunking activities is related to the fact that human observers perform poorly in the detection of fake news, and machines even slightly outperform humans on certain tasks. The mathematical modeling of information diffusion processes showed that there is a threshold value for the fact-checking probability that guarantees the complete removal of the hoax from the network which does not depend on the spreading rate, but only on the gullibility and forgetting probability (Tambuscio et al. 2015). This also raises a series of fundamental issues: how efficient are the tools and platforms aimed to combat information disorder? Which factors affect their performance and how to evaluate this in the first place?

Next, we move to defining the methodology of work that will help us pursue the goal of answering the above-stated questions.

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[11] https://www.poynter.org/international-fact-checking-network-fact-checkers-code-principles

4. Methodology of work

Pertinent to the definition of a proper set of performance indicators is the analysis of the contextual traits of the systems/organizations where the evaluation is to be performed. Unlike most of the approaches that pre-define the performance indicators based on the needs of their research objectives, we are extracting the baseline of the methodology from the existing frameworks and reports on the performance issues of two sectors: governmental and non-governmental. Combining the insights of the analysis of the two sectors not only enables us to extract a general set of indicators that brings forward the advantages of both sectors, but also allows these efforts to complement each other in a way that can improve both the evaluation and the performance of the organizations.

As most of the fact-checking organizations are in essence non-governmental, we first analyze and extract the relevant performance indicators for non-government sector, and then complement it with the insights from other contexts. This is shown in the following subsection.

In addition to defining performance indicators, an initial survey was also designed containing a basic set of questions addressing the identified indicators. This survey was piloted in several fact-checking organizations. In parallel, unstructured interviews were carried out with experts that are directly involved in the implementation of the fact-checking methodology of these organizations. Both types of feedback (from the survey and from the interviews) enabled us to perform a second iteration of improvements of our methodology and progress towards defining a more relevant and granular set of indicator-related questions for the empirical study provided in Section 5. A conceptual framework was also adopted to guide the structure of the elaborated issues and adjusted to the context of fact-checking in order to ensure the highest relevance of this work among the efforts for combating information disorder. To verify the relevance, a basic taxonomy of fact-checking systems was also developed as part of the methodology.

4.1. Developing performance indicators

It becomes clear by now that the introduction of performance indicators and metrics allows an organization to build a holistic quality management system. Although measuring performance may come once policies, procedures and feedback mechanisms are adopted and clarified, performance indicators can also be introduced in portions, using a small number at a time with the strategic goal to come to the foreseen outcomes. That is also the logic behind the development of indicators followed in this work.

4.1.1 Performance indicators relevant for non-governmental organizations

Scriven (1967) was among the first researchers who discerned the bifurcated role of evaluation: its formative and summative nature. The formative evaluation pursues the provision of useful

information to the team, with team improvement as the ultimate goal. et al. Chianca (Chianca 2005) also calls this type of evaluation *process evaluation*. For the purpose of this study, the process is represented by the indicator **internal coordination.**

Summative evaluation, on the other hand, is performed to provide information to the decision makers that run the team, as well as to potential users who judge the value or merit of the program in relation to important criteria. Scriven (1991) finds the two types of evaluation are interwoven – on a practical scale above all. When it comes to NGOs, fact-checking organizations notwithstanding, their goal of *pursuing social change* makes them to predominantly function as natural open systems, where performance is highly dependent on and sensitive to instability and rapid change in the external environment (Scott 1987; Fowler et al. 1992). We recognize this crucial interaction between the outside environment and the internal organization setting and enlist **external coordination** as another indicator relevant for the evaluation of performance.

Clearly, performance of non-governmental organizations can be evaluated with respect to the accomplishment of projects' goals on the one hand and, on the other, with respect to their overall societal impact. However, as many researchers have noted, there is a pervasive problem in that the organizations' monitoring and evaluation are mainly concentrated on expenditure, activities and outputs, but not on the effects and impacts of the organizations' work, e.g. on humans, society, environment, etc. (Fowler 1997; Riddell et al. 1997; Roche 1999). In the most comprehensive overview of NGO impact and impact evaluation methods to date, Riddell et al. (1997) looked at evidence from 60 separate reports of 240 projects undertaken in 26 developing countries. The authors report that (confirmed by data and interviews): *in spite of growing interest in evaluation, there is a lack of reliable evidence on the impact of NGO development projects and programs."* Thus, **tracking impact** is an important indicator to address in the process of performance evaluation.

Despite the objective to track their impact, Fowler has argued that the *"limitations of the instruments that NGOs use to monitor, evaluate and review"* are one reason why NGOs have not been able to substantiate their achievements (Fowler 1997:160). There has been a lot of argument over the value of Logical Frameworks as planning and monitoring tools (Wallace et al. 1997). Logical Frameworks have been useful in encouraging the identification of indicators at the planning stage, but much less so in ensuring their actual use during project monitoring or evaluation (Davies 1997). In practice, the widespread focus on *identification* of indicators reflects a bias towards planning rather than monitoring and evaluation that is built into most NGOs, and other agencies. **Tracking progress** is thus an important part of the continuous performance awareness.

Very often NGOs set the scene for anticipating exceedingly high expectations of what can be achieved (Davis 2001). It is widely recognized that the achievements of many objectives, such as empowerment, institutional strengthening and the development of civil society, are difficult

to define in advance. Hence, **clarity of objectives** is another indicator relevant for the performance evaluation of fact-checking organizations.

All of the aspects discussed above require the involvement of stakeholders in the elaboration of evaluation criteria, which should be an ongoing process. Such method also presupposes a high degree of transparency of the organization's activities. This is especially relevant for fact-checking organizations where absence of transparency has been detected as a major issue that affects the stakeholders' perception of the organizations' trustworthiness (Brandtzaeg and Følstad 2017). Therefore, **accounting for transparency** (of the methodology used, funding sources, etc.) is a factor we are enlisting in the set of performance indicators.

Addressing the identified set of indicators in the appropriate manner allows for a feedback loop to be established between the inputs and the outputs of the organizations' quality management system, enabling the introduction of necessary measures into the operations and the functions of the organization and the achievement of desirable goals. Nevertheless, NGOs exist in an environment that exhibits contextual traits which are not inherently present within the NGOs' structure and management, but are interlocked in the communication pathways with these external systems. Such are, for example, the government-related systems, whose presence brings additional issues, but also facilitates the coping with some inherently non-governmental issues. The next section introduces such indicators that emerge from the interactions between the two sectors.

4.1.2. Performance indicators from governmental contexts

The choice of the objectives of a system/organization is deemed critical for the governmental sector as well. In the context of governmental performance, *indicators' systems provide a systematic collection of information to measure and monitor particular activities* (OECD 2008). They can serve a variety of specific objectives, such as: allocation and control of resources, quality evaluation, cost, coverage, transparency and communication with citizen stakeholders, efficiency evaluation, etc. (Ibid.) As revealed by OECD in its Working paper N5[12] (on promoting performance using indicators in enhancing the effectiveness of sub central spending), indicators are not static and should be viewed as residing in a dynamic and collaborative context (OECD 2008). Certainly, this stands for NGOs-relevant indicators too, but also for any organization residing in a human-centric context. In a governmental context, performance indicators can be used to: establish the current organization's performance; measure improvement over time; set targets to motivate continuous improvement; and as part of a self-assessment which could be included in third party verification.

In addition to external evaluation, self-assessment is a very important part of the continuous performance evaluation both on a short term and on a long term basis. The self-assessment criteria can be adopted by the organization as a result of an internal discussion with the staff

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[12] https://www.oecd.org/tax/federalism/40832141.pdf

and/or an external discussion with stakeholders. Furthermore, **self-assessment** is an important part of tracking the progress of the performance. It encourages the team's involvement and responsibility and enables it to reflect on the role and contribution to the process of any of the group. Thus, self-assessment glues most of the other performance indicators together. In our empirical study we also pay special attention to self-assessment.

When speaking of governmental sector, it is inevitable to touch upon regulatory frameworks and policies. In the context of performance evaluation, the OECD Framework for Regulatory Policy Evaluation was devised to assist countries in evaluating the process of their regulatory policy (OECD 2014). In addition, it recommends an overarching method of evaluating performance based on data and information on the design, implementation and results. Thus, it becomes important to assess the **alignment between the regulatory policies** that are at the intersection of the state-responsibility and the NGOs' functionality.

Some obstacles to the proper application of this approach within NGOs can be the identification of the relevant outcomes which, as stated before, can be vague or too ambitiously planned. However, establishing the connection among the sequence of inputs, activities, outputs and outcomes is only a logical way to assess any organizational performance. In that sense, the choice of proper indicators contributes to enhancing the efficiency and effectiveness of an objective by reducing information asymmetries which exist among the various management levels and encouraging performance improvements by altering the incentives for carrying out the work for achieving the planned goals. Thus, **incorporating incentives** into the design of an indicator scheme is not even optional. Incentives are inevitable, regardless of whether their implementation is implicit or explicit to achieving the objectives. Therefore, an incentives policy into the organizations' work is the final performance indicator we are enlisting in the indicators' scheme.

Among the well-established performance indicators, **effectiveness** and **efficiency** are two broad categories used to evaluate the genuine advancement of the organizations' work. While effectiveness indicators measure how much targets are reached and relate actual to expected values, efficiency indicators, measure how "well" resources (like people, machines and money) are deployed to produce a given output (like products, services and profit). Similar as for the non-governmental organizations, the accomplishment of outcomes is naturally considered the most relevant indicator for measuring effectiveness in this context as well.

These two broad indicators' categories are also adopted in our approach and embedded into the empirical study. Moreover, they integrate (either implicitly or explicitly) all of the indicators identified in this section and unify them under the common term of *performance indicators.* For instance, the presence of incentives is relevant for both efficient operation and effective outcomes. The same stands for most of the other performance indicators.

To summarize, in addition to *internal coordination, external coordination, tracking impact, tracking progress, clarity of objectives* and *accounting for transparency*, the complementary

analysis of the governmental sector allowed for the identification of *self-assessment procedures* and *incentives policy* as additional indicators. The analysis of all of the identified indicators are either implicitly or explicitly embedded into the analysis of the *effectiveness* and *efficiency* indicators whose maximization is the most desirable performance aspect.

4.2. The WDF Conceptual framework

To establish a common ground with the approaches taken or yet to be taken in the field, but also to ensure a conceptual rigor, our work follows a well-defined conceptual framework. As underlying premises for studying the combating of information disorder by the fact-checking organizations surveyed in this study we have adopted the Conceptual framework for information disorder of Wardle and Derakhshan (2017). This framework (henceforth denoted as WDF) represents a qualitative sublimation of the types, phases and elements of information disorder (as shown in Figure 1).
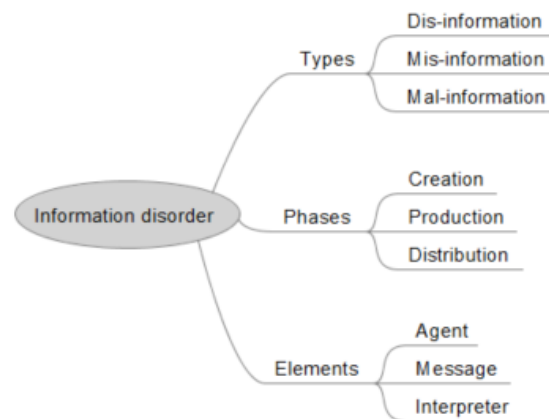

Figure 1. The WDF conceptual framework for information disorder

The three types of information disorder types were already defined and explained in the introductory sections. The phases essentially follow the logical lifecycle of information: **creation** refers to the steps towards 'creating the message'; **production** encompasses the transformation of the message into a media product, denoting its initial presence in the media; and **distribution** refers to the spreading of the message across various media and its proliferation in the public. The elements of information disorder are divided into: **messages** - being the information of interest, e.g. the (potentially) fake news; **agents** - referring to the controllers of the messages; and **interpreters**, signifying the 'audience' or 'the consumers' of the messages. Certainly, their roles and functions are further divided and analyzed into sub-processes.

These provide the guidelines for developing further our methodology - from designing the survey, through structuring and elaboration on the scheme of performance indicators, to the necessary adjustment to the narrower context addressed by this study - fact-checking. This "narrower context", for example, implies that, while the WDF framework requires addressing the 'Creation' phase of a message, the fact-checking process is clearly not tackling this issue and this phase would thus be irrelevant for our analysis. Therefore, a relevant mapping between the context of fact-checking organizations and WDF needs to be performed. This is demonstrated in the following section.

4.3. Mapping the WDF to the context of fact-checking

In order to be able to perform the required mapping, it is first necessary to establish the connection between the conceptual framework and the structural organization of the components of a fact-checking system. However, there is no known taxonomy of fact-checking systems that defines such components. Moreover, there is even not an approach that establishes the process of fact-checking as one that could be functionally organized into a systematic operational whole. This is probably due to the fact that the fact-checking process is mainly seen as a human-effort relying on human expertise, which makes it difficult to unify the operations across the organizations. However, relying solely on human effort is increasingly becoming an unrealistic assumption, and the latest development in the field call for the need to establish a common taxonomy of fact-checking systems.

In this section, we will only provide the basis for defining such taxonomy. The further development of this taxonomy is out of the scope of this paper and will be subject to our future work.

4.3.1 Taxonomy of fact-checking systems

The first step towards the definition of a fact-checker's taxonomy is the identification of existing systems that bare resemblance in their objectives to the process of fact-checking and debunking. Such are the computational trust systems, which are already highly automated and supported by a well-defined taxonomy (Marti and Garciamolina 2006).

Based on the known approaches that try to systematize the fact-checking processes (Conroy et al. 2015; Guha 2017; Hassan et al. 2017), and complemented with the taxonomy of trust systems, we are able to determine the following three main components that a fact-checking system would integrate: *Information gathering, Decision-making* and *Response*. These can further be divided into subsystems that can again be equipped with both human and computational mechanisms, as shown in Table 1.

Table 1. Basic taxonomy of fact-checking systems

Fact-checking system		
Information gathering	**Decision-making**	**Response**
Information sources Information classification Information aggregation Novice policy	Good vs. bad messages Good vs. bad agents Successful vs. unsuccessful interpreters	Targets choice Incentives Punishments

For the purpose of our mapping, it is sufficient to only consider the three major parts of the fact-checking system. With such defined taxonomy, we are able to perform the mapping of the WD Framework to a fact-checking context. This is shown in Table 2. By merging these two approaches, not only our analysis can benefit from getting a conceptual grounding, but the WDF can also be revised through the lens of more practical approaches. For instance, if we provide a feedback loop from the taxonomy to the phases of information disorder, it can be noted that the framework does not account for the full lifecycle of information: Storage and Destruction are missing in this regard to ensure that the complete set of the fact-checking activities that could be related to the elements of information disorder were taken into account.

Table 2. Mapping WDF relevance to fact-checking

Mapping WDF relevance to fact-checking			Fact-checking system		
			Information gathering	**Decision-making**	**Response**
WDF	Information disorder type	Disinformation	●	●	●
		Misinformation	●	●	●
		Malinformation	●	●	●
	Information disorder Phase	Creation			
		Production	●		
		Distribution	●	●	●
	Information disorder element	Agents	●	●	●
		Messages	●	●	●
		Interpreters	●	●	●

This, on the one hand could mean that WDF only accounted for the possibility of relying on human-effort in the fact-checking process. On the other hand, it does reveal an important space for improvement. Additional improvements can also be made at the lower organizational level of the framework. This is will be addresses in our future work.

The convenience of WDF lies primarily in the fact that it joins the general issues of several different contexts to construct common guidelines and recommendations for a variety of stakeholders. Moreover, putting this framework in practice enables us to design a constructive feedback from practice to theory and show how the two can benefit from each other. This kind of approach pushes the whole field a step further from having only a conceptual framework and a step closer to designing a common Reference Model for Information Disorder.

5. Empirical study

Clearly, the scientific validity of much of the above described methods and approaches depends on the cooperation of the target organizations (and the maturity of their projects). As a primary database of fact-checking organizations dealing we used the list compiled by Graves and Cherubini (2016). This list, however, turned to be incomplete (for example, it listed only one fact-checking organization for the Czech Republic, whereas we were able to identify three more: manipulatori.cz, hoax.cz and evropskehodnoty.cz, and one international project run in cooperation with the Czech Centre for Investigative Journalism (Holcová et al. 2017). Based on our extended search, 50 European organizations were approached, located in 27 countries. The majority of the organizations were contacted through their official website or through their publicly available emails. In 12 cases, however, online form was the only available form of communication. In addition, Facebook was used to establish contact with 7 of them, appearing to be the only possible way. The period of contacting all of the organizations was throughout December 2017 and January 2018. Despite the online communication, we also asked local contacts for help in several cases, such as in Finland, Italy, Latvia, Norway, Poland and UK. The feedback rate (number of feedbacks vs. the overall number of surveys distributed), although relatively low, allowed us to carry out highly relevant and statistically meaningful analysis. The processed results and the analysis are shown next.

5.1. Results and Analysis

The results, although derived from a modest statistical set, provide important insights. Few of them were expected, but most of them can certainly be claimed novel. So far we have collected data from 15 countries, 11 of which were obtained through the online survey, and 4 through the offline survey (30% feedback rate). Other fact-checking organizations promised to provide

their feedback as well. In addition to the surveys, 4 semi-structured interviews were also carried out. These helped us iterate through and polish the initial set of questions to a final coherent Survey[13].

The overall content of the Survey was divided into three Sections: two major sections corresponding to the two major sets of indicators: efficiency and effectiveness, and one additional section to help us capture some more subtle contextual traits and interpret more adequately the responses provided in the first two sections.

5.1.1. Efficiency of fact-checking organizations

To investigate the efficiency of fact-checking organizations, we questioned various aspects of performance-related issues. In that regard, we inspected the volume and fluctuation of the organizations' stuff, metrics related to the number of detected hoaxes/debunked fake-news, user reach, type of content analyzed, and tools employed for the analysis.

The number of people engaged in the fact-checking process varies greatly among organizations (from 3 to 30). However, there is no decreasing of stuff noted over the years and most (~64%) of the organizations have their stuff increasing. This speaks of the actualization of the problem and their effort of keeping track on the arising issues. If we consider the distribution of users reached over the duration of a given project, it can be noticed that most of the projects have similar rate of expansion of their user base, with the oldest projects having significantly larger audience. This, on the one side dictates the requirement of having proper dissemination practices adjusted to the type of user base, but on the other side reveals an opportunity for exploiting the user feedback to quickly detect, repair, and improve large set of potential performance issues. However, both of these appear to be exploited to an insufficient extent.

The number of debunked news/hoaxes (last three-months average) varies highly across countries and is very much context dependent. However, we required for this information to see if it can reveal some context-related peculiarities, such as huge variations in the number of hoaxes between regions. It turns out, as noted later, that the number of detected fake news and hoaxes is very much dependent on the political situation and concrete political events in a given country (elections, campaigns, etc.). Clearly, this number also depends on the type of content analyzed by the fact-checking organization and the share of such content among the information sources. In that context, Figure 2 shows a relatively satisfactory distribution of the type of content analyzed by the fact-checkers. However, it is important to note that there is still a significant division between the organizations with respect to textual and audio-visual content. In other words, most of them are 'specialized' in one type of content only. Visual content, although known to have far greater impact in the proliferation of fake news than text (Wardle and Derakhshan 2017), is addressed to the least extent. Hence, increasing and

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[13] https://goo.gl/forms/XV1DDjudPGZIFYLv2

adjusting efforts in this regard may result in a significant improvement of the rate of detecting fake-news, and thus, of the effectiveness of fact-checking organizations.
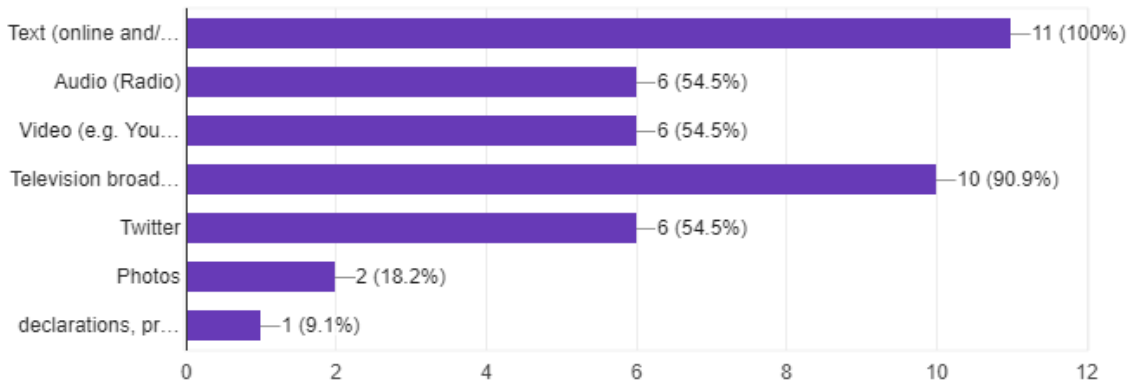

Figure 2. Type of content analyzed by the organizations

All of the metrics discussed so far can directly be related to the methodology employed by the organizations in performing their work, such as the share between the potential automated services/tools employed for combating fake news and the human effort invested in the process. In this regards, only three organizations reported the use of both human and computational effort. It is not clear, however, which aspect of the fact-checking process do human experts cover, and which is reserved for the computational techniques. Nevertheless, it is clear that the extent to which automated services are employed in these projects is very low. This, on the one side, prevents the organizations to exploit the full specter of fact-checking possibilities in a more efficient manner, and on the other side blocks the potential contribution to the development of novel technical means for combating fake news that could emerge from the processing of large text corpora through crowdsourced users' interactions. Hence, there is a large space for improvements and introducing novelties in this context. Similar suggestions have only recently been put forward (Ciampaglia G.L. 2018). There is a proposal for a complete (end-to-end) technical fact-checking solution based on machine learning and natural language processing named ClaimBuster (Hasan et al. 2017). Components of ClaimBuster have already been practically implemented into real-world technical systems. Thus, it is clear that certain improvements are starting to be developed in the direction of computational facilitation of fact-checking. It is important to note, however, that these are all operational measures, as is the fact-checking itself. Proactive steps need to be taken as the best measure against information disorder. This is also revealed through the results of the survey in the final section, where the fact-checking organizations themselves call for a greater awareness and better resource allocation in the fight against information disorder.

5.1.2. Effectiveness of fact-checking organizations

While efficiency can help analyze the functionality and operation of the employed means for fact-checking, it is less of an indication for the overall impact of the project. To inspect impact-related issues, additional analysis is required that are related to the effectiveness of the fact-checking efforts. In that context, we analyzed the long-term considerations of the organizations' operation represented by their objectives for internal and external impacts and the evaluation of those impacts.

As part of these considerations for long-term planning, we asked for a particular business and/or sustainability plan of fact-checkers. Little considerations of this kind were reported with only 2 organizations having a concrete business model, and 3 with a sustainability plan developed. Mapping this information on the current longevity of each of the projects, it is to some extent understandable why the "newcomers" have not had such operational considerations. However, most of the organizations/projects have been running long enough to have such plans already elaborated in their sustainability portfolio. This would also imply that mechanisms for transparency and accountability should be in place, which is directly related to increasing the credibility and trustworthiness of the organizations. Placing properly these interdependent considerations for sustainable operation will inevitably contribute for fact-checking organizations to strive towards a more effective outcome of their work and to have a more crystallized set of operational objectives.

Related to the issues of sustainability is the type of impact envisaged by the projects' objectives. Figure 3 demonstrates that almost all of the projects envisage political and human impact, and most of them are aware of the societal impact the work may have in general.
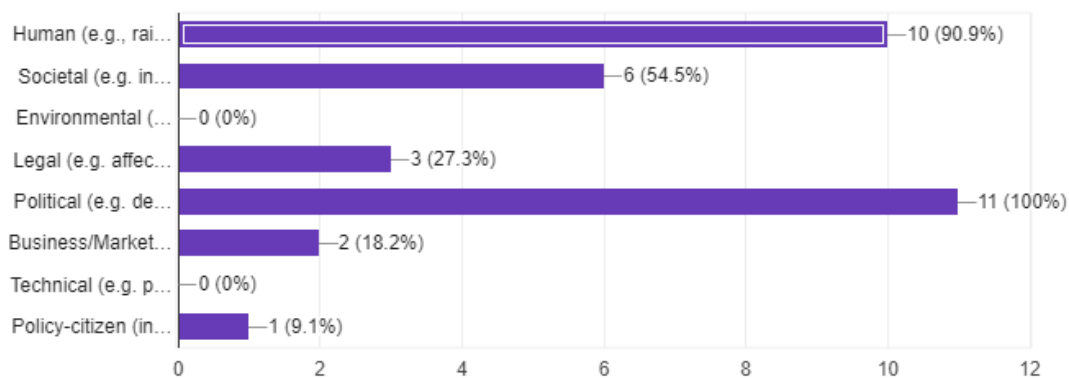

Figure 3. Envisaged impact by the project

Despite their potential of having even wider and greater impact, none of them considers environmental and technical impact in their objectives, and only a few actually assess this impact in some way. Most of the organizations do not assess any impact, regardless of

envisaging it as part of their objectives. Only one reported concrete measures taken in this regard: "*Prepared a video instruction how to use the site search tool; Monthly trainings that help increase citizen awareness[14]*". Clearly, monitoring and evaluation of impact as part of tracking their progress and impact is a measure of paramount importance to should be taken for increasing the effectiveness and efficiency of fact-checking projects. A lot has been done in this regard in the field of Public health and health-related projects. For e.g., the Payback model (Buxton and Hanney 1996) is the most well-known and used for project impact evaluation in disciplines other than health. It may be worth exploring this possibility in the context of fact-checking projects as well.

As part of the internal considerations, it is not only important to have the proper tools in place, but also to revise them and allow them to evolve together with the changing environment. In that sense, frequency of revision of the employed tools was explored, and the results are shown in Figure 4.
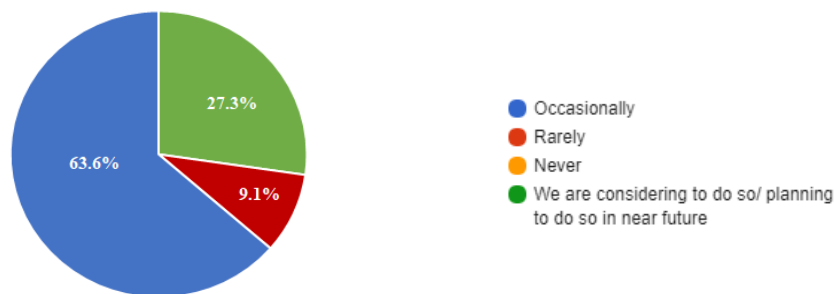

Figure 4. Frequency of revision of the employed tools

Most of the organizations do pay attention to revision of tools, but there is still a significant number of them that have not yet considered this. Taking into account that this is a crucial requirement for effective fact-checking, raising awareness of these performance-related issues appears as a necessity on a European level.

The majority of the organizations select their target sources and media by some predefined criteria, the most common of which is 'public interest about the information'. Furthermore, they employ some mechanisms for information source evaluation (credibility, independence, trustworthiness, etc.), mainly to evaluate the independence of their information sources (e.g. news articles, politicians' speeches, tweets, etc.), although there are still a few that do not perform such checks. However, even those that do pay attention to the independence of sources rely on human-expertise and subjective evaluations only. This is another point where technology can provide great support and play a crucial role in improving the effectiveness and efficiency of fact-checkers. More importantly, such approach would increase both the transparency and the accountability of the organizations and, ultimately, their perceived

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[14] https://www.facebook.com/slovoidilo.ua/videos/1604236676294784/

trustworthiness. For instance, one formal apparatus that offers the possibility to assess source dependence and to reason with subjective beliefs at the same time can be found in Subjective Logic (Jøsang 2016).

Many of the organizations also provided evidence of agenda-setting impact (e.g. legacy media referencing the results of their work) as part of their effectiveness assessment. This mere fact speaks of the importance of fact-checking efforts existing to complement the current strategies for addressing information disorder. Almost all of the organizations reported that they have noted high dependency between the number of fake news and specific public events (elections, campaigns, etc.), which makes them direct testifiers of the interplay between the offline and the online world in a particular information context. Considering the above, together with the scale and the speed at which fake-news issues arise, a case can be made that efficient and effective efforts for combating information disorder can soon become part of some general set of cybersecurity measures. This gives even higher weight and value to the work (theoretical and practical) performed in this study.

As part of the external considerations, we explored the interaction of fact-checking organizations with stakeholders. This includes the nature of interactions, the means of dissemination of work and results and the direct collaboration with stakeholders. Interestingly, social media are very little exploited to relate with stakeholders in an interactive manner. Only one of the organizations reported using social media for this purpose (Figure 5). Although social platforms are used to promote and disseminate the work of the fact-checking organizations, an interactive mode of promotion could be an obvious point where improvements can be sought and achieved.
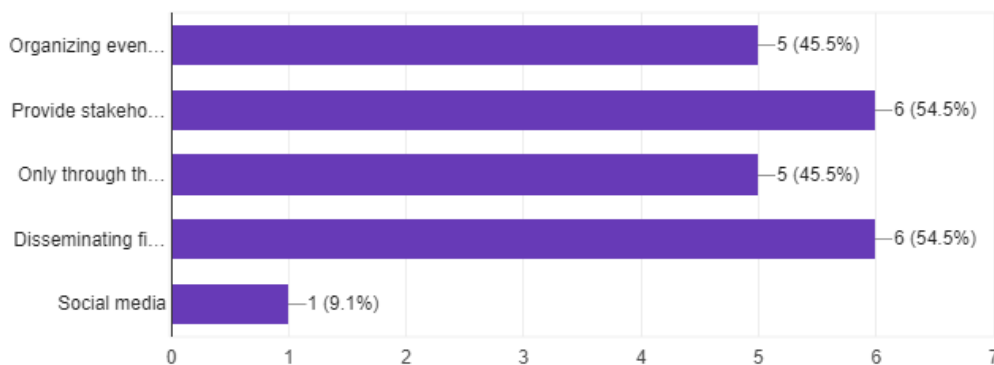

Figure 5. Nature of interaction with stakeholders

This especially stands true considering that almost all of the organizations reported on employed efforts to gather user feedback about one or more aspects of their work. Despite their seemingly identical work, there are organizational and operational traits by which these fact-checking organizations may largely differ. For instance, some of them only deal with

debunking political statements. Others only check the veracity of tweets, and some only deal with visual content. Nevertheless, there is a strong collaboration among most of the European fact-checking organizations reported by the respondents of the survey (Figure 6).

Moreover, there is a deep involvement into the regulatory issues related to the combating of information disorder online on both national and European level. Most of the organizations (~55%) reported that they *"do not find the requirements for quality of online content aligned with the national/regional media policies (e.g. code of ethics of journalism)"*.
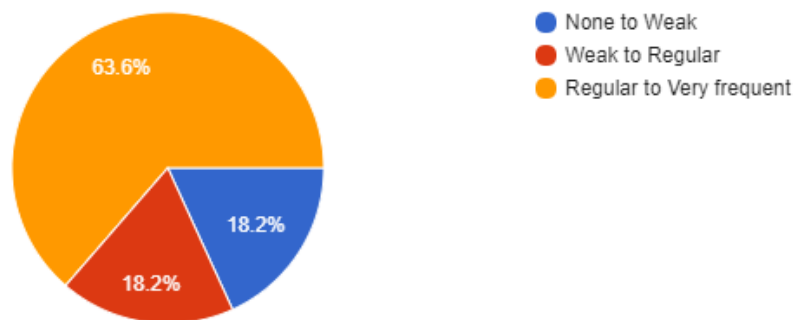

Figure 6. Collaboration with other similar (regional, EU, and wider) initiatives

Although no experiences with case law were claimed (in the sense that none of the organizations have been called to court about some fake-news related issues), 2 organizations reported direct involvement in the removal of harmful content by the IT companies or media outlets. Moreover, 3 responded that they have at some point employed 'strategic silence' (meaning: deliberately not revealing publicly a debunked fake-news article) to prevent the further proliferation of a fake news. This, in and of itself, is a strong argument for considering the possibility of a self- or co-regulatory effort that can be made by these organizations to increase even further their cooperation, their societal role, and, ultimately, to contribute for a more effective and efficient regulation and Internet governance per se.

Finally, to get a view on the organizations own difficulties in realizing their performance objectives, we asked which are the biggest challenges and issues encumbering the pursuit of their goals. In that regard, lack of resources and insufficient stakeholders' awareness on the issues related to information disorder were reported as the major problems affecting the fact-checkers' workflow (Figure 7). This points to the need for bridging the gap between the organization's objectives and the public understanding of its own role in the fulfillment of those objectives. To achieve that, it may be necessary to also engage external efforts in this process of raising awareness in order to give more credibility to the fact-checking movement and raise the publicity of the issues related to it.
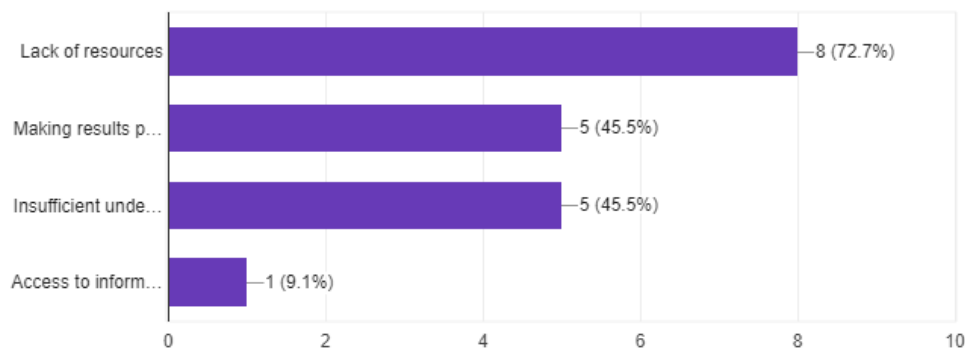
Figure 7. Most challenging issues in fighting hoaxes and fake-news

In this regard, it is important to note that in at least 11 of the EU countries (that were also part in our sample) there is more than one fact-checking organization, and in 6 of them there are even more than two such organizations. To cope with the drawback of insufficient awareness and understanding of the issues related to fact-checking, some of the organizations run their websites in multiple languages (e.g. stopfake.org integrates its contents in 12 languages, and EUversusDisinfo in 3 languages).

5.2. Discussion

In this section, we summarize the key findings and distill the main recommendations that result from this study. They are divided into parts following the same logical flow by which they were previously introduced.

5.2.1. Key findings

Efficiency: The number of people (the stuff) varies across organizations, but is either constant or increasing. This speaks of the ability of fact-checking organizations to act as stand-alone companies capable of preserving their human capital. However, only 2 organizations have a business and long-term sustainability plan in place.

There is an obvious lack of cooperation among the experts concerned by the problematics and that have different backgrounds and expertise. Such are the social scientists, lawyers, politicians, mathematicians, IT specialists, electrical engineers, and civil activists, to name a few. That being said, it can be discerned that although a clear general goal is set for all of the fact-checking organizations, there is a lack of clarity in the sub-goals and objectives that concern the internal processes of the organizations' operation.

In that sense, there is a lack of automated means that can be employed in the process of fact-checking, but also a lack of information about the advances in the various scientific areas, which causes activists to apply rather traditional, less functional and/or too costly methods for tackling information disorder issues in their activities. The great majority of the organizations

rely solely on human expertise to perform all tasks related to fact-checking. This is not only related to the efficiency of performing the tasks, but also to the effectiveness of the entire effort.

Related to this issue is the one of specialization in the analyzed content: although various types of content are addressed by the fact-checking organizations, each organization specializes in a concrete type, mainly text, leaving potentially significant and impactful information untreated.

Effectiveness: The obvious absence of long-term sustainability plans also concerns the effectiveness of the fact-checking organizations. Thus, it comes as no surprise that most of the organizations do not have means for tracking the organizations' progress in relation to the pursued goals. Moreover, no means for tracking and evaluating any impact are in place and the self-assessment procedures are largely missing.

The dissemination practices employed by most of the fact-checkers are non-interactive and one-sided, thus lacking the mechanisms of ensuring the effective fulfillment of their goals.

There is also a lack of mechanisms for information source evaluation (credibility, independence, trustworthiness, etc.) and a great reliance on human-expertise, in addition to the subjective evaluation process. Not only there is an absence of automated means for facilitation of the fact-checking processes, but the tools that are employed in some aspect of the work are only occasionally being revised.

Lack of resources and insufficient stakeholders' awareness of the issues related to information disorder are the major problems affecting the fact-checkers' workflows. This points to the need for bridging the gap between the organization's objectives and the public understanding of its own role in the fulfillment of those objectives.

Methodological remarks: We initially faced the fundamental problem of unwillingness to cooperate and to provide requested data. In a way, this also motivated us to evolve our methodology and search for more efficient and effective means for getting the desired feedback, practicing a similar set of recommendations as those that came out of our work. Some of the organizations were also contacted multiple times, including through their national contacts. A common argument provided by some of the privately funded organizations was that their private funding allows them not to be open to external assessment. Others expressed worries about "commercial secrecy" or sources of funding (vis a vis competitor in the field). Very often the unwillingness to cooperate was due to the high interest among researchers and journalists in the activities of the fact-checkers, causing a flood of questionnaires, emails and calls. Although some information is freely and publicly available at the websites of the fact-checking organizations, this information is in most of the cases identical for all of the organizations.

One (relative) drawback of the methodology employed in this work is the one that usually comes with a survey-kind of field research: the data obtained and the responses are largely

based on self-assessment by the respondents. However, in our survey we were aiming for as much comparable feedback as possible to lessen the drawback of the self-assessment. The questions that were more of a descriptive nature were posed with the aim to extract deeper contextual insights about the organizations.

5.2.2. Recommendations

Efficiency: Having proper sustainability and business plans in place, fact-checking organizations can act as stand-alone companies cherishing their own human capital. Through firm establishment within the network of related initiatives, they may even become part of a well-defined self/co-regulatory effort capable of affecting directly the regulatory landscape, the shaping of national policies and the implementation of national security strategies. However, this can only be achieved by bringing together in a transparent and eloquent manner the stakeholders from a diverse set of backgrounds and with various expertise. This will also lessen the gap between the fact-checkers' objectives and the public understanding of those objectives, alleviating one of the major problems these organizations are currently facing.

The successful 'marriage' between technology and human efforts must be considered by the organizations and adjusted to their context of operation within the particular environment. Although regular use of software-based fact-checking practices may not work properly in some specific linguistic contexts, implemented and employed properly such methods would dramatically increase the fact-checking capacity and the possible impacts in many regards (for e.g., allow for real-time detection and warning impact, address various types of content, choose relevant information sources, engage wider audiences and with that increase the awareness among stakeholders, etc.). The presence of such solutions is also an incentive for the public involvement in and of itself, affecting positively the effectiveness of the overall fact-checking process.

Effectiveness: In additional to considering the employment of automated tools and services as part of the fact-checking process, revision of the employed tools at all levels is a crucial requirement for effective fact-checking, raising awareness of these performance-related issues appears as a necessity on a European level. Such requirements should become part of the internal self-assessment procedures of the organizations as well.

To address the lack of self-assessment procedures, among which tracking impact and tracking progress are the major ones, implementing systems for monitoring and evaluation of impact is a measure of paramount importance for increasing both the effectiveness and efficiency of fact-checkers. A lot has been done in this regard in the field of Public health and health-related projects. For e.g., the Payback model (Buxton and Hanney, 1996) is the most well-known and used for project impact evaluation in disciplines other than health. It is worth exploring this possibility in the context of fact-checking projects as well.

While it is clear that the fact-checkers' trustworthiness is critical and fact-checking organizations must strive for transparency in their working process, foundations, internal organization, and funding sources, it may be less obvious that this issue is closely linked to the issue of guarantees needed to prevent fact-checking organizations from playing like censors online. Thus, there is a need for a stronger and independent civil society control and of broader stakeholders' involvement.

Once established as credible bodies within the regulatory network of actors, mechanisms for accountability of the fact-checkers should be put in place and their effectiveness must be ensured. This will allow to tackle appropriately the issue of lack of trustworthiness, too.

Methodological improvements: What would be the next logical step of this methodology is a formalization effort that could lead to quantification of the results and a concrete assessment of the efficiency and effectiveness of the fact-checking organizations. The dimensionality of addressed issues is satisfactory and promises valuable results if such an effort is to be pursued.

We firmly believe that the comparative analysis presented here is not only meaningful in a statistical sense, but are also extremely useful for providing the guiding insights into a topic that is relatively new and highly relevant in many aspects: political, economic, technological, scientific, and societal. This especially stands as an important remark considering the fact that there are no similar research data available, let alone empirical studies performed of this kind.

6. Conclusion and Future Work

This work is a contribution to the development of fact-checking systems and the combat against information disorder in general. Through the development of relevant indicators for performance evaluation of fact-checking organizations and the definition of a taxonomy for fact-checking systems, we engage in the efforts for functional improvement of the fact-checking process itself. The principles of work followed here also contribute to the general practices of NGO performance evaluation. We believe that this work can form the basis for defining a generic methodology for performance evaluation of fact-checking and debunking organizations.

In addition to obtaining theoretical insights into the workings of fact-checking organizations, the study presented the first empirical research of practically implemented fact-checking systems, supporting the recommendations for performance improvements with arguments coming directly from the "battlefield".

As next steps, it would undoubtedly be interesting and useful to get insights from a larger sample of organizations. Fact-checking initiatives from non-European countries will also be included to allow for additional comparative analysis. In addition, quantitative analysis need to be developed encompassing more precise criteria and indicators (especially those related to

assessment of methodologies used), as well as a more granularly defined taxonomy. This will also allow for the methodology to be formalized and integrated into a software solution that will serve the same purpose to a broader stakeholder community.

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