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Trends, Connections, Implications

Edited by Ján Višňovský and Jana Radošinská

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Meet the editors

Ján Višňovský is an associate professor at the Faculty of Mass Media Communication UCM in Trnava, Slovakia. He is particularly interested in the problems and questions of journalism in the context of the development of information and communication technologies. Besides working as a lecturer, he is also a member of editorial boards of Slovak and foreign scientific journals and scientific committees of international conferences. His key works are the monographs *Life and Work of Dominik Tatarka* (2009) and *Current Questions of Theory and Practice of Journalism in the Internet Era* (2015), both in the Slovak language. He has been awarded by the Slovak Literary Fund (2016).

Jana Radošinská has been a lecturer at the Faculty of Mass Media Communication UCM in Trnava, Slovakia, since 2014, after finishing her PhD in media studies. Her scholarly and research interests include the issues of media culture, media industry and its critical analysis, mainstream film production and media entertainment. She also focuses on the problems related to contemporary media audiences, cultural aspects of journalism, television studies and digital games. She has authored or co-authored three scientific monographs in the Slovak language (2013, 2015, 2016) as well as several studies published in scientific journals indexed in Web of Science or SCOPUS. She is a member of the editorial office of the renowned scientific journal *Communication Today*, working as an English Editor.

Contents

Preface

Throughout the twenty-first century, journalism has changed immensely. Once published only in the traditional press, news and opinions have quickly found their way into electronic media – film, radio, television and the Internet. Of course, each form of journalism has its own specific features and characteristic expressions that influence the processes of producing, distributing and reading journalistic contents. On the one hand, the circulation of print media (especially dailies) in Europe is currently stagnant and their target readers are predominantly older or middle aged. On the other hand, social media and digital applications are able to offer younger generations many new ways of reading and watching journalistic production. Most young people actively use the Internet – and social media in particular – to communicate, relax, participate in various leisure activities or seek information. The generations of 'digital natives' (however, not only them) use social media almost automatically as a natural part of their everyday lives.

Besides offering information and entertainment, journalistic products spread via social media platforms fulfil many other functions. They significantly shape the public opinion and allow their users to widely discuss current affairs and public events. Some of these discussions and polemics may even lead to society-transforming processes. Professional journalists and other people who create journalistic contents published on social media platforms thus have to face new challenges. News and opinions need to attract and hold the audiences' attention to succeed economically, and given the importance of innovative online advertising, journalists are required to find a certain balance between focusing on serious information, amusing their readers and presenting products, ideas or people.

The relationships between social media and journalism are very complex and sometimes hard to understand, and that is why the authors of the individual chapters of this publication aim to address various implications of social media journalism – especially its social, cultural, economic and technological significance. This publication is therefore divided into two sections. The first one is focused on the social and cultural aspects of social media journalism, offering three related chapters, while the second consisting of three chapters deals with the economic and technological evolution of social media platforms.

James Morrison's chapter discusses media audiences and the ways they actively participate in 'making' or rather 'completing' news stories on the Internet, especially by posting their comments, i.e. by contributing to discussion threads below news articles. Basyouni Ibrahim Hamada's text on social media journalism and related ethical issues claims that given the shift in the ways we see journalists and the values they foster, it is necessary to critically consider the transformation of traditional journalistic routines, values and processes. Pathak

Kinshuk's contribution reflects on new trends in journalistic production in India, which result from the increasing prominence of social media.

Following the research tradition of technological determinism, Alonit Berenson offers a body of knowledge on how social media influence public affairs and the formation of social movements. However, as Dutta Debolina's chapter points out, we also need to consider various economic implications of social media; for instance, the fact that social media and new digital technologies transform the whole field of human resources management. Reacting to the increasing need to find appropriate ways of analysing social media and their contents, Mário Cordeiro, Rui P. Sarmento and João Gama discuss the timely and very serious topic of finding suitable and functional methodological approaches and research frameworks that would enable researchers to conduct thorough analyses of social networks.

The publication's key ambition is to find its readership amongst the general public who are interested in the contemporary questions of social media and journalism, as well as amongst scholars focusing on theoretical and empirical reflections on the given field of expertise. As we believe, some of the information, research results and conclusions may also be useful for sociologists, social psychologists, teachers, students specialising in journalism, media studies and related spheres of study, as well as for HR executives, media professionals, marketing experts or e-commerce specialists.

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Introduction

Chapter 1

Introductory Chapter: Some Notes on Journalism in the Age of Social Media

Ján Višňovský and Jana Radošinská

Additional information is available at the end of the chapter

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1. Introduction

Social media are nowadays discussed quite widely and thoroughly, for a lot of different reasons and in many equally relevant contexts. They are perceived not only as an individualized social communication tool but also as a community building means and a way of implementing innovative corporate solutions and conducting effective marketing activities. Social media platforms thus have been reflected on by social and behavioral psychologists, renowned economists, business experts and marketing professionals, media and journalism theorists, professional journalists, lawyers, politicians, experts specializing in political sciences and so on. Obviously, the contemporary discourse related to social media does not result exclusively from interdisciplinary scholarly discussions and research inquiries; what we know and think about social media and social media journalism are often based on events and communication and cultural phenomena occurring on social media and/or popularized via social media.

Online social media are a dynamically expanding communication field filled with a plethora of social, economic, political and marketing activities and marked by diverse private and public agendas. Although we have stated that addressing the issues of social media and social media journalism is one of the essential topics of postmillennial media studies and related scholarly disciplines that even exceeds the vast boundaries of interdisciplinary academic discourses involving knowledge of multiple social sciences and humanities, we still believe that to understand social media's immense influence, possibilities and risks, up-to-date interdisciplinary reflections are still needed urgently. The spectrum of knowledge on social media and social media journalism certainly acknowledges the fragmented and globalized structure of today's media production—from the philosophical aspects of the Internet environment and its influence on the cognitive abilities of man [1], through the need to underline the importance of innovations within the media and entertainment industry [2] and the new demands and challenges

associated with regulating the freedom of expression in terms of various media communication spheres [3], all the way to the opportunities and risks resulting from decreasing advertising sales that the "traditional" (especially print) media experience have to cope with [4].

The global scandal involving *Facebook* and *Cambridge Analytica Ltd.*, one of the most discussed recent public events, has quickly become an important part of wider international discussions on Internet privacy and social media's true influence. As we already know, the British consulting company *Cambridge Analytica Ltd.* has collected highly personal data on 87 million Facebook users in order to influence their electoral behavior. The quiz application named *This Is Your Digital Life*, which was seemingly able to collect data only on basis of the *Facebook* users' previous approval, apparently collected such data sets even without their consent. The scandal spread globally in March 2018 when *The New York Times*, *The Guardian* and *Channel 4 News* published a statement given by Christopher Wylie, the whistleblower and former employee of *Cambridge Analytica.* Wylie's testimony clarified the complicated relationships between *Facebook*, the company he used to work for, and various politicians who had used its services in order to influence the 2016 American presidential election and the 2016 British "Brexit" referendum [5]. Even though *Facebook*'s CEO Mark Zuckerberg publicly apologized for the social network's misconduct and controversial business decisions, for instance, on *CNN* [6], the affair reminded us once more how important it is to address the questions of social media and their ethical standards, the existence of politically managed "consulting" organizations and the political aspects of media communication as such.

2. Social media journalism as a late-modern phenomenon

Social media may be rightfully seen as an immensely significant communication phenomenon of the second decade of the twenty-first century. Although both scholars and professionals have tried to provide the term "social media" with a proper theoretical framework and find its universal definition for years, it still seems that there is a lot of work left to be done. Harcup's *Oxford Dictionary of Journalism* claims that social media include *Facebook*, *Twitter*, *YouTube* and "countless other forums, and in just a few years they have become as important a way for journalists to find stories and sources as they are for news organizations to promote their brands" [7]. Social media are much more than just specialized social networking sites created to fulfill a certain set of purposes. They represent a broad spectrum of online communication platforms such as blogs, vlogs, chat rooms, social bookmarking services, etc. All these means of communication have diversified journalism and influenced journalistic production unprecedently.

As noted by McNair, the dominant model of journalism of the twentieth century, once embodied by the professional journalists producing objective and reliable information, is currently fragmented and widely questioned due to the influence of new media and technologies [8]. New online platforms—especially social media—have changed the ways we seek, select and process information sources and news, weakening the formerly hegemonic position of international media corporations and prominent mainstream media outlets. It is thus not surprising that the phenomenon of "alternative journalism" has gained increasing attention amongst both scholars and media professionals in recent years. Regardless of the connotations bound to this

term, some of them positive, others controversial or openly negative, we have to acknowledge that certain "alternative" forms of journalistic production *do* function as partly independent, participatory or even underground processes of information dissemination, offering a much needed counterbalance in relation to the globally operating mainstream media [9].

The emergence and dynamic expansion of new information and communication technologies based on Internet connection, digital technologies and miniaturized "intelligent" devices, especially smartphones and tablets, have given the rather passive media audiences (readers, watchers, listeners) many different opportunities to create and even publish journalistic contents. Many titles of scholarly literature, especially various valuable publications of the Anglo-Saxon provenience, tend to discuss "accidental journalism" or "witness journalism" as a specific kind of citizen journalism. The fact that "ordinary" people now can provide the general public with rare footage or even media coverage of important events, the moment they are occurring is nothing special anymore. Citizen journalism fulfills its important role in any democratic society, offering plurality of opinions. Its basic purpose is to contribute to the independent, responsible and relevant information dissemination in order to stimulate public discussions and form the public opinion [10]. However, such expectations are just heavily idealized versions of the current state of matters. That is why the vast possibilities of amateur journalistic forms and information dissemination via globalized social media walk hand in hand with the urgent need to reformulate the questions of local, regional, national and international questions of journalistic ethics, solve the issues of social (mis)recognition and articulate solidarity in the global communication environment overflowing with pieces of news of uncertain quality and highly questionable social relevance [11]. Media scholars, professional journalists and, above all, media audiences have to make a lot of effort to distinguish between reliable and unreliable information sources such as blogs, social media posts and commentaries, shared photographs and videos or news portals operated by professional or amateur journalists. However, despite all the effort, they often do not succeed since the boundaries between reliable and unreliable information sources have never been less clear and more questionable.

The recent scholarly discussions on social media journalism often mention the concept of "networked journalism" which involves crowdsourcing, wikis, social media and other forms of communication which "make the production of journalism a more fluid, interactive, and non-hierarchical process than it tended to be in the analogue age" ([7] pp. 194–195). It is only logical that along with these shifts in the production and distribution processes related to journalistic content, media audiences are changing as well. Today's media audiences are diverse, pluralized and fragmented, and that is why we have to reflect on their characteristic traits and typologies very carefully and thoroughly. Seeing the media audience members through the optics of marketing opportunities, economic statistics and numbers may be useful to fulfill the commercial imperatives of doing (media) business, but it tells us very little about the recipients' real preferences, taste patterns and future needs related to media consumption [12]. Moreover, the contemporary commercial imperative of placing the expectations of mainstream media audiences above anything else (including so-called good taste and moral values) tends to deepen the apparent—and appropriately commercially exploited—individualization of the media audience members. The emergence of new processes of media tabloidization, spectacular political communication and banalization of the public space are the most obvious, but not all consequences are considered here [13].

3. Increasing popularity: the rise of social networking

Social networking sites are amongst the most popular social media. Given the results of the *Global Digital Report 2018* published in January 2018, more than 4 billion people around the world are able to access the Internet. Moreover, 3.2 billion Internet users actively work with social networking sites [14]. The biggest increase of online social networks users was recorded in Saudi Arabia (32%), India (31%), and Indonesia (23%), with the worldwide increase reaching 13% [15]. The most popular social networks are *Facebook* (more than 2 billion users), *YouTube* (approx. 1.5 billion users) and *Instagram* (800 million users) [16]. Not only it is reasonable to presume that the numbers of active users visiting and spending time on online social networks will increase even further, we also have to presume that the more people will join social networks to have fun, socialize and seek information, the more importance social media journalism will gain.

The same can be said about effective marketing communication and advertising strategies adapted to the social network environment. Since the most popular social networks have millions or even billions of active users who communicate, comment on information they come into contact with, post statuses or share multimedia contents, "social network marketing" is on the rise. Čábyová characterizes the term as a type of online marketing strategy which is ideal to build brands or brand loyalties, as well as to combine the common goals of online marketing with social networking sites and their specific communication environment [17]. "Community marketing" has gained importance, too. Its aim is to build community platforms that would be interested in specific services, products or topics. It is therefore quite understandable that the academic discussions on community media deepen as well, having new communication and societal phenomena to analyze and reflect on [18].

The current issues and questions of social media journalism and new media platforms have even changed the ways we see media industry studies as a whole. According to Marshall, "the media industry is now a much more complex entity than its previous incarnations with print, popular music, radio, television, and film. (…) The media industry has both in an elaborate and sometimes uncertain way integrated an understanding of its audience as users." The media industry of the new Millennium is, and not only in terms of the journalistic production, dependent on the processes of cultural and media convergence. It is crucial to find new, untraditional ways of presenting media products which have only little or even nothing to do with the traditional forms of information dissemination: Media industry studies need to be adept at understanding the economic and cultural patterns and implications of this media-communication nexus [19]. The many faces of today's journalism result from cultural and media convergence [20], which is why we have to accept new perspectives to consider, new journalistic strategies to understand and new communication phenomena to reflect on.

4. Conclusion

As the previous notes have shown, journalism in the era of social media leads us to the need to question everything we know about theory and practice of disseminating news and opinions.

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These numerous implications influence not only our cultural environment, i.e., the ways we live our lives and seek knowledge, but also the preferred forms of processing information, news gathering, presentation of media contents and distribution strategies. Innovated economic and marketing strategies and untraditional forms of managing human resources cannot be overlooked, either. The cultural situation resulting from the rise of social media journalism surprises even the most experienced media professionals and journalism scholars who have been active for decades and thus fully experienced both the era of "traditional" electronic media and the boom of online journalism and social media journalism [21]. For instance, it is necessary to take into account the numerous differences between news genres published in the traditional press [22], opinion genres of varied quality published in print newspapers and magazines [23] and emerging genres of online journalism aimed at Internet users who prefer to access news and opinions via their intelligent mobile devices [24].

Social media journalism may be always up to date and based on multimedia in its nature, but its recipients still need to select between various versions of the same information and subject them to serious critical evaluations. As mentioned by Harcup, "the future of journalism is both uncertain and unwritten, but the social role of journalists in informing citizens, and contributing toward the health of public sphere, means that journalists have an ethical responsibility to engage in a process of critical reflection on their practice. Despite the structural forces and constraints that bear down journalists, individuals and groups of journalists retain elements of choice in their work" [25]. This statement seems to be quite hard to argue against.

Since social media journalism is one of the causes and also consequences of the emerging worldwide (globalized) media culture, there are, as Lipovetsky points out, many specific and so far unseen cultural traits to get acquainted with. The boundaries detaching culture from advertising and marketing are long gone, and all media products—including news and opinions published on social media—are placed on the market by means of marketing techniques able to attract the audiences' attention through creating media events [26]. That is why we believe it is absolutely essential to discuss social media journalism in the international or even global academic environment, to confront our own opinions with experience and research inquiries offered by authors affiliated with different types of institutions, by scholars coming from different countries, cultural frameworks and academic circles. It is the only way to provide the interested readers with a set of more diverse, objective and multifaceted views on the most obvious traits and numerous positive features of social media journalism but also on its (often hidden) pitfalls, imperfections and faults. Some of them have manifested themselves years ago, and others may come to our attention in the near future.

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Section 2

The Social and Cultural Implications of Social Media Journalism

Chapter 2

Online News Audiences as Co-Authors? The Extent and Limits of Collaborative Citizen-Professional Journalism on Newspaper Comment Threads

James Gordon Morrison

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Abstract

Recent research has demonstrated how comment threads published beneath online news articles are being transformed into fluid interfaces between professional journalists, their work and their audiences. Today's audience-members are not only able to respond to published narratives but to embellish and, potentially, contest them: by posting comments based on personal knowledge about an issue and even using eyewitness testimony to directly affirm or challenge a story's details. Though often stylistically "messy," such comment posts go beyond merely manifesting and magnifying news discourses—let alone simply reacting to them. Rather, as on social media, posters can publicly discuss and debate the meaning and significance of stories, with the more informed and assertive among them contributing content so significant that it reshapes the texts themselves. In so doing, such claims-makers and counter claims-makers become hybrids of journalists (news producers), audience-members (news consumers) and claims-makers (news sources). Drawing on the author's recent empirical findings, this chapter argues that online news has entered a dynamic but disruptive new phase in which journalistic authority may increasingly be contested, as "audience-members" begin to compete with "reporters" for authorship of news narratives.

Keywords: journalist, audience, comment thread, citizen, collaborate, author, story, finished

1. Introduction

Much has been made of the opportunities, and tensions, arising from the expectation that journalism in the Web 2.0 era would become ever more "participatory" [1]: less a "one-way

lecture" by reporters and commentators than a "dialogical conversation" between news professionals and their audiences [2]. If the traditional model was largely top-down—with privileged gatekeepers selecting, packaging and projecting stories to the public based on institutionalized judgments about what made something newsworthy—early optimists held that the newfound ability of those once dismissively termed "consumers" to contribute their own comments, eyewitness accounts and supporting evidence would transform journalism into an information-gathering and publishing process far more democratic, even *bottom-up*.

Nowhere was the possibility of reimagining journalism as a multi-directional, even citizen-led, exchange of news and views more clearly articulated than in its near-spontaneous occurrence during the Arab Spring. This cascading wave of popular uprisings across north Africa and the Middle East saw first-hand testimony, backed by digital photographs and video footage, escape through the cracks of creaking authoritarian censorship regimes via Twitter, YouTube and other social media platforms to spread "democratic ideas across international borders" [3]. In this case, the status of gatekeepers fell to a network of previously disenfranchised activists, transformed into (often inadvertent and involuntary) citizen journalists. Without them, Western media outlets would have known little of what was happening on the ground—and had meagre source material to inform their own reports.

Yet, 8 years on from the Arab Spring, there are grounds for arguing that it may have been both a singular event—or sequence of connected *events*—and (in media terms at least) a false start. For all the industry hype about transforming audiences into vibrant, engaged "communities" and newsgathering itself into a "collaborative" process led as much by lay "produsers" as trained reporters [4], recent studies point to a continuing resistance among professional journalists toward interacting directly with their publics, let alone surrendering their gatekeeping authority to them. A well-cited early newsroom-based study into a local newspaper negotiating the transition from print to online-only publication drew a marked distinction between the attitudes of younger, more digital-native, "convergers" enthusiastic about interacting with readers to enhance their output and wary "traditionalists" [5]. Though editors encumbered by dwindling newsroom budgets embraced the chance to harvest newsworthy content at little or no cost, while enriching stories already running by crowd-sourcing eyewitness accounts, photographs and video footage from audience-members, they were initially much more reluctant to recognize the importance of allowing readers to post comments and reactions (e.g., [6, 7]). More recent work has found that, even when news organizations demonstrate an enthusiasm, in principle, for encouraging their audiences to spend time on their sites engaging in debate and discussion, and even contributing their own original material to inform and enhance their output, they are invariably hampered by inadequate resources. The "small size of online teams at news organizations" makes it "difficult" for hard-pressed journalists to "moderate," curate or engage in more meaningful ways with threads or other forms of audience-generated editorial contributions—together popularly known as user-generated content (UGC) [8].

Whatever cultural and organizational obstacles might be frustrating the wholesale, industry-wide adoption of collaborative newsgathering and reporting practices, however, there

are intriguing (if still embryonic) signs that they *are* starting to emerge—even if this fact is not always fully recognized, or capitalized on, by news publishers. Nowhere is the potential for this more evident, moreover, than on the below-the-line comment threads routinely run beneath articles on news websites. Though comparatively under-researched to date, compared to Twitter, Facebook and other (external) social media platforms, these deliberative spaces are uniquely significant in two crucial respects. Firstly, they offer online audiences an opportunity to comment directly—and publicly—on news texts, by doing so on the sites to which they are native. In so doing, they capture a raw and immediate record of public *reactions* to news events, and the ways they are represented by specific outlets (and journalists), while offering intriguing insights into how individuals process media narratives and derive meaning from them, based on both their own prior knowledge, experiences and worldviews and the interpersonal dialogue in which they engage with fellow audience-members. More significantly, though, comment threads are important because they allow those with relevant knowledge and/or experience to *contribute* to narratives, not just respond to them, by adding evidence-based posts that confirm what a journalist has reported; qualify it with a more balanced or nuanced account; or even contradict the published one. When backed by first-person testimony, credible and clearly cited statistics and examples, or other verifiable truth-claims, such posts have the potential to affirm, enhance, dispute or even *debunk* the substance of "journalist-led" articles on which they "comment"—helping to complete and/or correct otherwise "unfinished stories," and transforming audience-members into co-authors of the "finished" versions [9].

Based on discourse analysis of an extensive corpus of UK newspaper comment threads gathered during two recent studies into popular representations of low-income social groups carried out over a two-year period between 2016 and 2017 (much of it previously unpublished), this chapter explores the evidence thus far for considering below-the-line threads as *extensions*, rather than adjuncts, of the articles they accompany. Conceptually, it argues that the journalistic potential of threads is considerable, if (as yet) largely untapped. This is because they offer opportunities that go well beyond monetising audience engagement in the most superficial sense: for instance, by encouraging people to linger and debate the news to boost short-term advertising revenues. By contrast, more sophisticated *evidence-based* comment posts—though often obscured by the noise of routine chatter—have the power to provide nuggets of rich additional detail, background and context, alternative angles and follow-up ideas. In so doing, these dynamic interfaces between journalists, their articles and their audiences have the potential to be used as engines for promoting much more systematic, valuable and widely adopted forms of crowd-sourced, collaborative reporting.

2. From comment to discussion: the news value of online threads

Studies of the ways in which online news sites, and media generally, harness comment threads and other forums to connect with audiences have historically emphasized two dimensions: their *democratic* role, as agents of inter-user deliberation and user-to-producer feedback; and

their *utilitarian* function, as thinly disguised profit-generators that enable owners, editors and sales managers to demonstrate the breadth and/or depth of their user engagement to promote their brands and attract sponsors and advertisers. Among the most influential optimists in the user empowerment debate has been Axel Bruns, who has crystallized the explosion of interplay between publishers and their audiences as a "hybrid form of simultaneous production and usage" he defines as "produsage" [10]. Considering news websites specifically, he suggests these have fostered the rise of a new form of "citizen journalism" that "fundamentally disrupts the industrial journalism model by employing its users as journalists and commentators": a collaborative and participatory movement led by (though not confined to) digital-native outlets such as *IndyMedia*, technology news site *Slashdot* and the South Korean-based "opinion leader" *OhmyNews*.

Such positive visions of audience and/or consumer empowerment have, however, been tempered by increasing recognition of the ways in which "the producing consumer" has been "co-opted" into "corporate strategies regarding the marketing and creation of content"—with everything from UGC published on news sites to "comments, bug reports and other feedback" fed by video-gamers to "developer-funded platforms at company websites" demonstrating how online forums are being hijacked for naked commercial purposes [11]. As Jonsson and Ornebring have argued, "strengthening and in different ways exploiting the relationship between users and their media (through 'community-building' on newspaper websites, for example) is an increasingly important part of monetising strategies used by newspaper companies." Quoting real-world examples, including ex-*USA Today* president and publisher Craig Moon's description of its comment and community features as devices for deepening audience "engagement" with the paper's "brand" while also creating a "stronger environment for" its "advertisers' messages," they also emphasized how contributing users act as "a form of 'free' labour" for budget-conscious editors [12]. Moreover, empirical studies of newspapers that were relatively early adopters of below-the-line comment threads suggest that, far from being used as sites of interaction between journalists and their audiences, or acting as leveling mechanisms to empower the public to inform or contest articles, they were seldom even visited, let alone read or responded to, by news professionals. Twelve out of 19 respondents to a survey of *New York Times* journalists by Schultz in the late 1990s confessed they rarely, if ever, looked at their own paper's comments forums, suggesting that, far from being the "people formerly known as the audience," as Jay Rosen memorably characterized them [13], active online media-users were largely sidelined, by being left to "discuss among themselves" [14]. Meanwhile, in relation to the deeper question of whether the rise of digital media has redefined "the boundaries" of the "public sphere," as some anticipated it would, the likes of Trenz have cautioned against accepting "the mainstream assumption" that it necessarily has "a new emancipatory potential"—arguing instead that, in political communication and other areas, "by and large" the Internet "continues to reproduce the national public sphere "[15]. Early evangelism about a citizen-empowering "interactive revolution" [16] and "grassroots journalism for the people, by the people" [17], let alone the "techno-deterministic optimism" and "web 2.0 ideology" succeeding it [18], have, then, been supplanted by more conflicted, less optimistic assessments of the liberating democratic potential of the Internet.

For all this fast-building scepticism, however, in the realm of online news publishing specifically, recent years have seen promising signs that comment threads and forums—dismissed

by some in the journalism industry itself as "relics of web 1.0" [19]—are slowly being transformed into sites of meaningful inter-user (and user-producer) discourse that take us a step closer to the kind of journalistic co-production or "collaborative produsage" [10] envisaged by Bruns and others. Rambling, structurally cumbersome, stylistically messy and less technically agile or user-friendly than dedicated social networking sites, threads nonetheless provide an increasingly dynamic space for engaged and proactive audience-members to post material *capable* of embellishing, qualifying and/or contesting the articles to which they relate—and (by using their more interactive latter-day features) to "liking" and "rating" each other's comments in much the same ways as users of more conventional social media "share" and/or "retweet." In so doing, they have the potential to nudge the balance of power in the dynamics of news (and reality) construction a small step further away from being the preserve of privileged journalist-knowers and their (typically) elite sources, and into the hands of informed citizens as influential social actors.

As indicated previously, although traditional news organizations were relatively quick to take up forums and comment threads in the early stages of migrating online, adopting them well before they began experimenting with more sophisticated forms of UGC, research suggests user comments were introduced with little enthusiasm—and scant regard for any meaningful *editorial* contributions they might make. A succession of ethnographic studies stretching back to the early 2000s testify to a widespread normative aversion among news professionals to giving audience-members too much of a say on their websites. These were based on everything from proprietorial concerns that doing so might erode their privileged gatekeeper roles (e.g., [20, 21]) to fears that threads could open the flood-gates to abusive, ill-informed and/or defamatory comments [6, 7], thereby necessitating continual, time-consuming and costly, refereeing to promote civility and avoid litigation.

More recent studies have continued to highlight the wariness and indifference of many journalists (especially those trained in the analogue era) toward the value of comment threads. A revealing content analysis and newsroom ethnography carried out by Canter at two British local newspapers found levels of direct interaction between audience-members posting comments and journalists on whose work they were commenting were "virtually non-existent at 1 per cent" [22]. Nevertheless, there were signs, even here, of threads starting to serve a useful deliberative function, as well as offering audience-members opportunities to post "comments" that potentially went well beyond merely reacting to articles: by making *evidence-based truth-claims* affirming or contesting them. Around half of all exchanges on these websites involved two or more posters debating issues with one another, while 34 per cent of posts used asserted knowledge or experience to confirm, challenge or otherwise "interact with" news texts (if not their authors). Though more optimistic about journalists' willingness to engage with audiences, an earlier newsroom ethnography by Robinson spotlighted a marked difference of opinion about the value of UGC (including threads) between a younger generation of digital-native "convergers" and older "traditionalists" keen to preserve conventional gate-keeping hierarchies [5].

For all these undoubted tensions, however, a growing current of academic opinion has come to view threads and forums as actual or potential sites of audience empowerment—allowing them to engage in peer-to-peer debate and information-sharing and actively contribute to

narratives around which their dialogue revolves. Focusing on the ways in which fellow users exchange news and views on threads, in the manner of other social media, several scholars have reconceived of them less as sites of *comment* than "discussion" [23] or argumentative "dialogue" [24]. More positive still was a 2008 study suggesting that, at an even earlier stage, visitors to the websites of Britain's biggest-selling national daily tabloid, *The Sun*, and Sweden's *Aftonbladet* were increasingly creating "news/informational content," with threads offering them the opportunity to "manipulate existing content" so as to change "the nature and character" of the news material they were accessing [25].

This was a highly significant finding, in that it recognized that the effect of people posting comments containing fact-based claims, rather than mere opinion, was to *alter*, *edit* or *supplement* the articles themselves, rather than simply *respond* to them—in so doing, conceivably helping to *inform* other audience-members who read them. As Meyer and Carey would later observe [26], such posts "represent a way to continue the conversation about important community topics" and "can help journalists see that the story does not end once it is published," by identifying "new avenues for examination and new perspectives to include." However, by far the most persuasive evidence to date of informed audience-members using threads as a way of participating in the construction of *stories themselves*—at times directly contesting the authority (and by extension authorship) of the journalists whose by-lines they carried—was contained in Secko et al.'s 2011 study into the ways readers with expert knowledge engaged in sophisticated levels of "narrative interaction" with an online science journal, through posts either directly "questioning…the journalist's authority" or "contradicting essential elements of the journalistic narrative" [27]. Equally significant in this case was the finding that, far from ignoring this audience input (as had Canter's refuseniks and Robinson's "traditionalists"), journalists on this publication "in no cases" considered their own articles, standing alone, as "a completed package." Instead, they would routinely "read the audience commentary after their articles," to get "a sense of what people were concerned about, and even details on breaking stories."

These, then, are the concepts that form the theoretical and argumentative basis for the coming empirical sections. Firstly, it is argued that articles researched and authored by journalists are (and can only ever be) incomplete, in that they are constrained by limitations of time, space, budgets and other organizational pressures—which invariably prevent them from offering fully rounded, let alone comprehensive, accounts of news events or issues. In addition, the authority and accuracy of journalists' articles depends on their gaining access to trusted knowers: individuals, organizations and other sources equipped with the information and expertise they need to make sense of (often contested and unfamiliar) subject matter and translate this material into terms that are understandable and meaningful to the public. In circumstances when there are questions about the credibility or suitability of sources, or whether a sufficient range of knowers has been consulted, moreover, articles can be said to be even less finished than otherwise. Flowing from these issues, it is further argued that one way in which journalist-authored narratives can be made *more* complete is to incorporate the testimony and background knowledge of (informed) *lay knowers*: in essence, by reconceiving of user "comment" threads as sites of narrative negotiation and knowledge exchange, rather than mere reaction, and users themselves less as audience-members than citizen sources and

co-authors. Most importantly, the chapter moves beyond the narrow purview of Secko et al.'s study, which focused on exploring the co-authorship potential of threads on *specialist* websites, to build on arguments introduced by this author elsewhere that they might just as usefully be viewed as tools for finishing "unfinished" stories in the context of *mainstream* online news media as those aimed at niche audiences [9].

2.1. Comments and conversation as co-authorship: constructing case studies

The sources of primary data on which this chapter's analysis is based are supplementary findings drawn from two recent studies by this author into the role played by comment threads in amplifying and consolidating UK newspaper narratives portraying low-income children, parents and/or families as problematic. The main body of data is extracted from threads analyzed for a 2016 conference paper into the ways in which press reports about children and parenting, and the comments accompanying them online, tend to distinguish between "good" and "bad" families, communities and neighborhoods [28]. The overall dataset constructed for this study consisted of all articles about children and/or families published in a cross-section of British national newspapers over 10 weekdays between 1 January and 4 March 2016 inclusive, as well as the online comments they generated. Three titles—a broadsheet, mid-market tabloid and red-top—were sampled on each date, beginning on the first Friday in January, followed by the second Thursday, third Wednesday, etc. This sequence was reversed from the start of February (i.e., first Monday, second Tuesday and so on). In addition, different sets of papers were sampled over each of the two periods: *The Guardian*, *Daily Mail* and *The Sun* in January and *Daily Telegraph*, *Daily Express* and *Daily Mirror* during February and early March. The threads selected for qualitative analysis here are those published in response to three of the most widely reported (and debated) stories in this dataset: sites of UGC that offer especially clear and rich illustrations of the range of narrative and discursive possibilities presented by comment posts.

The additional findings derive from research carried out for a forthcoming monograph focusing on press and popular discourses that frame households experiencing poverty as relatively more or less "deserving" of public sympathy and social assistance [29]. For this project, six datasets of articles were assembled based on a series of Lexis Library database searches of all UK national and regional newspaper articles using the terms "benefits," "welfare," "unemployed," "dole," "claimant" and "poverty" during 2016. In-depth framing analysis was reserved for a selection of six key stories that generated both some of the most widespread newspaper coverage and lengthiest discussions on comment threads. The threads explored in this chapter are those that were published in response to one of the most widely reported of these six stories: the tale of an unemployed couple who had been denied social assistance (welfare benefits) after spending a £50,000 cash prize.

Of the numerous user posts generated on the threads explored here, our analysis focuses on those that contributed additional detail, background or context based on claimed eyewitness testimony, other forms of personal experience and/or asserted expert/insider knowledge. The most intriguing and impressive of these elevated themselves well beyond the status of mere reactive opinion, by making truth-claims that were arguably of equivalent (if not greater)

news value to those included in articles on which they "commented"—often backing up these claims with strong supporting evidence. Though high-quality evidence-based posts of this kind accounted for only a small minority of the total of all posts analyzed for the two studies, a number were identified in each case, with the most extensive threads—often those published on *Mail Online*, the world's most visited news site [30]—at times opening up into energetic debates between fellow posters about disputed "facts" and details.

The following analysis centers on four discrete samples of evidence-based posts that emerged from the inter-user dialogue generated by these threads. The samples are presented in the form of conversational snapshots concerned with aspects of the stories concerned that provoked high levels of debate and, at times, dissent. Each sample is presented as a case study, accompanied by explanatory context illustrating how the nature of the post(s) generated introduced additional material pertinent to the articles over and above that included by the journalists. This evidence had the effect of strengthening, qualifying or contesting the framing and/or substance of the original texts. It is argued that, by *contributing* to journalistic texts in such ways—and modifying, amending or even "correcting" them—audience-members participating in these conversations were engaged in a process of factual and discursive negotiation that saw them, at times, *compete with* the journalists for overall authorship of the narratives. In this respect, their agency in the communication process was closer to co-authorship than any form of simple news *reception*.

2.1.1. Case study 1: using personal testimony to affirm/reinforce a story's framing

The most common form of evidence-based comment to be found on the threads sampled across the two studies were those that saw audience-members transform themselves into additional news *sources* for journalists' stories—by contributing personal testimony that affirmed, and therefore consolidated, the way articles were framed. A vivid illustration of this process in action was the succession of posters effectively crowd-sourcing themselves in support of a 19 January 2016 *Daily Mail* story about the UK's high rate of stillbirths, which opened with an alarmist introduction blaming "the needless deaths of 720 babies a year" on "Britain's failure to provide proper care for pregnant women" [31]. The value of such posts was particularly marked in this case, given that the report itself largely relied on truth-claims made by professional and/or official sources, rather than women themselves: principally the respected medical journal *The Lancet* (which had published the study it cited) and a mix of other academics, leading clinicians and spokespeople for stillbirth charities.

Several women responding to the story affirmed its angle in the loosest sense, by focusing on the alleged shortcomings of antenatal and maternity services they had experienced personally. "Jjj20, London, United Kingdom," a self-styled "first time mum," decried "the lack of information and advice" from her midwife, remarking that she had "not yet seen the same midwife twice," and "wojdy, manchester" relayed how, despite her placenta "showing signs of packing up" and advice from her doctors that she "needed to be induced asap," her hospital had no beds available and her local maternity unit was "closed." Others went further, however, to reflect specifically either on their own experiences of suffering stillbirths or how they or someone close to them had narrowly avoided one, despite having also been let down by professionals. While "Geordie Lass 71, Newcastle Upon Tyne" confined herself to recalling her child's stillbirth as "the most heartbreaking thing that has ever happened in my family,"

"Sarahmum, Hull" angrily rebutted several posts highlighting lifestyle factors, like smoking and obesity, as bigger causes of stillbirth than poor healthcare, by urging fellow readers not to "blame mums." Describing herself as a "slim" non-smoker, she recounted how she had lost her own baby 28 hours after the birth because her midwives "could not interpret" the signs of "severe distress" on her fetal heartbeat monitor (CTG).

The most effective evidence-based posts, however, were those containing anecdotes that could be verified by referring to authoritative third-party online sources—even if their posters rarely provided these details or signposts themselves. A commenter using the alias "My point not yours, wales" described how, when her friend's midwife ignored the "severe itching" she complained about during late pregnancy, she referred herself to "a different midwife" who recommended that her baby be induced "three weeks before term" to avoid a stillbirth. The potential link between itching and stillbirths is confirmed by the official website of Britain's National Health Service (NHS). Although it states that mild itching is common in pregnancy, it advises that persistent itches can be a sign of the liver condition Intrahepatic cholestasis of pregnancy (ICP), which can increase the risk of stillbirth [32].

By way of balancing the picture, it is worth noting that the verifiability of truth-claims also applied to more contentious posts—including those that generated debate and disagreement by criticizing mothers themselves for the high rate of stillbirths, rather than poor and/or underfunded health services (in line with the way the same story was framed by at least one other outlet: the *Daily Express* [33]). *Mail* reader "VerySeriousPerson, Peebles" suggested provocatively that the main risk was the fact that "the UK has the fattest mothers with many health problems." His/her claim for the obesity level itself is broadly supported by readily searchable academic studies (e.g., [34]), while the association between overweight mothers and increased stillbirth risk is backed by the US National Library of Medicine [35].

In sum, then, evidence-based posts generated by this story contributed valuable additional testimony and factual context that was missing from the original report. When combined with the more generalised account given by the journalist, the (often detailed) anecdotes provided by women who claimed to have experienced inadequate antenatal care and/or the trauma of stillbirth added substance and legitimacy to the *overall* journalistic text: that is, the original journalist-led article *taken together with* its accompanying comment thread. Moreover, some posts introduced truth-claims that went beyond merely volunteering experience-based testimony: affirming the story's *substance* while also adding human-interest value that potentially made the story more involving for other readers. The most significant were posts containing additional scientific/medical information that introduced substantive context which could easily be independently checked.

2.1.2. Case study 2: using personal observation/experience to widen scope of story

Another way in which evidence-based posts can help consolidate the framing of an article is by contributing testimony based on background knowledge and/or experience that *widens the purview* of the original story—giving it added legitimacy by demonstrating that a problem or issue it identifies is more widespread and/or serious than might be apparent from the report itself. By way of illustration, a 16 February 2016 *Mail Online* article, headlined "Primary

schools are forced to tell parents to stop smoking CANNABIS and using foul language as they take their children to school," focused on two schools—one in Greater Manchester, the other in Devon—but dialogue on its accompanying comment thread prompted a number of posters to regale fellow readers with anecdotal tales based on alleged similar antics at those in their own neighbourhoods. These included "sayitwithasmile, Isle of Wight," who claimed such behavior was "happening nationwide," based on his/her experience of working at a school where "the 'F' word" was "in most of the sentences spoken among a large percentage of the students," and "Ternet, Edinburgh," who had seen a notice "regarding foul language" posted on the door of a local nursery school. "Bev Burrows, Hull" described "similar issues" at her local primary, ranging from parents turning up at the gates in their "pyjamas" (a behavior complained about at one of the schools named in the article) to "foul language AND cannabis abuse by parents waiting for their kids, both before and after school." She was also one of several posters to assert that such problems were typical of (if not endemic to) the Manchester area, informing fellow readers that she lived "in a village on the outskirts" of that city, but was "desperately" trying to "move away" to escape the conduct of "long term residents." Another, going by the curious nom-de-plume "I MUST SAY," claimed that, while working as a "learning mentor" at a different Manchester school, she had had "to deter parents from swearing and FIGHTING"—often over "what was said on Facebook the night before."

A further notable feature of inter-user discourse in relation to this story was the frequency with which people combined their disdainful comments about the parents concerned, and/or anecdotes about similar behavior they had witnessed, with sweeping generalizations about their assumed social class and/or income status—often explicitly stigmatizing them as welfare claimants. Though many such comments were *unevidenced*, they are relevant here in that they were sometimes answered by evidence-based counter-claims challenging their prejudices. One notable post of this kind widened the story's scope much further than those complaining of identikit behavior in unsavory areas of their own towns and cities, by arguing that uncouth parents were not confined to working-class schools. Dismissing the notion that anti-social behavior was unique to "benefit families," "NorfolkBroad, Norfolk" claimed to "recall teaching in an Army school," where she told a mother about her "concerns regarding a child's violent attitude and foul language"—only to watch as she "turned to the child, slapped him around the head" and swore at him.

In some ways, then, scope-widening evidence-based posts can be problematic. The numerous posts shared by audience-members within the comforting echo-chamber of a *Mail Online* comment thread, in which they shared superficially similar anecdotes affirming the story's "problem parent" narrative, bear all the hallmarks of what Iyengar calls "episodic framing": a de-contextualized litany of antisocial antics that simply reinforce lazy social stereotypes [36]. In other respects, though, they offer the potential to be used for quite the opposite end: to add more varied, at times surprising, observations and examples that can contribute toward a more rounded and representative "thematic framing" approach [36].

2.1.3. Case study 3: using firsthand knowledge to add detail specific to the story

Perhaps the most exceptional form of co-authorship to appear on threads accompanying day-to-day news reports is a strain of evidence-based post purporting to contain additional details,

context and/or testimony that *directly pertains* to the news event, incident or individual(s) that are the subject of the story on which it is "commenting." While crowd-sourced eyewitness testimony and/or expert observations have been normalized during recent coverage of major incidents, from the uprisings of the Arab Spring to terrorist attacks and extreme weather events, it is much less usual to come across user-generated content of this kind in relation to less high-profile, spectacular and/or breaking stories.

The datasets from which these case studies were drawn, however, did include a handful of (more mundane/routine) stories that produced evidence-based posts of this kind. Of these, by far the most commented on was the story of an unemployed couple from Guernsey, a self-governing UK dependency, who attracted widespread national media attention when their local paper, the *Guernsey Press*, reported that they had been refused social assistance after spending a £50,000 cash prize they had won in a Christmas Lottery. Though evidence-based posts only accounted for a tiny minority of the 4400 comments their story generated on the *Mail* thread alone, some of the longest of these introduced additional details about the couple's background absent from the journalist's report. Others, meanwhile, emphasized and developed points that the article itself had downplayed.

Given the nature of this story, and its widespread framing as the tale of two irresponsible and entitled young people—the *Mail's* headline alone read "Jobless lotto couple who won £50,000 and then spent it all in eight months face eviction after being refused benefits" [37]—it is perhaps unsurprising that many comments were negative and highly judgmental. Beyond those that were merely reactive, however, a number contributed details and observations that might well have added to any feelings of derision and disgust the report provoked in their fellow readers. A background fact included in the *Mail* story, but amplified and expanded by posts from readers with local knowledge of the couple's history, was the fact that, as a younger man, the husband had been convicted and gaoled for an unsavory assault on a woman, during which he had spat in her mouth while infected with Hepatitis C. Though the *Mail* wove key details of this conviction into the second half of its report, at least two posters copied and pasted whole chunks of their local paper's original account of the court case into their posts, adding details such as the name of the judge and the fact that an earlier offense by the defendant, in which he was caught "brandishing an axe and a hammer," took place during a meeting he arranged in a car park [38].

More significantly, several posts on the threads of both the *Mail* and *Daily Mirror* were used to inform other readers of sensitive personal details omitted from the news articles themselves, but which arguably had a bearing on key comments attributed to the couple in the reports. To illustrate, the *Mail's* story described the couple as having two children and quoted a Facebook post in which the wife had responded to criticisms from the public that the lottery money should have been spent on them by retorting that her "kids have everything" and were "very spoilt" [37]. However, a succession of posts from audience-members claiming to have local knowledge of their situation qualified these remarks by asserting that the couple's children were no longer living with them, as they had been taken into care by child protection services. Referring to the husband's convictions, a poster going by the geographically revealing alias "Guernsey mum, Guernsey, Guernsey" remarked that he had "done plenty and been done for it" and that his "kids have been in care for a while because of it," before posting a further

comment querying why his wife was "playing the kid card," given that "their two sons are in someone else's care." This refrain was echoed by *Mirror* poster "GSYLady E2," who confided in fellow readers, "as far as I'm aware (from word of the mouth in Guernsey with it being small) they don't even have their children," before adding this incisive (if brief) critique on the unfinished nature of journalist-led stories: "you never get the full stories on these websites." Other sensitive, and potentially contentious, details added by posters included references to Facebook posts by the wife (unmentioned in the news coverage) that some interpreted as indications that she and her husband were recovering drug addicts. Reacting to comments on social media accusing them of wasting their lottery winnings on drugs (allegations repeated by a number of those contributing to the newspaper comment threads), *Mail* reader "blah blah, manchester" quoted her retort to critics on Facebook that she had "spent nothing on drugs coz we're on 'script'" as an admission that "she hasn't spent it on drugs coz they get it free on prescription!" Likewise, *Metro* contributor "Carrie Little" encouraged others to "read her Facebook"—which she said explained why the couple "do not work" and also proved that they were "smackheads."

Besides adding intriguing, if demeaning, details about the story's *subject(s)*, evidence-based responses also introduced valuable context about Guernsey itself: in particular, the island's disproportionately high property prices and general costs of living. This information was relevant because the premise of the story—the family's impending eviction following their failed social assistance claim—was predicated on the fact that, despite having managed to pay the initial deposit on their new flat, they had insufficient income and savings available to cover the cost of their rent and other essentials, like food and heating. By way of example, one poster to the *Metro's* thread, "Thomas Foxen," informed his fellow readers that "the Guernsey housing market averages above London's for both purchase and rent sadly" [39]. This is a claim which independent data shows to be broadly historically accurate, if not at that precise point in time [39]. However, while another poster with insider knowledge, "WizzleTeats E1," agreed that it was "hard going keeping a good job and home" on the island, based on the experience of her "family and friends on Guernsey," he/she claimed to know "a few who have at least a few children to their families and live off around £26,000 a year and they manage ok!" The figure of £26,000 added a layer of context that will have been significant for readers at the time (in the UK, if not Guernsey), as it was the level of a then new cap on the maximum amount individual working-age households in Britain were eligible to receive in welfare benefits [40]. A more banal (if persuasive) defense of the couple's financial predicament was offered by *Mirror* reader "Jonathan Sebire" in response to a dismissive post by "Pash Pash" challenging them to "join the rest of the working class and earn a real wage" by applying for jobs at McDonalds, who were "hiring—with free meals." His confident, drily worded retort simply stated that there was "no McDonald on the rock," because the "foot fall needed to sustain a store" was "more than the population" of the island.

It is worth briefly noting that evidence-based posts drawing on asserted local knowledge to confirm, embellish, qualify or contradict the *detail* included in articles (and/or added by other readers commenting on them) were not confined to threads responding to the Guernsey story. Among the many posters who affirmed the substance of reports about cannabis-smoking, pyjama-clad parents was "jason69, Durham," who claimed to have direct knowledge of

antics at one of the schools specified in reports. "I live in Darlington," he explained, "and this poor head has been subjected to vile abuse because of her sensible comments." He added that he had "many friends" content to "spend all day smoking weed in their council-funded properties," so it was "no wonder these parents do as they please!"

2.1.4. Case study 4: using personal knowledge to contest inaccurate reporting

One of the most powerful uses of evidence-based audience testimony is not to affirm and reinforce the truth-claims made in an article, but to contest them. A story in the conference paper sample which provoked a particularly strong evidence-based counter-discourse from readers disputing its accuracy and the manner of its framing by journalists (and many other posters) concerned a supposed plan to adjust the dates of that year's school exams timetable to avoid it clashing with Ramadan. The story's premise rested on the fact that the Islamic festival was, unusually, due to coincide with the period when 16-year-olds sat important GCSE exams—meaning that young Muslims might be disadvantaged if their concentration suffered because they were observing the custom of daytime fasting. As a result, the Joint Council for Qualifications (JCQ), the body that represents UK exam boards, was said to be planning to reschedule exams in key subjects, including English and Mathematics, to earlier dates, which (in *Mail Online's* words) would give all children "fewer days to revise" [41].

Coverage of this story (spread across a wide range of newspaper titles) prompted an initial deluge of comments condemning the reported decision. However, these were met with a swift and vocal fightback, particularly on more liberal news sites—not only from people defending the merits of the proposals but evidence-based posters self-identifying as practising Muslims, teachers or other expert knowers who disputed the story's entire basis.

Perhaps the most direct and unambiguous attempt to debunk the framing of the *Mail's* report—provocatively headlined "Sit exams early to fit in with Ramadan: Pupils taking GCSEs and A-levels face timetable shake-up to accommodate fasting Muslims"—was mounted by "cherriesandoranges, Doncaster," who began with the blunt analysis, "DM this is shoddy reporting," before going on to argue that, as "a GCSE English lecturer in a college which delivers GCSE to over 1000 students," he/she had known "the exam date for both Maths and English for 2014 in spring 2015"—meaning that the practical difficulties of rescheduling the nation's exams were such that "there's no way they will change the exam days now," because "it's too late." Intriguingly, however, this particular truth-claim was contradicted by "John Cantelo," another self-identifying schools expert (this time on the *Huffington Post* comment thread), who responded to a previous poster's tirade against a decision to "screw over all the other students because of the muslim [sic] students' religious problems," by arguing that, "as a former secondary school examinations secretary," he doubted that "examination boards have yet fully firmed up the precise timetable for summer 2016 (let along published it for the students)" and that this was probably "why this is being debated now." Importantly, though, he was one of several posters to criticize the way the story had been *presented*—i.e., as a proposal that would negatively impact non-Muslim students—by arguing that, far from "being given an 'unfair advantage'" over everyone else, those observing Ramadan were merely being protected from "any potential disadvantage they may suffer from their beliefs," and that "all that

is happening" was that *all* students would be sitting Maths and English exams in the morning, rather than the afternoon. In the event, the first of these two counter-claims would prove to be nearer the truth, based on a succession of subsequent pronouncements by the exam authorities exposing the extent of the misinformation contained in articles about the subject. These included an official statement issued over the following days by the JCQ—which pointedly identified "a clear misunderstanding in some parts of the media as to how the GCSE and A level timetable is set and the impact religious events, such as Ramadan, Easter and Passover, have on it" [42]—and a public letter from Glenys Stacey, chief executive of the UK exams regulator Ofqual, to then Chief Inspector of Schools Sir Michael Wilshaw, reiterating that "the [exam] timetable for 2016 was drafted over a year ago, is published, and won't be changing" [43]. Nonetheless, for all its comparative limitations, "John Cantelo's" counter-claim still offered evidence-based testimony of real material value, if only because it directed his fellow readers to pay closer attention to (underplayed) details in the report to which they were responding: namely that, even if some timetabling adjustments *were* made, these were only likely to involve bringing forward some exam sittings from one end of a particular day to the other.

Perhaps the most unified front against misleading impressions conveyed by articles about this story, though, was presented by posters who self-identified as Muslims. Many of these commenters went beyond disputing details of whether, or how, exam timetables might be changed to accommodate Ramadan, by instead rejecting the entire premise of the story, i.e., any suggestion that Islamic religious-leaders regarded observing Ramadan as somehow incompatible with sitting exams. One *Mail* poster, "pray for peace, forever-london," said he/she lived in "the Middle East" and had Muslim children, but that exams times had "never changed due to Ramadan"—despite the fact the region was "far hotter than in the UK." Meanwhile, "AN333, South Yorkshire" claimed to have "done exams during Ramadhan whilst fasting" and "Peru123456789, London" asserted, "I'm Muslim and going to do my GCSE exam," adding that he/she was "fine with fasting and sitting exams." But perhaps the most significant strand of truth-claim mounted in defense of the Muslim community was that emphasizing the fact that there was scope within both interpretations of the Quran itself and the official advice issued by Britain's leading Islamic authorities for exam-aged children to be exempted from fasting. While "Mother of Two, At home" bluntly told her fellow *Mail* readers that "Muslim children are exempt from fasting," "slight32" contextualized this claim by adding important further detail for those on the *Independent* thread: notably the explanation that there was "no requirement in Islam for children to fast," and that "those choosing to" could either delay it until after their exams or instead observe "an alternate form of piety," such as "charitable works." Once again, these confident and fulsome posts added genuine material value to the journalist-led narratives—at least for anyone prepared to take the time to check them out—because the truth-claims they made could easily be verified by referring to authoritative third-party online sources. The websites of both the Muslim Council of Britain (quoted in several articles welcoming the supposed rescheduling plans) and the Association of School and College Leaders stressed "the flexibility Islamic Law offers" children to "delay or exempt themselves from fasting and late night prayers if they believe their performance in exams could be affected"—adding that "Islam encourages critical reasoning" and individuals' rights "to make their own decision" [44].

Oppositional evidence-based posts contesting the way journalists and/or other audience-members had framed a narrative also surfaced on threads accompanying reports about the "problem parent" story. In an impassioned and personalised riposte to the anti-Manchester, anti-welfare sentiment expressed by many *Mail* posters, "Mrsxsx, Manchester" railed against the "middle class snobs that read and write articles such as this," arguing that "not all teenage parents or sink estate kids are like this." In the course of two lengthy posts detailing her own background as someone from a low-income, working-class family, she told fellow readers she had been "brought up on a council estate, had a child at 17, married his father, who was also brought up on the same estate," but had gone on to "own a home, 2 new cars, and earn in excess of £80k per year between us" at the age of 30—thanks to "nothing but hard work" and "a determination to prove snobs such as yourself wrong."

2.2. Problems with evidence-based posts: contentious or inaccurate truth-claims

As with any argument over truth-claims—including those advanced by journalists themselves, and by the competing "he said/she said" sources on which they often rely [45]—some evidence-based claims inevitably proved less credible and/or verifiable than others. Responding to the *Mail's* take on the stillbirth story, "Michael Haymar, Oxford" drew attention to the assertion, "not mentioned in the article," that the annual flu vaccines offered to some adults in Britain were "a cause of stillbirths." However, a glance at the research literature shows this to be a highly disputed link, with some studies suggesting that these jabs can, in fact, *reduce* the stillbirth risk, rather than increasing it [46]. The importance of subjecting such claims to careful fact-checking was also demonstrated in this case by one of the few posts that directly cited its source. This was a statement by "amj127, Stockholm" that Icelandic mothers were "on average older than mothers in the UK": a retort to a previous poster's remark that had insinuated a connection between the age at which British women became pregnant and the fact (mentioned in the story itself) that the country's "stillborn rate" was "eight times" higher than Iceland's [31]. Although this poster cited his or her source as "Eurostat," the European Commission's statistics database, a visit to its breakdown of maternal age ranges across the 28 EU states shows that, in the then most recent year (2015), the mean age of UK first-time mothers was actually *older* than Iceland's [47].

Spurious evidence-based claims were far from confined to threads responding to the stillbirth story. A sweeping statement by a poster using the (misspelt) nom-de-plume "Spolit Rich Kid, Chelsea" described Manchester as the "drugs, gun and crime capital of UK" on the thread accompanying the *Mail's* rendition of the "problem parents" story. More verifiably untrue was the wild claim by "Fed up tax payer, london" in response to the same story that the cost of "obesity-related illnesses" (a problem he/she associated with the feckless families portrayed in these articles) now accounted for "50% of the NHS budget." Swift fact-checking against an online report by the respected free-market Institute of Economic Affairs thinktank showed the "net cost" of UK obesity to be £2.47 billion—equivalent to "0.3 per cent of the UK government's total budget in 2016 or 1.8 per cent of the NHS budget in the same year" [48].

Other evidence-based posts were problematic because they contained truth-claims that were *misleading*, rather than inaccurate as such. Responding to the story about the Lottery-winning couple, *Mail* poster "Listen_To_Me, bristol" confidently talked his fellow readers through the

rules set by the UK's Department for Work and Pensions (DWP) to determine eligibility for social assistance—apparently oblivious to the fact that they were residents of Guernsey, not Britain. The criteria he set out regarding the UK system were broadly accurate: principally the fact that "you are not eligible for benefits if you have more than £16,000" in savings and that, "if the DWP believe that you have deliberately disposed of money over this limit" to make yourself eligible for benefits, they had "the right to refuse" you [49]. However, as "Anon, Anon, Jersey" pointed out elsewhere on the same thread, posters complaining about subsidising their lifestyles did not "have to worry about paying toward their rent," as "the Channel Islands aren't part of the UK for tax/social security purposes."

3. Conclusion: the scope and limits of evidence-based comments

As the above case studies show (however briefly), hidden among the blizzard of comment posts that are wholly or largely *reactive* in nature, the threads published below online news articles offer rich pockets of asserted experience, expertise and local/privileged knowledge which can enhance, embellish and, at times, authoritatively contest the way stories are framed by journalists. But for such evidence-based contributions to truly "come of age," by realizing their full narrative and discursive potential, three pre-conditions will first need to be met. Primarily, journalists (and the news organizations for which they work) must be prepared to acknowledge the value of such audience-to-journalist truth-claims and to integrate them more meaningfully into the process of news production. In short, threads should be recognized as forums offering crowd-sourced information and testimony about day-to-day stories and issues that, if properly incorporated into newsgathering and reporting routines, can be every bit as useful and important as the more dramatic user-generated footage and eyewitness accounts contributed by lay sources to coverage of rarer, more explosive, "news events" like terror attacks or natural disasters. The second precondition is that the value of evidence-based comments needs to be recognized not only by journalists but also (other) *audience-members*—and factored into their understanding and appreciation of the *overarching* narratives they are reading/viewing, and to which they are responding (whether publicly, through their own posts; in discussions with peers; or through their own private interpretations).

It is the third pre-condition, however, that is most important: that relating to the responsibilities of the audience-sources *contributing* the evidence-based posts. If their role is to be taken seriously, they have a duty to ensure that the truth-claims they make are honestly expressed, clearly and credibly sourced—and (as far as can be ascertained) factually accurate. As this chapter shows, evidence-based posts often contribute additional context, detail and layers of meaning with the potential to fine-tune and make more complete the journalist-led articles to which they relate, in so doing improving public understanding of their subject matter. As with news articles themselves, however, it is unwise to take posts at face value: though many may be trustworthy, some contain truth-claims that are misleading, if not downright inaccurate. What is needed, then, to make the most of the opportunities offered by threads for substantiating and finessing stories is a new form of three-way "contract" between journalists and their two *levels* of audience-member: people who contribute their own source material to

consolidate/contest the finished narrative, and those content merely to "receive" the truth-claims relayed through this emerging hybrid of professional and citizen journalism.

Conflict of interest

I confirm there are no conflicts of interest.

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Chapter 3

Social Media: A Turning Point into Global Journalism Identity and Ethics

Basyouni Ibrahim Hamada

Additional information is available at the end of the chapter

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Abstract

Social media are growing drastically representing a further step in the ongoing deterioration of journalism profession and ethics. The lines between professional journalists and amateurs have been blurred; consequently, the structure of news media has substantially changed affecting the core traits of the profession and its ethics. This phenomenon has challenged the already disputed concepts of journalism as profession and journalists as professionals. While this challenge is tremendous, research on its implications to journalism identity and ethics is scant. The existing literature focuses on new or digital media usage, newsgathering, production, dissemination, and consumption, with little emphasis on journalism ethics or the profession itself. This chapter seeks to examine how social media contribute to the ethical dilemmas off and online journalism encounter and how this transformation puts the profession at risk.

Keywords: social media, digital communication technologies, global journalism ethics, journalism profession

1. Introduction

It has only been about 20 years that news has been contextualized, gathered, disseminated, and consumed in four distinct media outlets—print, radio, television, and online [1]. These media have diverse environments in terms of ways of production, distribution, and consumption, which ultimately create different professional identities and perceived credibility among audiences [1]. The four different news media environments, though, have distinct features; all share common similarities of journalism profession. Journalism as profession is operated under hierarchical organizational settings, within specific constrains and ethical standards [2]. Due to the

digital technologies of the social media or social networks platforms, journalism profession as we know it has entered a very different phase hinges on the revolution of convergence. Media convergence is not just a matter of technology merging; it is an endless process with comprehensive and substantial implications on every aspect of journalism culture including producers, consumers, distribution of power, and influence. As Henry Jenkins argues, convergence is both a top-down corporate-driven process and a bottom-up consumer-driven process ([3], p. 37).

The main two partners of the convergence process—producers and consumers—compete to maximize their benefits and expand their control over the flow of news and information. Both have aims and motives that pull them to share the same media platforms, yet with different purposes. As Jenkins claims, news media organizations try to speed the flow of content across delivery channels to enlarge revenue opportunities, expand markets, and enhance viewer commitments. On the other hand, citizens struggle to control the flow of news and information [3]. The two partners are trying to win the battle of autonomy, independence, power, and revenues. In this battle, citizens who are free from the journalistic routine and constrains of news media organizations have become much more active in producing and distributing news and views. At the same time, news media organizations lack the prestige, power, and influence that were once a hallmark of journalism. Audiences are universally migrating away from mainstream traditional journalism and seeking for news and content available at social media platforms [4].

The resulting explosion of the network of "mass self-communicators" [5] has led to a wealth of news and information content online that comes from outside the walls, or firewalls, of professional journalism organizations. Citizens of social media not otherwise employed as journalists find themselves with access to tools for producing, recording, and sharing text, photos, video, audio, and other forms of content more quickly and easily than ever before [6]. In this battle, convergence, interactivity, customization of content, and hypertextuality along with the widespread penetration and availability of new technological "tools of the trade" are redefining journalism, how it is carried out, and, of course, who is a journalist; meanwhile, it raises new ethical dilemmas [6].

Social media as used in this chapter is a "catch-all term" referring to a wide variety of web-related communication platforms utilized by unprofessional and unemployed citizens who use blogs, wikis, social networking, and all other social media forms for the purpose of sharing news and views on unlimited topics. For the purpose of operationalization and clarification, Journalism here refers to two different types: (1) offline or traditional journalism, namely newspapers, magazines, radio, and television news and (2) online or digital journalism including both the online versions of traditional journalism and "only online news sites" that report on top news stories and that do not have offline version platforms. The distinct feature of both off and online journalism is that it is operated by full- or part-time journalists who mainly earn their life by working in news media organizations. On the other hand, social media include social networking sites (such as Facebook, LinkedIn, Snapchat, Instagram, Ozone, and RenRen), online discussion forums, content-sharing sites (such as You Tube), and microblogging sites (such as Twitter or Sina Weibo), in addition to the search engines (such as

Google, Yahoo, Bin, or Baidu) [7]. Social media are platforms driven by citizens who are not specialized in journalism. However, this distinction does not mean that professional journalists do not use social media—as citizens—to produce, disseminate, and consume news. One cannot exclude them from being part of social media platform community, but in this case, they do not represent their organizations, instead, they express their own views, interests, and attitudes that have no connection and implication with their employers.

The importance of this chapter stems from two facts: (1) The literature dealing specifically with the ways in which social media affect ethics and moral decision-making in off and online journalism is scarce. Earlier and current studies have investigated the impact of social media from different angles using different methods; however, social media and journalism ethics studies are understudied [8]. (2) News media organizations at present time are least trusted institutions. Trust in news is declining overtime, and the percent of people who worry about false information or fake news being used as a weapon is 70% of the total population examined in Edelman Trust Barometer of 2018 [7]. Similarly, Meyer finds that traditional journalism is no longer perceived as either credible or trustworthy source of news and information [9]. Hence, the profession experiences a real threat where borders that protect those who work inside the house of journalism and exclude those who are invading it from outside are crashed. This chapter seeks to provide a conceptual groundwork for future empirical studies of the notions of professionalism and journalism ethics as they relate to the emergence of social media and as they are closely related. Ethical issues controversy lies at the core of the debate of journalism profession. The key issue this chapter addresses is the implications of social media platforms to both journalism professionalism and ethics.

2. Structural digital transformation and journalism profession

Sociologist William Dutton at the Oxford Internet Institute (OII) argues that we are witnessing the emergence of powerful new news platforms and networks, which act independently and out of control of the traditional mainstream media. Dutton has termed these powerful platforms as the "Fifth Estate" that already undermined and worked beyond the boundaries of existing news media organizations [10]. Dutton believes that the Fifth Estate could be as important to the twenty-first century as the Fourth Estate has been since the eighteenth. He argues that in the twenty-first century, a new institution is emerging with some characteristics similar to the Fourth Estate, but with sufficiently and reasonably distinctive and important features to warrant its recognition and existence as a new separate Fifth Estate. Such network is opening new ways of enhancing the accountability of political organizations, news media organizations, and other loci of power and influence [10].

In response to the emergence of the Fifth Estate, mainstream news media organizations attempted to understand and identify the technical and social challenges raised by the rapid growth of this phenomenon. Emphasis was given to a number of practical issues: editorial control, scalability, ownership of intellectual property, the blurring of professional and

personal spheres, as well as concerns about the representative or unrepresentative nature of the networks seeking for recognition [11]. It is obvious that strategic dilemmas as identified by the mainstream media are not directly or indirectly related to journalism ethics that have been, unfortunately, pushed to the backstage. Nearly all researches were conducted in this area with specific explicit or implicit purpose to examine the usage, functions, roles, and effects of social networks in comparison to traditional media [8].

In this context, I argue that the most critical issue social media have brought is the ethical challenges and its impact on the decline of trust in the profession and journalists as professionals. If readers, listeners, and viewers distrust social media platforms, this negative attitude is likely to be extended to other journalism platforms whether they are off or online. This is why the profession as a whole is at risk. Symptoms of the crisis are numerous, among which are decline of news media audiences, circulation, and advertising revenues. The ongoing decline of journalists' jobs, the declining interest among journalism students to enter media job market [12], and the shutting down of several news media institutions across the world are also obvious indicators of the crisis. Surveys of journalists show that the numbers of full-time journalists working for mainstream news media in the United States, for example, have declined substantially from about 122,000 in 1992 to about 116,000 in 2002 and even more so from 2002 to 2013 [13]. This situation is threatening the overall functions and roles of journalism in the society as a social institution responsible for providing accurate, fair, honest, objective, and comprehensive account of daily events. In fact, these new platforms, whether we agree or disagree, like or dislike, have become an alternative source for news and views especially for youth, minorities, activists, and even majorities especially in countries where mainstream news media are affiliated to and controlled by the governments.

Social media watch the traditional watchdog, checking its legitimacy and credibility, questioning its accuracy and standards, and forcing a new transparency [14]. However, the other side of the coin bears misinformation, disinformation, and fake news. The current literature underestimates and overlooks the negative side of social media especially its implications to the profession and its core; the ethics. Social networks enable both grassroots and elites to bypass mainstream news media and take their message—unmediated—to their supporters or followers. In addition, "disinformation has become a truly global problem, extending beyond the political sphere to all aspects of information, including climate change, entertainment and many other issues" [14]. The key characteristics of the social media as alternative for off and online journalism make it a double-edged sword. In one hand, it is based on the technology of freedom that enhances transparency, democracy, and personal interests. Social media empower the marginalized people who suffered from inability to express their opinions and voice their interests in the mainstream news media due to the structure of power in a given society. In contrast, social media users are, by traditional journalism criteria, not responsible professionals or communicators who can be held accountable. Social media are free, albeit irresponsible, and unaccountable journalism platforms, hence it is powerful tool to damage and corrupt. Power tends to corrupt; absolute power corrupts absolutely. Social media citizens (producers and consumers) are free from the institutional hierarchies, constrains, and regulations of off and online journalism. While freedom reinforces self-personal interests, lack of responsibility and accountability works against the ethical foundations on which the

profession of journalism has been founded since its establishment five centuries ago. Freedom has been shifted from the owners and journalists of small number of news media institutions to all people. In this replacement process, new owners of freedom are not constrained by either laws or ethics that govern the environment of old owners.

In this context, it is important to highlight the statement made by Guy Berger, UNESCO Director for Freedom of Expression and Media Development in his introduction to the book of "Journalism, Fake News and Misinformation." Berger argues that disinformation is a social media phenomenon that powerful actors—and I can add—antitransparency and dictators—today are exploiting to clamp down on the news media. As a result, new and rigorous laws are scapegoating the "easy" targets of news media institutions or lumping them into broad new regulations, which mainly intend to censor and restrict off and online journalism, but which restrict all social media platforms as well [15]. This is not just an apprehension, but a reality where governments in most Arab countries seize the opportunity of people complains, to tailor the laws that undermine the right of communication, the right of information access, and the well-established right of freedom of expression. In today's context of disinformation and misinformation, Berger argues that the ultimate risk is not only unjustifiable regulation of journalism, but that public may also come to disbelieve all content—including journalism [15]. Having said this, the key challenge faced by journalism educators, professionals, policy makers, and civil society organizations is how to minimize or entirely erode the corrupt side of social media platforms mainly the unethical outcomes (i.e. misinformation, disinformation, fake news, propaganda, brainwashing) without limiting the communication rights of citizens and professional journalists. I, therefore, agree with Jane Singer who argues that the fundamental challenge that social media platforms pose for journalists in off and online journalism is not about money or even job security. It is about the notion of professionalism [16]. However, I may disagree on how Singer defines "online journalists." For this chapter, the source of the threat is related to the citizens or social networkers, who are not part of the journalism profession. Websites or online versions of traditional journalism as well as the online-only news sites that embrace professional journalists constitute a part of the professional camp of journalism. They are supposed to be employed by news media organizations, have an adequate body of knowledge and training, committed to the code of ethics, and at the same time struggle to safeguard the profession from government and commercial interventions to maintain their autonomy.

The view of Larson [23] for the profession is more or less applicable to online journalists whose job is mainly producing and disseminating news and views. Larsen sees that any profession has a sense of identity that exists among its members. Therefore, professions "tend to become real communities, whose members share an enduring relationship, an identity, individual and group obligations, specific interests and general loyalties" (p. x). However, it is a fact that there is no profession that meets these criteria perfectly; doctors, for example, have lost the autonomy of private practice as they have become employees of corporate healthcare providers [17]. This debate raises an important question of whether journalism—under the explosion of social networks—is a profession sufficiently able to meet the reasonable requirements of professionalism itself as an ideological construct [18]. A question that we need to discuss in brief. Doubts about journalism as a profession date to at least to the start

of the twentieth century, when Joseph Pulitzer proposed that journalists should receive regular education and training to acquire and improve their social standing [19]. In this regard, Weaver and his colleagues carried out several cross-national surveys among journalists and found that disagreement prevails among journalists of the world on professional norms and values to the extent that they cannot claim the emergence of "universal occupational standards" in journalism [20]. Other scholars have engaged with this question to identify the common grounds that may shape a distinct ideological occupation of journalism. Shoemaker and Reese [21] after examining the issue conclude that though journalists adhere to similar journalistic values and norms, they apply it differently in different cultural contexts [21]. For me, it would be naïve to assume the existence of such occupational ideology among all journalists serving in different cultures across the world, especially in this liquid phase of news production without empirical investigations to examine how much journalists believe in similar occupational ideology.

However, much of the research on professionalism centers on attributes theory, which identifies particular traits for a profession. The set of attributes vary from one study to another; yet, most studies focused on the following attributes: (1) The occupation is organized around a body of knowledge or specialized technique. (2) Members of the occupation have considerable autonomy to conduct their work. (3) Members of the occupation are willing to put public service ahead of personal and economic gain. (4) The occupation has an established professional culture to promote its values, norms, and symbols. (5) The occupation socializes its members through education and training. (6) Members of the occupation produce an unstandardized product. (7) The occupation is usually lifelong and terminal [22]. Without doubt, none of these attributes is applicable to social media citizens and it barely describes off and online journalists nowadays as will be shown later. This judgment is supported by several studies that document the failure of off and online journalism in serving objectively, independently, and as public service-oriented institutions.

Attributes theory of professionalism has experienced severe criticism, which is beyond the limit of this chapter. Yet, the three dimensions for professionalism theory: cognitive, normative, and evaluative seem more relevant to the current discussion. A cognitive dimension requires a specific body of knowledge and techniques that professionals employ while they perform their tasks. A normative dimension provides the ethical framework that justifies the privilege of self-regulation that society awards them. The evaluative dimension indirectly highlights the significance of the profession, its autonomy, and prestige [23]. Jane Singer's analysis of the applicability of the three general dimensions of the profession to journalism seems important. She claims that the cognitive dimension, involving a core body of knowledge and techniques possessed by professionals, is problematic. If we try to apply this dimension to journalism, we will find that journalists have never had a shared approved knowledge base in the way that doctors or lawyers have. In all Arab countries, for example, the majority of old generations of journalists have never obtained bachelor degree in journalism. However, this phenomenon has gradually disappeared under the restrictions and regulations of press syndicates. In the United States, the vast majority (82%) of contemporary journalists are college graduates—but at least as of the early 1990s, barely half of those

graduates (56%) had majored in journalism or any other communication-related area [13]. Journalism's strongest claim to professional status as Singer argues is the normative dimension. Safeguarded by the First Amendment, US journalists have long claimed to provide a public service—not just to help individuals but also to help democratic society as a whole [16].

This normative dimension is not without criticism; history tells us, at least in most developing countries, that the constitutional articles do not represent an obligatory procedure in several countries. The applicability of such constitutional articles and international conventions does not serve well as a benchmark for the normative dimension of journalism profession. Constitutions of all Arab countries, for example, stipulate that journalism is free profession to serve public interest, to watch policy makers, and to enhance democracy, good governance, and to fight corruption. Even though none of these countries enjoys the privilege of "free press category" as identified by all Freedom House reports since its establishment in early 1990s right now [24]. With regard to the third dimension of journalism, which is its autonomy and prestige, it is enough to refer to the report of Edelman Trust Barometer of 2018 mentioned earlier in this chapter indicating that 70% of the total population view journalism as fake, disinformation, and misinformation. Journalists' professional autonomy also as Hardt cited in Dickinson and Bigi [25] has been weakened due to the impact of new production technologies that eventually threaten the news output itself. His findings support the notion that new technologies are likely to have different impacts in different contexts as they are likely to be adopted in diverse ways [25].

Professional autonomy as a cornerstone defining journalism profession can provide a good explanation of why social networks are threatening journalists and the profession. Professional autonomy problem, I argue, is the main cause for the expansion of social network platforms that, in turn, deepen the problem as it have taken over the authority and control of off and online journalists. Historically, nearly all news media organizations in Western and Eastern countries were either owned by or affiliated to political parties. Gradually and after the Second World War, newspapers liberated themselves from party ties and declared themselves independent actors. Despite this liberation, most news media still take an ideological standpoint such as liberal, conservative, or social-liberal that will color both opinion and news pages [26]. There is no doubt that when journalism institutions are owned and operated under the tight control of the governments, the decision of selecting the news stories and how they are covered is not professional. In such cases, the governments set the news media agenda and use journalists as spokespersons. The pioneering "Functional Analysis of Mass Communication" developed by Wright [27] proves that news media largely reproduce the existing social order. Subsequent studies for five decades of classical-to-neo-functionalist evolution have revisited, criticized, and refined Wright's model but have settled on the conclusion that news media are not autonomous, journalists are not free in their daily judgment, and that journalism tends to reflect the political structure more than the individual or news media independent judgment [28]. Since news media are dependent to governments and political systems, journalists have weak or no voice on how news are contextualized, gathered, and disseminated. According to Bennett's first formulation of indexing theory, news is formulated as a dependent variable of

governmental discursive structures [29]. However, if the dominant power in the inner circles of the government is characterized by plurality, diversity, and opposing views, then the voices in news stories will be varied. This is what Bennett and his colleagues have provided in their revision of the original indexing theory to reflect a particular, not universal, relations between press and USA government during Bush years (from the Iraq war to Hurricane Katrina [30]. Literature review suggests that journalists' autonomy is a matter of negotiation between different layers of influences. It is constrained at higher levels of politics, economy, and organization of news media; then negotiated at the editorial level; and finally exercised at the level of practice [31].

Journalists' autonomy, I argue, shapes the core of journalism profession and the most important strategy in the fight against the threat of social media platforms. Yet, this does not mean that autonomous journalists enjoy freedom without responsibility. As Kant suggests, autonomy is the product of rationality that enables man to impose moral laws on himself, and it is this ability to legislate ourselves that binds us to these laws. Hence, autonomous individuals are bounded together in a social setting by morals [31]. This double meaning of autonomy makes it the cornerstone of journalism profession. In addition, the holistic vision of this concept must link it to the type of knowledge that enables journalists to take the right decision. As Susan Shell argues in today's liberal world, the term "autonomy" both describes a fact—the ability to choose and suggests a right—the right to exercise that ability without external interference, either by overt force or by lack of truthful information. Autonomy, so understood, as both a quality that a self must minimally possess to be a self at all and one that all (adult) selves are presumed to insist on or deserve ([32], p. 1). Autonomy in one of its aspects means occupational control over who enters the field and the grounds for expertise. At the same time, it means a process of self-regulation, which gives the public a positive sign of good governance.

Professional journalists everywhere claim that they are abided by a universal code of ethics. Consequently, professionalism is the concept that renders autonomy [33]. As journalism is not fully a profession, in the sense that its professionals may not have a universal type and amount of knowledge in comparison to medicine, law, or engineering; for example, news media organizations are relatively weak. They have low entry barriers, and its options for sanctions are few; thus, the autonomy of the individual journalist represents unwarranted thing—the potential power of which warrants some levels of control [31]. In an empirical study of journalists' perception in 18 countries for professional autonomy, Zvi Reich and Thomas Hanitzsch find autonomy to be restricted on two levels—external and internal. The external restrictions refer to all forces restricting the political autonomy of the news organization, including state censorship and ideology, economy, legislation, and regulation. Internal restrictions relate to force and pressure rooted inside the news media organizations [34]. In his global survey of journalists across the world and inconsistent with this result, David Weaver concludes that majority of journalists are not only unhappy about how free journalists are in their work, but also they perceive large gaps between the ideal of autonomy and the actual freedoms they practice [35].

Autonomy problems, in fact, help us understand how and why social media platforms considerably influence the profession of journalism, be it off or online. Arguably, social media or citizen journalism began as a direct and determined response to the perceived weaknesses of mainstream journalistic professional autonomy. The first Indymedia site was established to cover the 1999 World Trade Organization meeting in Seattle, and the political protests surrounding it, which became known as the "Battle of Seattle." Activists who anticipated that mainstream media coverage of their protests would be strongly biased toward portraying them as criminals took matters into their own hands by publishing their own, alternative text, audio, and video reports from the protests through new digital publishing platform of the Web [36]. Inception of social platforms as shown in the "Battle of Seattle" is rooted in the failure of journalism industry to reflect an independent coverage of a controversial event as well as the inherent privileges of the new digital platforms. Technology has played an important role as disruptor and enabler in these developments. First, the rise of the Internet as a popular medium has led to a substantial increase in available channels for information and entertainment. Second, the proliferation of possible channels for news content undermined the attractiveness of the journalistic product, leading to a continuation of decline in audiences and revenues. Third, decline of audiences and revenues, in turn, enforces news media organization to accept both commercial and political funding and interventions, which eventually undermines journalistic autonomy [36].

The ultimate result of this cycle of effects is the decline of trust in journalism profession as a whole. Historical roots of the social media provide an evidence that the awareness of citizens for the unfair alliance between traditional news media and governments was the main cause behind inception of this phenomenon. If audiences perceive off and online journalists as fair, objective, and autonomous, they will trust them and migration to alternative platforms will be at its lowest rate. Scott Gant, 2007 in his book "We are All Journalists Now," explicitly claims: the mainstream media neglect much of what is worth knowing and worth thinking about. Now, with the rise of social media platform, many more people are passing on their observations and ideas, playing a role previously occupied only by members of the institutional journalism ([37], p. 45). Further, media criticism has become less an organizational activity and more of a practice embedded in the social media platforms. One of the most important consequences of social media is the structure of accountability it provides for traditional "professional" media [38].

Social media platforms have a distinct feature by the direct relationship between news producers and consumers, and no editors are currently served as mediators in this relationship [54]. The collapse of gatekeeping represents a direct attack on the elites (journalists, policy experts, public officials, academics, etc.) who have operated as the mediators and representatives of social and political meaning under the social responsibility theory. At the same time, citizens have become independent and free producers and consumers of political and social meaning they construct out of the mix of mediated narratives they are presented [39]. The collapse of gatekeeping has shifted the power and influence from the hands of a small number of journalists to all citizens who are capable to manage the process

of newsgathering and dissemination. In practical terms, journalists lost the monopoly of gathering, handling, and disseminating news and information. Furthermore, any institution can directly contact its public without the traditional mediation of journalists, the dominant rule in the last three decades ago [40]. Gatekeeping as a process of ensuring comprehensive and fair coverage, therefore, is no longer strictly necessary; the gates have multiplied beyond all control [41].

Given the previous discussion, journalism educators and professionals cannot ignore the considerable impact of social media platforms. It is evident that such platforms have been increasingly blurring the boundaries between news media organizations' websites, the blogs, and collaborative spaces of citizen journalists. The blurring of lines can be observed in the metaphors of dialog professional journalists and journalism educators use to define "good" journalism practice [36]. In response to this reality, a recognition that the already weakened entry barriers to the profession has become more lenient than before and that control over journalists whether through the organizational constrains or the code of ethics has become more weaker and negotiation over what is journalism and what is journalist has become more transparent. Two research trends arise: The first is whether journalists and journalism students see it as an open, collaborative, and/or strict and closed profession. The second relates to the ways social media redefine practices, ethics, and identity of journalism profession [42]. In her study on renegotiating the journalism profession in the era of social media, Jaana Hujanen concludes that ideals and practices governing journalism are being revisited by journalism students in terms of the challenges and opportunities that social media and citizen journalism offer [42]. Similarly, the Project for Excellence in Journalism study found that both the journalists and their publics are prepared to accept a new different vision of journalism [4] in which the key function of gatekeeping of traditional mainstream journalism is no longer exist [43].

The aforementioned discussion demonstrates that the ills of off and online journalism throughout the world are partly responsible for the appearance and growth of social media. The tight restrictions under which professional journalists operate give rise to a new digital alternative empowered by freedom without both responsibility and accountability and usually without sufficient knowledge and expertise that guarantee rational judgments. Thus, the problem is not with citizen journalists who exercise too much autonomy but with professionals who practice too little autonomy. This in turn directs our attention to many important questions that need more exploration. How can we understand the phenomenon of citizen journalism? Is it without boundaries or is it without ethics? What makes it persistent? More importantly, what are the factors behind its expansion and dominance to the extent that it has become a real threat to the existence of professional journalism? The answer comes from the sociological theory of civil society developed by Jeffery Alexander in his book "Civil Sphere" in which he describes civil society as a sphere that is analytically autonomous, empirically differentiated, and morally more universalistic visa-vis the state, the economy, and from other social spheres and institutions as well [44]. Alexander argues that it is the civil sphere of justice that established the democratic societies. Justice fulfills collective obligations while at the same time safeguarding individual autonomy. He emphasizes the strong relationship between civil sphere and democracy and the freedom that embraces political and cultural spheres [44].

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The central theme of Alexander's theory is of great value for our discussion of the challenges social networks impose for off and online journalism. Alexander sees that power and self-interest are not the only interest that shape societies and that ideal of community and justice, integration, and feeling for others are important. This solidarity is possible because people are oriented not only to the here and to now but also to the ideal, to the transcendent, to what they hope will be the everlasting. Alexander argues that the discourses and institutions of civil society go beyond the social restrictions of daily life, providing more universalistic civil codes for democratic critique, action, and reform. This autonomy from political and economic power is due to the fact that social solidarity grows from a symbolic structure deeply rooted in the core of social life [44]. Social media citizens are integral part of the civil sphere in which they express their views and attitudes free from the boundaries of journalistic institutions. They are part of the Internet virtual community that has its own language, cultural, rituals, and sometimes ethical or unethical practices. Scholars of communication are invited to examine the ideals and norms that constitute the behavior of social media community globally and locally with special emphasis on its implication to the current debate of what is journalism and who is a journalist. The central issues are (1) Whether the communicative behavior of social media citizens satisfies unmet needs that off and online journalists are supposed to meet (2) To what extent the content of social media platforms is viewed by Internet users as a real substitute for off and online journalism and why (3) To what extent freedom and autonomy social media platforms experience hinder or enhance its potential role to protect an independent civil sphere (4) What institutional changes off and online journalism have to experience in order to meet the challenges posed by social media platforms.

Given the challenges posed by social media, developers of journalism education programs everywhere may need to decide on choosing between the convergence-oriented curriculum or the individual courses or tracks.

The previous discussions and questions lend support to my argument that if off and online journalism institutions work on the principles of open and ethical participatory publishing, allowing their audiences freedom of interaction, and their journalists' full autonomy to decide on what and how news stories are published, social media platform threat will be gradually marginalized. In Internet environment characterized by the fast growth and penetration of distrusted online social platforms, what matters is not the amount and speed of news but its accuracy that helps inform, enlighten and empower the recipients and the society. What matters is the outcome, not the output. Social media from this perspective should be seen as an opportunity not a threat for mainstream news media organizations.

3. Social media and global journalism ethics

Obviously, unethical issues of traditional journalism are not exclusively related to or started with the introduction of social media platforms. Literature documented the failure of mainstream news media in meeting the universal standards of ethics [45]. Yet, the problem has

been intensified in the age of Internet in unprecedented way. Social media platforms challenge the essence of the profession and attack its ideals and norms as they are occupied by gossip, rumors, fake identities, and e-commercial activities [46]. The emergence of unlimited online communities interested in countless number of topics and interests, with and without any commitment to laws and ethics, brought endless troubles for the already troubled and disputed profession like journalism [47]. I cannot ignore the fact that these online communities help attain the fundamental function of the autonomous public sphere as stated by Jürgen Habermas [48]. There is no doubt that this new phenomenon has positively promoted the civil sphere; meanwhile, it comes at the expense of quality of journalism as it blurred the lines between professional and non-professional journalistic work [49]. The lack of reliable institutional and professional standards in addition to lack of experience, training, and education raises the question of what is journalism and who is the journalist in this new flux environment [47]. Here, one has to raise the question of whether the social media platforms have added to or extracted from the normative ideals of traditional journalism. Evidence show that, unfortunately, this new phenomenon has undermined the basic role of journalism. In democratic societies, the news media organizations fulfill two functions. First, they inform the public and serve as an open platform for deliberation through providing all opinions available. Second, they scrutinize those who are in power and watch their mismanagement [50]. To perform these duties properly, news media, Asp argues, should be fair to represent all partners involved in the news stories, informative to supply up-to-date accurate information, and finally serve as watchdog to hold powerful public figures accountable [50]. These ideals linked journalism to the universal value of objectivity where journalists are impartial, detached, or nonpartisan [51]. Without good and reliable information, citizens struggle to engage in a democratic system of governance, as evidenced by falling voter participation both during and after elections.

The role of journalism as watchdog to hold public officials accountable has been shifted to social media platforms, where anyone can be a watchdog to scrutinize the mismanagement and misbehavior of all in power. As Singer argues, anyone can publish anything with virtual impunity; moreover, the publisher can choose to remain anonymous. On the other hand, the two-way or multiple ways of communication encourage interaction and enhance democracy [52]. Singer's claim of supporting democracy is in fact unsupported by empirical evidence. What is more realistic is that, though information and interaction increased in terms of quantity, scope, and speed, its low quality impedes its potential role in fostering democracy. Existing literature points to the fact that despite the current global society is flooded by information through social media platforms and news media organizations, democracy is not being well served. Political participation is being deteriorated in Western and non-Western democracies. In contrast to the expectations of the optimistic view, the most obvious impact of social media upon democracy has been its disruptive capacity for traditional political practices and institutions [53]. In other words, disinformation, misinformation, and fake news of social media platforms cannot contribute to creating the informed citizen; rather it converts him to be apathetic, inactive with no or little political efficacy. In his review of the contemporary history of digital journalism, Ben Scott points to the crisis

created by the new social media platforms. Rather than being the rescue for journalism by restoring a public service mission to create a better civic life, he concludes that these platforms are steps in the continuous deterioration of journalistic quality and democratic values [54].

Practicing freedom in the absence of responsibility either from inside the individual, organization, or society resulted in proliferation of unethical acts that not only limit the power of these platforms but also endanger off and online journalism as well. Perlmutter and Schoen, 2007 listed a number of unethical problems of social media platforms as follows:

- lack of fact-checking and editorial oversight;
- lack of logical coverage of topics;
- rumors and lies dissemination;
- privacy invasion;
- plagiarism and copyright violations;
- lack of accountability; and
- deception, manipulative practices, and undisclosed conflicts of interest [55].

Among the ethical problems of social media platforms is the use of hyperlinks that allow journalists to feed their stories with a wealth of information [56], and while enriching the news, it makes it difficult to identify the responsible person in case of ethics violation [57]. This is simply because the content is changing every second to the extent that accurate, fair, complete, and balanced coverage of any event would be impossible [57]. The immediacy brought by the social media platforms, where everyone is a potential publisher, allows for even less deliberation by the journalist and editor who try to compete with social media platforms [58]. This has created a verification problem because content can be changed, manipulated, or removed out of context from the original [59]. Furthermore, the acceleration of the news cycle has raised concerns about the erosion of the discipline of verification among journalists themselves [60]. The verification problem, in turn, negatively affected sources and message credibility that has been the asset of journalism. Credibility has been connected theoretically and empirically with perception of trustworthiness and expertise. It has been measured with survey research asking the public to report their perception about bias, trust, fairness, and accuracy [61]. The erosion of credibility of social media platforms was explicitly stated in the call of the Vice President of European Commission Frans Timmermans who said: We live in an era where the flow of information, disinformation, and misinformation has become almost overwhelming. That is why we need to empower our citizens with the mechanisms to identify fake news and check accuracy of content they receive [62]. The structural characteristic of social media platforms allows its users to be anonymous. They can transfer information to others without specific identity. Moreover, someone may take someone else's words and

modify or change them or grasp someone else's identity and disseminate information and news as if they were belong to the other. The communication system of social networks is susceptible to disruption. Individuals are more likely to behave in undesirable ways when they are anonymous [63].

In this context, it is worth to emphasize the notion that social media fake news and unethical behavior can be an opportunity for journalism credibility. The ethics collapse is seen by Charlie Beckett, a professor from the London School of Economics, as a wake-up call for off and online journalism to be more transparent, relevant, and to add value to people's lives [64]. In face of crisis of "information disorder and the unethical public relations communications," ethical journalism should remain as the central pillar of a sustainable model of practice even while fighting financial and trust crises [14]. The journalist no longer has much if any control over what content people use, nor what items they think are important. As a result, the influence of off and online journalism in setting the agenda of the publics and in shaping the political life, in general, is being weakened. In such an open and overcrowded media environment, the mission of the journalists has to be shifted from being information disseminator to an emphasis on ethics [52].

One of the explanation for the discrepancy between off and online journalism in one hand and social media platforms on the other hand in terms of amount and type of ethics violations could be found in Shoemaker and Reese's Hierarchy of Influences model. The model posits that constraints on traditional media content occur at five different levels: the individual, the routine, the organizational, the extra media, and the ideological level [65]. Research has shown that off and online journalism are constrained by the five layers of constrains, and therefore, they tend to be relatively ethical even if not independent. News is detached from journalists' interpretations. Mainstream news media journalists are observers rather than interpreters. Social media platforms, in contrast, are free from the five layers of constrains and thereby there is no separation between news and information they constantly provide and their own interpretations [66]. Hence, all sampled guidelines examined in a number of studies framed social media as risky and dangerous tools. News media institutions also revealed their anxiety about their journalists' uses of the social media platforms [67]. Similarly, the Social Media Today report suggests that 49% of people in the United States have heard breaking news via social media that turned out to be false [68].

4. Conclusion

The initial step to examine the implications of social media platforms for global Journalism ethics is to recognize the fact that journalism ethics entered as Stephen Ward puts it in its fifth stage, a stage of overlapped media where communications technology blurred the boundaries between traditional mainstream news media and social media platforms [69]. Publics at this new stage access news and views from multiple sources, some of which are offline, some are online—extended version of offline copies, the third category are purely online with no affiliation to the profession, that is social media or citizen journalism platforms. Historically,

ethics was developed for a journalism that reports locally to address local public based on the nation-state borders. This logic is no longer exists where journalism has become global in terms of technology, geography, cultures, identities, and interests. Due to this transformation, several studies during the last decade tried to expand the conceptual and empirical base of journalism ethics as a discipline [69]. Due to globalization of communication technologies, the society to which journalists now have to be accountable is not as easily defined as before three decades ago. News media organizations are now invading the four corners of the globe [70].

The core question here is: Should ethical values for off and online journalism be seen as particular to the sociocultural context in which journalism operates, or are there universal values that could guide journalists around the world irrespective of their cultures and locations? [71]. Social media platforms whether we consider them as communication technologies or different ways of communication provide the practical need to think about a model of journalism ethics that transcends geography and indigenous cultures and that considers what is common among all civilizations and cultures. One implication of social media platforms is that media scholars and university professors should "de-Westernize" journalism ethics [69]. In the sense that centrality of Western model of journalism ethics should be questioned, non-Western journalism values and norms should be globally considered in scholarly conferences as well as university textbooks and professional circles. We are in need of more critical theories to resist attempts to impose a hegemonic system of Western ideas and values on other cultures, especially "neo-liberal" ideas ([69], p. 5).

At this stage, an important question should be raised: Do we need to completely ignore the current ethics and think about a different model that suites the new communication technologies of social media platforms? My answer is that ethics are the same irrespective of the channels of communication, be it off or online. Yet, communicators, professionals, and policymakers have to think about ways of self-regulation to help monitor the previously mentioned ethical problems related to technology per se. The challenge that social media platforms brought for journalism ethics is tremendous and not easy to be overcome. What journalism ethics could be in this liquid time of newsgathering, production, and dissemination where every citizen irrespective of his/her cultural background, education, ethical orientation, and respect for others can circulate news and views in one click. Currently, we have two different models of journalism ethics: one that governs the off and online journalism as defined in this chapter where professional journalists try to apply the ethical standards differently and sometimes with bold violations to universal values and norms. The second model prevails among citizen journalists who occupy the larger amount of the public sphere and who are likely more readable and usable by the public everywhere. According to the traditional ethical model, journalists are truth-seeking professionals who aim to offer factual, accurate, and balanced coverage people can trust [72]. On the other hand, the citizen journalist model does not care about accuracy, verification, objectivity, balance, and truth telling; what he is interested in is spontaneous; and quick publication of anything at hands assuming the responsibility of the users to verify or not to verify what they consume.

The dilemma here is whether the traditional model journalist should integrate with social media platform citizen to cope with the technological determinism, leaving his genuine ethics forever or he should behave independently to safeguard his identity and to cope with what I call ethical determinism? The right answer is none of these options is reasonable and practical as both have their weaknesses that jeopardize journalism profession and ethics. The fact is that mainstream news media journalists have become an integral part of the social media platform. A recent study conducted in Sweden, which is known for its heavy social media use, found that 71% of journalists in the country use social media privately or professionally on a daily basis [73], and thereby, any initiative for refining or developing journalism ethics should not ignore the overlapping usage of both professional and non-professional journalists for social media platforms. Secondly, saying that current journalism ethics is no longer relevant nowadays is a false assumption, as the core of ethics throughout history of journalism (print, radio, and television) is the same. What is new at present time is the new technology that requires different technological ways to trace and identify all issues raised in this chapter, which is built in the structure and the logic of the Internet free and interactive technology rather than the human being.

What I propose is an evolutionary model of traditional journalism ethics that while consider the technological determinism requirements, it does not accept negotiation over its original ethical orientations. In other words, while adhering to the traditional model of ethics, professional journalists have to apply what I referred to earlier in this chapter: the principles of participatory, interactive, democratic, and at the same time ethical journalism. A good journalist according to evolutionary model of ethics is keen to listening to and reflecting a variety of voices and stimulates discussion and engagement with the public and within communities [74].

In this context, Hamada has introduced a comprehensive global ethical model rooted in Islamic cultural theory [45]. The model is based on four guiding principles: respecting pluralism and cultural diversity, freedom of expression, justice, and moderation. What distinguishes the Islamic ethical model is its human universal ethical values that should be given priority over political partisanship, national and personal interests, or technological determinism. The essence of the model and its strength stem from the fact that it seeks to create the balance between what is global and local, what is native, and what is not to the extent that it defends both universal solidarity and cultural differences. It is a cross-cultural ethics model, designed to overcome several shortcomings of other important but biased toward Western hegemony paradigms [45]. The model looks at differences of other competing cultures as opportunities rather than threats. The principles of openness, interactivity, engagement, participation, and respect of others guide the model; therefore, it is developed to cope with social media platform challenges while appreciating the original ethics of journalism. Recently, a number of scholars affiliated to "Worlds of Journalism Study" have examined the principles of this model in 12 Muslim-majority countries including 3500 working journalists in Africa (Egypt, Sierra Leone, and Sudan), Asia (Bangladesh, Indonesia, Malaysia, Oman, Qatar, Turkey, and the United Arab Emirates), and Europe (Albania and Kosovo). Although the authors developed a little bit different model of Islamic Ethics, they conclude that journalists' roles in Muslim-majority countries are not so much shaped by a distinctively Islamic worldview as they were by the

political, economic, and sociocultural context in which the journalists work [75]. Finally, although the Islamic model as suggested represents a practical approach tackling challenges raised here, it should be complemented by empirical and analytical investigations to monitor how and why social media platforms endanger off and online journalism at different cultural contexts and how the latter should be reoriented and reconstructed; otherwise, our civilization will enter in a self-destruction process.

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Chapter 4

An Evaluative Study of Influence of Social Media on Journalism: Interference or Professional Advancement

Kinshuk Pathak

Additional information is available at the end of the chapter

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Abstract

Journalism is an established profession in the society across the globe. With the sudden increase in social media technologies in last few years, the nature of Journalism practice has been significantly influenced. Due to added value of social media traditional journalists have consciously embraced this technology for delivering and promoting their work. Enormous literature is available on impact of social media to journalism practices leading to various perspectives. Yet least qualitative studies are available on the perception of journalism practitioners on their professional interaction with social media. The study is an attempt in this direction to find out the professional impact of social media and the active role being played by the journalism practitioners to embrace the technology. It also attempts to find an answer to that whether the advancement of social media technologies in journalism practice is interference or professional advancement.

Keywords: journalism, journalism practices, social media, Web 2.0, communication, social participation

1. Introduction

The emergence of new media technologies in recent years has changed the face of journalism practice. "Each new development in the world of journalism seems to change the way the consumers receive their information and each new development in journalism lead to a decline in one form of media consumption and a spike in consumption of another form" [1]. "Journalism is experiencing considerable changes linked to social, cultural, economic, and technological transformations" [2]. Social media is an extension of Right to Freedom of expression in a virtual world. Social media has brought new characteristics like interactive dialog and social

interaction which can be used by the Journalists for real conversations with their audience [2]. "In the 2017 Global Social Journalism Study, 75 percent of journalists describe social media as *completely* or *to a large extent* necessary to promote and distribute content" [3]. News organizations have also started adopting social networks for sharing news and information with the decline of circulation of print copies of newspapers.

Take into consideration of the changed structure of journalism practices with the influence of social media the current work was intended. The basic intention of this chapter was to find out the usage pattern of social media and find answer to the research question that whether social for journalists is interference or professional development.

2. Social media

Social media has been defined from various perspectives. A range of interpretations can be found in the area. Some of the prominent ones have been mentioned below:

Technopedia [4] in nutshell refers social media to be an umbrella term for various internet based applications which lends end users the ability to create contents and mutual interaction.

University College London views social media as a technology that affords 'social scalability'. It argues that traditional media was divided into two parts: (a) public broadcasting for large group and (b) private communications for small groups which has been bridged by the social media. The social media bridge over the public and private media has created media sociality lending an element of scalability for information dissemination among the largest and smallest group [5].

Encyclopedia Britannica [6] has defined social media as technologies, platforms, and services that enable individuals to engage in communication from one-to-one, one-to-many, and many-to-many. Kaplan and Haenlein [7] in their most cited work view social media as a group of Internet-based applications that build on the ideological and technological foundations of Web 2.0, and that allow the creation and exchange of User Generated Content.

On the other hand, Carr and Hayes [8] defines social media from a technological perspective as Internet-based, disentrained, and persistent channels of mass personal communication facilitating perceptions of interactions among users, deriving value primarily from user-generated content. McCay-Peet and Quan-Haase opines that social media are web-based services that allow individuals, communities, and organizations to collaborate, connect, interact, and build community by enabling them to create, co-create, modifies, share, and engage with user-generated content that is easily accessible [9]. Burgess, Marwick and Poell have defined social media as digital platforms, services and apps built around the convergence of content sharing, public communication, and interpersonal connection [10]. Miller et al. argues that social media should not be seen primarily as the platforms upon which people post, but rather as the contents that are posted on these platforms [11]. On the other hand, Hopkins views Social media as computer-mediated communication software that enable users to create, share and view content in publicly networked one-to-one, one-to-many, and/or many-to-many communications [12].

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3. Social media platforms

According to purpose and function FEMA has classified social media into seven categories [13].

3.1. Social networking

Social networking platforms are informal means of communication to discover people with similar interests and connect virtually. They can be in the form of social websites or applications. According to Boyd and Ellison social network sites can be considered as web-based services where individuals can (1) create a public or semi-public profile (2) articulate a list of other users with whom they share a connection, and (3) view and traverse their list of connections and those made by others within the system but the nature and nomenclature of these connections may vary from site to site [14].

Examples: Facebook, Twitter, GooglePlus, and LinkedIn.

3.2. Blogging (using publishing websites)

Blogging is a personal online virtual diary to record ideas, stories, articles and many more things.

Examples: Wordpress, Blogger.

3.3. Managing multiple social media platforms

An aggregator is a tool that can be used to "aggregate social media site feeds in one spot, allowing users to search by keywords."[31]

Examples: Hootsuite

4. Objective

The work has been carried to meet the following objectives:

- To find out the usage pattern of social media by Indian Journalists.
- To know the perception of journalists about social media. Interference vs. professional development.

5. Methodology

In order to meet the objectives, journalists engaged in news channels of India were considered as sample for the study. Further, only Hindi and English news channel were included in the

study. A questionnaire designed using five point Likert scale was presented to the journalists. Those who responded to the questions were interviewed through video conferencing.

6. Data analysis

About 350 questionnaire was distributed to the journalists of Hindi and English news channels. Out of 350 distributed questionnaire 150 submitted the completed questionnaire. Response rate was 42%.

Table 1 shows the list of news TV channels that were part of the study.

Out of 150 submitted questionnaires 40 (26%) were from English news TV channels and remaining 110 (73%) were from Hindi news TV channels. Moreover, 98 respondents were female and 52 were male.

The summary of usage pattern practiced by the Indian journalists is presented in **Table 2**.

It reveals that majority of journalists are utilizing the social media tools to keep the readers abreast of recent developments around the world. Most striking is the fact that majority of them respond to user's view and are engaged in active communication.

It was astonishing to further note that about 95% of respondents were virtually present on their social media platforms 24 × 7. Also, they pointed out that various news channels are running campaign or episodes to curtail the false information and evaluate the information shared over the social media platforms. **Figure 1** shows the average time spent on social media platforms.

The journalists were then asked to give their opinion on social media as interference or professional development. About 96% of the respondents considered social media as a vital tool for professional development. Many of the respondents cited many uses of the social media which has helped them to excel professionally. Some of the opinions are mentioned below:

"In a global economy, media professionals cannot confine themselves to purely local connections due to which social media is inevitable".

"Through social media information is available 24/7 and you have the power to decide when you want to access it and for how long".

"In an era of information overload, social media is only platform where flow of information becomes overwhelming by looking for ways to narrow focus (e.g. Twitter lists, which allow you to group those you're following in categories and better filter your results)".

"Through social media one can look for groups that focus on your career/discipline area, connect with alumni or represent professional groups in your field".

"Online communities created in these social media spaces provide opportunities to share resources, spark questions that expand collective learning and make connections that sometimes lead to employment offers, consulting requests and collaboration opportunities".

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Hindi news TV channels	
1	Total TV
2	News World India
3	DD News
4	IBN7
5	India News
6	NDTV India
7	India TV
8	Live India
9	ABP News
10	Zee News
11	News 24
12	News Nation
13	CNBC Awaaz
14	Khabar Bharti
15	Aryan TV
16	Jan TV
17	Lok Sabha TV
18	Aaj Tak
19	Tez TV
20	Samay
21	Hindi Khabar
English news TV channels	
1	Bloomberg Quint
2	BTVI
3	CNBC TV 18
4	CNN News 18
5	NDTV 24 × 7
6	News 9
7	News X
8	Republic TV
9	Times Now
10	WION

Table 1. TV channels under study.

Posting images	70%
Sharing news	80%
Tweeting news	75%
Respond to reader's views	92%

Table 2. Usage pattern.

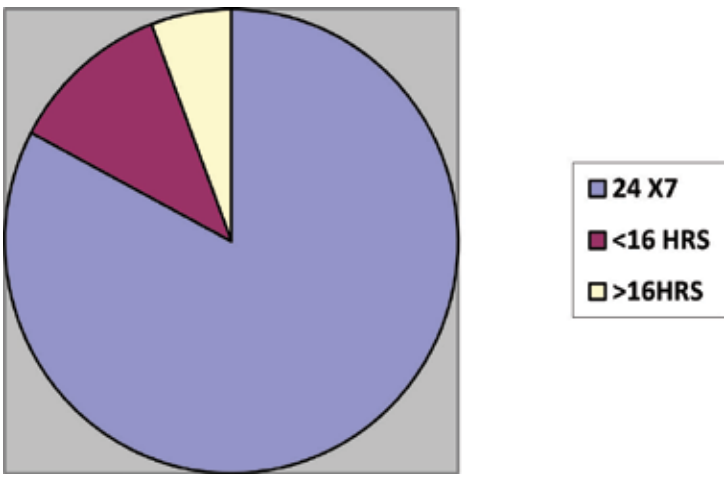

Figure 1. Average time spent on social media platforms.

7. Conclusion

The advent of social media has offered news organizations an enormous potential to market their contents, wider-reach and frame brand image. Either in the form of conversations or newspaper clippings, social interaction has remained a viable source for dissemination of news. However, this form of interaction has become virtual under the impact of social media and extended the news coverage. The significance of social media lies in proper understanding and adoption of various tools. The way social media is reshaping journalism, journalists have positively adopted the change and performing their duties more efficiently in keeping people abreast of recent developments.

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Section 3

The Technological and Economic Evolution of Social Media

Chapter 5

Journalism and Social Media Frame Social Movements: The Transition to Media Matrix

Alonit Berenson

Additional information is available at the end of the chapter

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Abstract

Audiences all over the globe are experiencing an unprecedented communication challenge. The intensity of the transnational media platforms and the rapid media distribution information implies a huge adaptation and interaction to diverse media technologies. These have created a transition in the culture of citizens' acts, creating the era of "Media Matrix." The printed press and the television still today cover the social movements' demonstrations playing an important role in which these are revealed to the public. The importance of the news framing and Internet, as well as social media, depends upon one other crucial component for the social movements' visibility. The present study aims to offer a theoretical reflection on this issue describing a three-stage analyses, which the media coverage underwent. The study describes the different stages in the coverage and "news-making" of social movements, which brings us to today's matrix era. Furthermore, it also deliberates the impact this phenomenon has had in the civil society.

Keywords: journalism, social media, social movements, news, social protest

1. Introduction

At the beginning of the twenty-first century, as the Internet entered the world of communication, the journalistic media underwent a profound change adapting to the new news-making wave. The old "traditional printed press" changed its old format and adjusted itself to the new media formats, that is, the digital media. Online journalism, for instance, 24/7 Internet broadcast news via websites, and smartphones has established itself as a constant presence in the virtual world. The news new platform of diffusion, commentary articles, and the

television broadcasting - have depicted a new complicated picture in need of interpretation. These innovative circumstances allowed a huge transformation in the industry of journalism and its practices.

The aim of this chapter is to provide a better understanding of the transition occurring in the journalistic practice in the coverage of social protests. The present three-stage model is a framework to understand the relationship social movements-media during the last few decades in framing this kind of events. The first stage comprises the predominance coverage of social movements by the exclusive of traditional media printed media, television, and radio. The second stage is the digital media, Internet in the press web sited one-way communication. The third stage is the interactive virtual media - social media as part of "Media Matrix," a variety of representations with constant re-mediation and "panmedia" media contents in the virtual world in diverse information platforms, available everywhere at every time in the smartphones.

The question that needs to be asked is to what degree the media have been encouraging social change by employing researchers from the social sciences during the last few decades. Castells et al. [1] have pointed out that the wireless media was more quickly absorbed than any other communications technology in history. With the establishment of the use of the smartphone space and time ceased being barriers. This changed the practices and contexts of social movements' interaction in a range of areas—including protest activists. These ways of communicating made it possible for people to reconstruct their views on governmental institutions as never before. Similarly, these communication technologies made cross-continental ideological and strategic brainstorming activity possible in civil societies in order to advance social change through the use of more efficient unifying contacts to advance political interests and shared political identities.

McLuhan and Force [2] observed the dominant communications media in society as the explanation for the development of the national state that was the outcome of the dominance of the printing press technology in Europe prior to the drawing of national borders. Later, predicted that television would cancel out these borders because of the features of the technology involving the transfer of information that, to a great degree, was returning us to the era of oral communication. He defined this new phenomenon the "global village" without national borders nations would return to live in tribal frameworks. The adoption of this vision has provided the media as a social agent with enormous power. McLuhan [3] boldly predicted how the speed of the dissemination of information would convert the world into the present "global village" and this is a vision that has been brought to fruition by the Internet network. People all over the world share ideas and exchange messages in real time and are able to provide real responses to each other about ideas and activities.

Thus, arises are the question to what extent the media influences in the process of group identity construction? This study's aims is to help decipher by means of a three-stage model, what is the contribution of the communications technologies in the social changes processes, and how they influence and strengthen existing identities, create new identities or, alternatively, lead to the disappearance of identities such as the national state.

The new communication systems challenge the old traditional media. The digital technologies have provided with unprecedented wide-ranging communication options. This, in turn,

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has led to an exponential increase in the range of platforms that host political content. The old established media, consecutively, has continued to fashion the backbone of the communication system by adjusting to the changing reality. The political communication communities thus, navigate themselves through a maze of complex communication possibilities. In our three-stage model, we explain the different stages of relationships between the media and the social groups. These are: (1) Traditional media; the printed and electronic journalism coverage of social movements events; (2) Web 1.0—traditional journalism adjusts to the Internet still being one-way transmission; and (3) The media Matrix Era—introduction of the smartphone, Web 2.0, interactive communication, and "pan-media."

The development of the presented three stages model has significantly influenced the diverse strategies used in the different social movements activities. Especially at times of social protest calling for changes in policy of the political elites, in attempting to exert influence upon policy in the decision-making process.

2. Traditional media, the printed and electronic coverage of social movements events

In the first stage (of the model), the traditional media and the printed journalism had hegemony over the editing of news content, which included social movements activities, and especially social protest events. The coverage which arose out of different interests, such as economic interests and rating considerations [4] created the construction of a reality by journalists in which the dependence of social movements upon the news media was created. In contrast, today's widespread use of smartphones, and their unimaginable and unprecedented presence of the Internet in it makes it possible to discuss and access to information during the coverage, or not, of contentious moments.

The tactics of journalism news coverage play an important role in our perception of a protest and its legitimacy in the public agenda-setting. Framing and "media logic" are means to presents these narratives. Framing means the processes in which journalists, who are in the dynamic process of constructing meaning, present their interpretation of subjects and events in the form of a news narrative. Framing means the process in which the journalists choose and categorize information. They choose the arguments and adopt a position. In so doing, in fact, they create a frame in the consciousness of the subscribers [5]. It is generally associated with the term "agenda setting" in which the journalists decide "what is important". It is "agenda setting" that defines what is "worth reporting" for public attention. Entman [6] defines as the emphasis placed upon the reasons for the problem, its moral judgment, and suggestions for the best way to "deal" with it [6]. Framing thus fulfills an important task in the structuring of the reality that is presented covered in interpretation using metaphors or selected connotations suited to the chosen narrative [7]. "Media logic" refers to that the mass media gained power not only by cementing their institutional status but also by developing a commanding discourse that guided the organization of public space. The formal grid of understanding that steers information, news, and communication was effectively exported to vital areas beyond media organizations, where mass media gained legitimacy mostly through the influence of its logic [8]. According to McQuail [9], by framing the image of the reality,

the information is presented in an interpretive coverage, and it is considered to have a strong influence on the structuring of social reality. Therefore, journalism discourse is part of the process by which individuals construct meaning, and form a public opinion, developing and crystallizing meaning in the public discourse [7].

2.1. The battle for the narrative

To gain journalism support is important for the protest event. On the one hand, the mass media needs the social movements to "make news" but the interests of the movements' activists and the journalists are not often compatible. Gitlin [10], a pioneer scholar-researcher, in his seminal book *The Whole World is Watching*, describes the connection between journalism coverage and new leftist groups protests, active during the 1960s in the United States. He clearly expressed the problematic nature of the relations between these groups and the media. He found that, during the framing of coverage, it assisted this group to garner wide support. However, most of the time the coverage of social demonstrations is negative [10]. Journalism mostly focuses on issues such as drama, conflict, struggle, and personalization (of figures) that will allow it to be newsworthy. In contrast, the social movements were interested in spreading their ideas to the wider public and their mission was to attract media (and public) attention to their causes while the journalists often do not focus upon problems or the issues the movements raise but act according to other interests such as rating considerations for the commercial advertisers [4]. Thus, journalists not only focus on coverage that presents characteristics of violence and conflicts or the personal details about the leaders of the struggle. But also, also prefer to rely upon information that comes from sources that are linked to political power bases and safety organizations such as the police, because such sources provide "office narratives," the points of view of the elites are given preferential treatment in the coverage [11]. Social movements must struggle to gain attention and when they are included in the coverage they are treated to framing, which creates an interpretation of the issues that they are raising and for their activities, which do not always suit the agendas they are aiming at so that they mostly receive negative coverage [12, 13].

Thus, raises the necessity of asking questions about the mechanisms that determine why there are events that are included in the media coverage while other events are left out. News values, the gate keepers of the mass media, the cruel competition over the available room in the journalistic space are everyday realities for the social movements and their chances to gain visibility in the news.

In coverage done on social groups, one can quite often see that the news media take on the role of news frame fashioner when journalists present a position for or against certain social movements [14]. Moreover, the autonomous role played by the media in the choice of news items and their content opens the gates to some groups but not to others. In an essay written by Smith et al. [15] it seems that sometimes the coverage subverts the agenda of the protest events. They find that the coverage tends to focus on both the drama of the event such as violence and arrests and go on to conclude that the social movements have failed in their attempt to attract the public's attention to the subjects of the protests to which they wished to mobilize them. The mass media tends to frame the protest as a "passing episode" in which the role of

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the movements was supposed to have been the presentation of the "subjective" narrative of the protest. In fact, in the results of an earlier research literature [15–17] one can see that in the journalistic coverage journalists tend to create a clear division between the protestors and the public in which the protestors are presented as being a factor that is breaking the rules of what constitutes urban life. The bias of such coverage makes both the mobilization of protestors and the public's attention that the protestors are trying to attract difficult, which, in turn, also makes it difficult to arouse public debate about the subjects the protest was demonstrating about. If protestors are presented as those who are violating the public's daily routine and disturbing the peace then the result is a drop in the support for the demonstrators, the demonstration, and its agenda-setting. An opposite trend to these findings can be found in the research that examined the coverage of demonstrations against the war in Iraq in eight states [18] in which they found that the demonstration and its agenda attracted a great deal of coverage and even received the support of people from all sections of the public. The newspapers paid a lot of attention to the claims made, the slogans used and to the narrative of the protestors while emphasizing their arguments against the war in Iraq.

Even though, in the professional discourse, the journalists use the words "news report" and "story" there is a misunderstanding in the culture about recognizing that these same journalists who are dealing with the news are also creating selective narratives. The way Bird [19] sees it arises out of the tendency to relate to news as facts that can be verified, but the news is a cultural construct, a narrative that tells a story about new and important events. Oring [20] notes that it is an illusion to think that the news reflects reality and argues that all the choices made in selecting a media text are determined by the editors and writers. Similarly, the journalistic coverage is not free of emotional content and values since journalistic writing is creative and is the product of constructing reality from the point of view of the journalist [21].

The journalism, which covers things on the national and international levels, bring major conflicts to the attention of the world, and for most of the people around the world, the news is the essential sources of information about conflicts, struggles, and even wars that display the collective destruction of human dignity. This mediation of the conflict has important implications for the way in which the audience of news subscribers, including the leading decision makers, react to events [22]. This is in light of the encounter between different variables such as political pressures, economic motives, local outlooks, professional styles, and the mechanisms of human perception. Some of the conflicts are considered to be more important for coverage than others and, as a result, some of the events receive more attention than others [23]. "Media logic" is responsible for creating a format for the reporting of conflicts and the tendency is to emphasize violence and to present the visual dimension as support for the chosen narrative. The report aims for less critical thinking, emphasis on the winners and losers, the creation of differentiation between "us" and "them" and the drawing of "them" as the source of the problem. It has sometimes been found that routinely the news and its values tend toward escalating the conflict in the report. Thus, the report about the conflict tends to choose a side for the news consumers that provide them with little information about the socio-political context and the historical perspective of the reported upon event.

3. Web 1.0—traditional journalism adjusts to the internet

Throughout the 1980s and into the 1990s the business of printed-media underwent a crisis because of the public's preference for the electronic media and this crisis was expressed in a fall in the sales of newspapers and the competition over advertising between the newspapers and commercial television [24]. Newspapers were purchased by profit-seeking corporation that, according to McManus [25], were seeking ways to maximize the profits of their investors. McChesney [4] notes that there was a crisis in democracy in the US and the rest of the western world following the creation of partnership deals and cross-ownerships involving media, which was something that damaged the necessary conditions for preserving the quality of the democracies. He also points out the concentration of ownership, the greater commercialism, and the decline of the traditional and professional newspapers and relates this to the globalization of partnerships in the field of the media. He also relates these to the neo-liberalist global economy as reasons for the collapse of the idea that the role of the media is to provide a service to the public. Consequently, the media serve the needs of commercial factors (the owners of the media, investors, and advertisers) and not the wider public. For example, in 1999–2000 a number of massive deals were made in the area of the media, media corporations broadened their activity on the global level and the absence of limitations on cross-ownership paved the way to colossal deals being made. The ownership of a number of media creates a concentration of management and decision making and these do damage to journalistic pluralism, see [4]. Some of the difficulty arises out of the need to justify selection in the news that deals with certain subjects or events that preserve the status quo. The claim is that as long as there are no shocks and the status quo is preserved the business cycle will also be preserved. Another problem that arises from this policy is the unwillingness to deal with investigative journalism at all, and especially not to express criticism of business bodies that are sources of income for the newspaper. Like all commercial bodies, the media try to maximize their profits and, in general, commercial enterprises that advertise in the newspaper receive complimentary coverage. According to McChesney, this kind of behavior causes the newspapers to behave unethically and unprofessionally. All of the above are part of the outlook of the western journalism at the beginning of the twenty-first century [26].

As a result of the influence of the commercial owners of the newspapers, journalistic framing expresses itself in the selection of the subjects or events that will be included or made prominent in the coverage or will not be covered at all, particularly when it comes to protesting against hegemonic economic policy. An example of this is the coverage given to the summit meeting of the World Trade Organization (WTO), which met in Seattle in 1999. The journalists did not want to cover the protest events because of their support for global capitalistic economics and because of their views about the modern liberal ethos that supports trade, the increase of commercial activity, and the growth of sales outside the USA. Taking into account the finding that their main advertisers are corporations that are trying to grow their cross-border markets, there is a need to avoid reporting about the protest agenda or, at least, to create framing in reports made about such events, see [4]. Journalists are motivated by business considerations when they choose subjects to cover and business factors exert pressure on the journalists to write positively about the globalization of capitalism and to relate to the

protestors against the WTO with expressions of doubt, suspicion, and even disappointment. In the news coverage of events of this kind, the emphasis is placed upon the damage done to property, the violence of the demonstrators and, in contrast to this, the activities of the police.

Underwood [24] sees another reason for journalistic framing and argues that newspaper marketing, by paying attention to the issues that concerned the public and today the newspapers are planned and "packaged" to "give the readers with what they want" ([24], p. xii). Underwood uses terms such as "reader driven journalism" ([24], p. xii) and "customer driven journalism" ([24], p. xiii), which means that the readers influence the contents and character of the newspaper editing and an expression of this influence can be seen in the management of market research and public opinion polls.

It is important to emphasize that some of the newspapers in the world have even adjusted to the technological developments of the Internet and have built new online sites in order to keep up with news updates online and turn the printed newspaper of tomorrow into something irrelevant. Moreover, the newspapers have adapted themselves to the Internet era and are giving less emphasis to the news and more to commentary articles and opinion columns. The components of the newspapers have also changed and we are now witnessing to the addition of special supplements devoted to the sport, economics, health, and other topics that may interest their audiences. The above-mentioned phenomenon was acceptable until "fast-growing networks like Facebook and Twitter with millions of active users are rapidly penetrating public communication, affecting the operational and institutional power balance of media systems" ([27], p. 3), which switch us to the third stage of the model.

4. The media matrix era: introduction of the smartphone, Web 2.0 interactive communications

4.1. Social movements visibility's emancipation

The distinction between the role of the newspapers, on the one hand, and the Internet, on the other is important and significant. According to Castells [1] mass self-communication has displaced mass media. Let us describe the distinctions between them. The later, traditional mass media is characterized by its centrality, professional-produced and private proprietary, informing in a one-to-many format. In contrast, mass self-communication, or social media is basically decentralized, peer-produced, nonproprietary, based on open-source platforms, informing in a many-to-many format, and basically free access and distribution or inexpensive (cited in [28], p. 485). Hence, protesters coverage is framed accordingly to each segments interest.

Rheingold [29] argues that there was erosion in the media and free discussion following the increase in manipulation that was being carried out in the news and public opinion by governments and corporations through advertising, public relations, and information management. While television had turned into a means of entertainment for the purposes of profit, the Internet, in his opinion, was an objective electronic forum through, which citizens could take part in the rational discussion and so revive public opinion. Rheingold focuses on structures

of control - meaning the way in which the new electronic networks make the creation of new structures that bypass the existing institutions possible. In his opinion in any place in which the media is mediating there is a computer available, a virtual community grows and this phenomenon also reflects the "hunger for community" ([30], p. 6). The virtual sphere becomes the new public sphere [48]. On The background of the death of the public space in our lives, the electronic community acts as a framework for the development of collective values. In contrast to the system of one-directional broadcasting that transmits information from one source to many subscribers who do not have the ability to react to the information they receive the Internet provides the free interactive approach. The interactive media makes it possible for many and varied voices to be heard, which creates democratic pluralism and, through this, the Internet global electronic communities can exist as can new forms of fashioning sharing, community, and democracy.

The information and communications technologies, which operate through the cellular telephones and the world-wide Internet web, change the ways activists connect up, cooperate and go out to social demonstrations. The architecture of the activities of the social movements changes because of the mobile phone, which is used to arrange the demonstrations in a way that bypasses the country's authorities, including the network of barriers and restrictions. The technology also facilitates rapid and widespread mobilization structures, which attest to its being a mechanism that allows individuals to organize themselves and join up with collective activity through the sharing of information about such things as new social structures and new repertoires of action strategies.

Available and shared support for the organizational system led to widespread mobilization and conventional forms of demonstration, which contributed to the rise in the active participation of social movements. The new information technologies make things quicker through the way they allow the news to flow to the citizens, especially those that include current and relevant information. In this way, an information environment is created that provides a flexible and variegated environment that includes information that is passed on through different forms of communication via photos, audio and video, and represents the dynamic sharing of these technologies by the users. Information crosses physical borders in such a way that the speed with which it arrives deepens its penetration into the social movements operating in the demonstrations during the last two decades.

The printed press and the television are those media that still cover the demonstrations and even play an important role in the way the demonstrations are revealed to the public – including how the demonstrators look. The importance of the news and Internet media depends upon one other crucial component for the social movements and that is mobilization. The nature of the messages that will be passed on in the social networks and the printed and electronic media will play a significant role in the level of legitimacy of the demonstration and its agenda in the eyes of the citizens and it is this that can crystallize their readiness to be mobilized to support the protest and even to take an active part in the demonstration.

Research literature shows that, not only media protesters coverage is presented negatively, overstating the faults, partial toward protesters, and overlooking their main agendas, but also, is intended to have a better narrative by focusing on the erupting violence of the covered

events [11, 31, 32]. Furthermore, journalistic storytelling news media are likely to use sensationalism to attract mainstream audience [33]. In addition, when covering global demonstrations, the media tends to emphasis the outbreak of violence misleading the coverage [31]. Consequently, intended for forming public opinion, by overemphasizing sensational narrative, the press' framing coverage reports unacceptable violence and resistance [33]. Framing tools are specially used to build cognitive schema. Research scholars [21], discovered that the use of myths and archetypes, narratives, and values [34], via connotation and metaphors induce the spectator to think about the "what" and "how" is framed. Subsequently, journalists create and maintain the constructed schema by means of repetitive metaphors across events. In agreement with Meade ([33], p. 131), when an event coverage is trivial, hostile, and/or partial, the protesters' credibility is reduced to the non-participants' eyes. As a result, the media defines the worthy of public attention agenda setting, highlighting what should be audiences' moral judgments, and how it should be solved [6].

It is well-known that the media influence people's behavior and the media does not have the power to impose sanctions, to punish or to threaten and yet it does engender inspiration, reveals, advertises widely, and even accuses. The media has public influence. It can open people's eyes and arouse consciousness ([23], pp. 36–37). Wirston ([35], pp. 170–171) describes the information generation as something that gives strength to people throughout the world in a way that many years ago seemed impossible. The electronic media allow citizens access to an enormous and unprecedented amount of information. Earlier communication was carried out through the use of telephones, radio, and television, and later the Internet through the use of email, forums, social media, and varied shared sites, and ultimately it has been the smartphone that concentrates the presence of all the above to operate within the smartphone. When one deals with the question of how a communication medium contributes to changing the environment the answer can be found in the appearance of the cell phone at the beginning of the 1990s and the transition to the use of the smartphone in the middle of the first decade of the millennium. A turning point transition was created by the medium that changed it from being a tool used for carrying out a task to being a tool that shapes one's social environment. With the spread in use of the smartphone, space and time stopped being barriers to existence in a world that could mediate all the time, at any given moment. The search for an Internet connection in all places we get to has become something we can find in our own pockets, a part of ourselves. This changed practices and contexts in a range of areas including those of the protest activists, businessmen, in consumerism, in international communication, in newspapers, in culture and in entertainment, and others. The mobiles and the accessibility have turned us into being always available [36].

While the protest movements in the past used offline low-tech media technology, analogic print-based technology, posters, proclamations, and newspapers, now, in a period when everybody has a computer and mobile phone, one sees a move across to high-tech and the digital approach makes the widespread, rapid transmission of messages more efficient. This kind of media is the product of technological development and works online through the autonomous use wireless Internet networks while creating new communicative tools and platforms [26].

The Internet has provided opportunities for establishing online coalitions such as simultaneous mobilizations of lots of net users in cities throughout the world. The potential of the use of the

Internet for political goals has enticed many and the possibility of there being an "electronic democracy" in which the use of the Internet as a political channel for mobilization, participation, and the transmission of political information has appeared more promising and has even been partially actualized. Friedland [37] and Street [38] have presented different models according to which modern democracy can be assisted by computer communication to increase the participation of citizens in daily current discussions, in the use of expressing needs and demands to their representatives and to allow them to participate in polls through using computer communication. There are also researchers and thinkers [39] who believe that it is possible to use technology in order to create participative democracy in the style of the Greek polis.

4.2. Protester's new visibility

As aforementioned the essence of the relations between the media and the social movements focuses upon the term "visibility." Social players have an interest in the visibility of the subject matter they raise, in the media's coverage that acts as inspiration for the way the movements and their agendas are presented in the news. The Internet has created the opportunity for open discussion, which has somewhat liberated the dependence of the social movements upon the traditional media in the battle for news attention. Thompson (cited in [17], p. 4) argues, that presentations in diverse communication channels are about the "management of visibility" and the "struggle for recognition."

Researchers into social movements believe that identity is a key concept that can help us understand the naissance of the social movements [40]. Collective identity is a shared definition that is produced by individuals who have a shared link and who cooperate in the space of opportunities and limitations that are dependent upon the place in which they operate ([41], p. 33). A collective identity defines the boundaries of a group, its beliefs, and world view that basically helps in the building of trust as an essential stage in the acceptance of members wishing to join and will work for the benefit of things that, for them, are burning subjects [42]. A modern communications technology, the Internet network, created a mass social and political awareness and the challenge was to endow renewed power to citizens to strengthen the contact between individuals as an expression of "civil democracy". The new technologies have far-reaching implications because of the way they speed up the processes that crystallize the formation of a shared identity through language and symbols. The culture includes ideas and especially the shared values the human group that is shaping its identity ([42], p. 85).

Thanks to the involvement and efficient way, the Internet is used in a democratic and egalitarian way. With no gatekeepers more and more citizens in the world are making use of the Internet medium to get information, to inform others, and to build new political and social relations. The communications technologies actually appeared in order to change the ability of social movements to organize themselves politically with the help of "electronic support" [43]. As they oppose the information hierarchies of the traditional media, the Internet and the social networks provide a platform for a variety of "alternative" voices and make it possible for them to be heard [11, 17].

Together with this, in relation to traditional and virtual media it is important to note that, despite the advantages of the Internet because of the absence of the gatekeepers over the filtering and

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regulation of the information, there is a disadvantage involving the question of to what degree the information that comes up on the net is correct. What is the proportion between truth and evaluation? How much of the information is reliable and what part of it is misleading information? Or, for example, what part is played by conspiracy theories? In an environment like this citizen might continue to expect to receive information from the news media since they rely upon the professionalism of the journalists on the assumption that the rules of ethics are being preserved. Similarly, the desire to hear commentaries about current issues by experts in different areas will return us to the traditional media news also because of the amount of information on the net that does not allow us to identify the nature of the information.

4.3. The media matrix and the power of social media

At the end of the twentieth century and into the twenty-first century with the development of the Internet, the news is streamed to us rapidly in real time and to all over the world. Protest activity in one place can expand to wider parts of the same area and have the potential in the future to create motivation for activity everywhere. Evidence of this can be seen in the spreading of the protests that took place in 2010–2012 in Arab countries, in Europe and in the USA and, in Israel, there was the feeling of there being contagion between different areas and different countries even if the objects of the demonstrations were sometimes different.

2010–2012 will be remembered most of all for the social protests that became a powerful part of the political, social, and economic discourse in different parts of the world. The scope of the social protest broke through the boundaries of the nation states and aroused many citizens in the global space. We were witnesses to a flood of massive demonstrations that developed in a number of countries throughout the world and among the goals of most of the demonstrations that took place during these 2 years, were governments and their social policies but they also provided a strong international outlook upon democratic processes. At the end of 2010 and the beginning of 2011 social movements, in the name of democracy, began to blossom in the Arab countries of Tunisia, Libya, Yemen and others and took part in some of the wider demonstrations of the "Arab Spring". At the same time, demonstrators also initiated quieter demonstrations in the streets and squares of many European countries among, which were Great Britain, Spain, Portugal and Greece, and Israel. At the beginning of autumn in 2011 a number of protest activists in the USA, as a form of protest, broke into Zuccotti Park in the area of Wall Street in New York. A few weeks later the "Occupy Wall Street" demonstration began in New York and spread to other cities throughout the USA. The inspiration for the Occupy Wall Street (OWS) demonstration was the wave of protests that began in Tunisia and spread throughout the Middle East and North Africa eventually becoming what we today known as the "Arab Spring," and which continued through the "Social Justice" protest in Israel, the "Indignados" in Spain and the uprising against the austerity steps taken in Greece [27]. Hundreds of thousands of demonstrators identified with the significance and percolation of images and practices of a democracy that was in opposing, struggling against, and protesting the dominant economic—social system—whether this was against authoritarian or elected regimes. What was common to all these demonstrations, even if the context was different, was the use of the same tools of communication—the Internet and especially the social media networks. There are those who call the present period "revolutionary" or the "Twitter

and Facebook revolutions" and so on while those who are nostalgic criticize the saintliness that is part and parcel of the demonstrations together with the physical presence and the visibility in the public space. Those who oppose this will say that this is the public space of society that is emerging in the Internet era and even call this phenomenon "the political power of the social media" [28, 44, 45].

Together with this, it was mainly in the traditional media of printed and electronic journalism that the shaping of the public echoing could be seen. The news media play an important role in the shaping of the perception of the protest, the agenda-setting and the way these are handled for the subscribers throughout the world and in the eyes of the protestors, is an important social institution and influential player in the battle over the public discourse. The news coverage is important for a number of main reasons: (1) the coverage has a direct effect upon the ability to mobilize people to join the demonstrations and the recruiting of the media is a necessary early stage to achieve this. (2) Coverage by the newspapers creates either the legitimation or the de-legitimation for the existence of the movement and its issues in the eyes of the political elite. The importance of the news coverage here grows because in order to realize the demonstration's goal influence has to be exerted upon the decision makers and the process of decision making. (3) This reason deals with the question of whether the social movement will manage to gain supportive coverage from the media, which will allow the creation of a situation in which people who had not been interested in the demonstration's issues up till then begin to pay attention, examine the subjects and perhaps become allies of the movement. This is true for most of the wider public because a positive opinion that is widely accepted by the public is an important resource for the achievement of the legitimacy of the social movement's demands and will become a powerfully influential political tool.

Social movements sometimes succeed in their ability to breathe life into new ideas in the public and media debate. It is true that the basis of the information is transmitted through the social media but the public echoing, to no little degree, is created by television—"the tribal campfire"—particularly by the central news broadcasts.

There is, allegedly, a battle between the social media that expresses itself through the Internet sites and uses them to mobilize and gain support for the social protest and the newspaper coverage that is mostly negative. If this so is the battle between the traditional and the new media based upon values and world views or upon active role-playing as part of a rating war? Or are there, perhaps, business considerations that arise out of the struggle for economic survival by the printed and electronic media that are creating the difference?

Despite the fact that the social media offers variety in its social activity tasks, the traditional mass media institutions are still influential in constructing reality, and despite the fact that the balance of power in the media world has changed with the appearance of the Internet and the social media, the traditional mass media institutions are important, and play a significant role in the determination of the presence and acceptance of the social movements. Unsurprisingly the traditional media have a permanent interest in preserving the world as it is and in maintaining the status quo. As a result of this, the social activists that support social change have strained and forced relations with the traditional mainstream mass media [28].

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As already stated, the complex media matrix constructs our today's social worlds [1, 35]. Worlds which are not often complementary nor singular. The media matrix is in constant flux. It is an unprecedented combination of diverse media formats, from written media to photographs, from radio to television or cinema, in our laptops, electronic devices, or/and smartphones. Moreover, scholars observe that there is a constant remediation of a media, changing it to be remediated. Bolter and Grusin ([46], p. 44), termed "remediation" to this persistent representation of one medium into another medium, that is, Vimeo, Hulu. Subsequently, research literature suggests, that creating new representations bring us to a "panmediation," suggesting that we live immersed in a Wi-Fi-cloud ([28] p. 146).

This stream, whose different directions cross social areas and use a variety of the communication ways ([19], p. 3) has been called by DeLuca and his colleagues "Panmediation" matrix ([28], p. 487). It shows how counter-framing activities pass through mediation processes that combine different communication technologies ([47], p. 136).

The influence of the interaction between the media tools can be seen in the 2011 demonstrations in the USA. The media take and the unequivocal support provided in the OWS demonstrations in the USA came late and the public and media attention paid to social protest in the USA as a whole can be divided into three stages: completely ignoring it; raising questions about the identities of the demonstrators and the subject of the demonstration; and public and media support. In the case of protest in the USA, one can see that media activity expresses the balance between the different media tools. In fact, only after the Internet displayed video clips, which showed the brutal violence of the police toward the demonstrators in their use of tear gas, did the OWS begin to get significant journalism cover. A short time later the printed and the broadcast media and the social networks turned their attention toward the violence of the New York police who arrested and handcuffed hundreds of demonstrators in a demonstration that took place on October 1st on the Brooklyn Bridge. In the process of spreading the movement, the demonstrators distributed content such as edited video clips and narrative texts. They utilized all the virtual communication space that was available to them—Facebook, blogs, YouTube, and Twitter and in addition, they edited and distributed a newspaper called the OWS Journal [27]. While the protest movement constructed autonomous platforms with technological infrastructures the members of the movement worked with freelancer journalists, local media producers and including journalists from the electronic and printed media and the contact with the television and radio networks was continually maintained. The members of the movement helped themselves by combining the media in every possible way and using every channel for passing on messages. This process was called "Transmedia mobilization," meaning something that cuts across all the possible kinds of media [27].

5. Conclusion

Despite the fact that the social media offers variety in its social activity tasks, the traditional mass media institutions are still influential in constructing reality. And despite the fact that the balance of power in the old media exclusively control of the news framing has changed with

the appearance of the Internet and the social media, the traditional mass media institutions are important, and play a significant role in the determination of the presence and acceptance of the social movements. Because of this the social activists that support social change have strained and forced to use all communication platform possibilities to gain their interest—influence decision-making policy.

The media, especially today, are not differentiated according to the division of tasks that characterize one kind of communication as opposed to another but, to a great degree in most of the societies; the multi-faceted media exist and connect with each other. For example, with aid of a smartphone, we talk, share information, and film clips on social networks, send and receive emails and watch or read the up-to-date news—and all this is, in fact, is managed by the media matrix.

Consequently, Matrix Era journalism needs to adapt itself to the new trends and innovations to maintain their competitiveness but they must also keep their professionalism. Thus, journalism and journalism studies should address this issue and prepare future journalist generations with the skills needed to endure this new challenge.

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Conflict of interest

The authors certify that they have NO affiliations with or involvement in any organization or entity with any financial interest or non-financial interest in the subject matter or materials discussed in this manuscript.

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Chapter 6

Social Media and Technology Trends in HRM: Cases in Recruitment and Talent Management

Debolina Dutta

Additional information is available at the end of the chapter

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Abstract

Human resource management practices have evolved over the years to align with shifts in technology, economy, globalization, talent diversity and business strategy, with practices intended to solve business problems. Increased globalization, competition and the pressure for speed and innovation mandates differentiated HR practices which enable attracting, motivating, and retaining a talented workforce, a factor critical to business success. While employees have embraced digital and social media for increased communication and collaboration, opportunities of leveraging the rich information available on social media platforms for HR practices have emerged. The of use of human capital analytics is becoming a powerful tool available to the HR fraternity, as data driven insights have demonstrated impressive business results. The latest of these trends is the leveraging of social media combined with technology solutions and embracing digitization of various HR processes. The present research presents three case studies that illustrate how technology solutions and data insights have transformed talent acquisition, learning and talent management practices within HR functions in India. The cases demonstrate the how the technological advances and increase usage of social media is likely to have significant implications for talent management processes of the firms in the near future.

Keywords: talent management, social media, HR analytics, talent development, predictive analytics, case study

1. Introduction

The rapid pace of technological changes and globalization are simultaneously acting on each other and compounding their effect on the pace of change. The net result has been a pace of change resembling a spiraling vortex that has increasingly challenged individuals' and

organizations' ability to adapt to the same. With technological changes leapfrogging ahead, the access to Internet also changed the way information was produced, received and consumed over the world. The biggest transformation in media communication was from the unidirectional consumption mode of communication changed to multi-creator and multi-user bi-directional communication. Conventional print media continued to see steady decline with sales reduction from2.1 billion copies in 2000 to less than 1.4 billion copies in 2010 [1]. With commoditization of information and multiple media platforms through which consumers and other stakeholders accessed information, organizations were forced to re-think the way conventional communication could be effected with their relevant stakeholders. While multiple examples exist within the realm of co-creation for product development or marketing, human resource functions still struggled to come to terms with the changing ways communicating with and engaging their current and potential workforce.

Human resource management practices have evolved over the years to align with shifts in technology, economy, globalization, talent diversity and business strategy [2], with practices intended to solve business problems [3]. The resource-based theory has been the guiding paradigm influencing strategic HRM research [4]. Increased globalization, competition and the pressure for speed and innovation mandates differentiated HR practices which enable attracting, motivating, and retaining a talented workforce, a factor critical to business success. This becomes critical, since sustainable competitive advantage obtained from people and people practices, as argued by resource-based theory, have been weakened by globalization and environmental changes [5]. While employees have embraced digital and social media for increased communication and collaboration, opportunities of leveraging the rich information available on social media and technology platforms for HR practices have emerged which indicate a potential to change the dynamic capabilities of organizations [6]. For HR functions, leveraging of technology solutions and embracing digitization of various HR processes therefore becomes critical.

The "war for talent" [7] continues, with organizations trying to identify high quality individuals who not only meet the functional and technical needs of the jobs, but also demonstrate a fit with the organizations values. Simultaneously, research on employee recruitment continues with multiple studies addressing recruitment objective, strategies, intervening job applicant variables and recruitment activities and processes [8]. However, a limitation of some of the recent recruitment method research has been the emphasis on post-hire outcome (e.g. performance, turnover) rather than pre-hire outcomes (which approaches generate better applicants)—something that is of critical interest to organizations seeking high quality talent. In this context, it becomes extremely crucial for HR practices to evolve more broad based recruiting methods to discover skilled applicants required to support organizational growth. Furthermore, targeted recruitment (whom to recruit, where to recruit, etc.) has also attracted little attention from researchers, and the need for research on targeted recruitment [9] and the use of data science and intelligence tools within human resources has been emphasized [10].

In the present chapter, the case studies of three firms of India are discussed which are aiding and enabling talent management. Two of the cases demonstrate how people analytics utilizing predictive analysis measures is transforming talent acquisition and workforce planning in the emerging markets of the world and the resulting impact on HR functions

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within organizations. The third case discusses new approaches in leveraging technology for building efficiencies in the recruitment process. While there has been considerable research on e-recruitment and its drivers, there is need for research documenting the latest trends in the use of technology, artificial intelligence and machine learning for supporting external recruitment. These cases demonstrate the state-of-the-art technology available to recruiters to enhance the operational efficiency, agility, and quality of applicant hired in their recruitment process, and illustrate the way social media and technology is being used to hire both efficiently, in terms of reduction in resources consumed, and effectively, in terms of finding a fit between the person and the organization. The new ways of communicating with talent, quantifying and systematizing through technology, the complex human decision making process related to employee-organization fit, are demonstrated. The implications that emerge from these trends in talent acquisition is that technology is likely to revolutionize the HR organization by possibly creating redundancies within the applicant attraction process of recruitment or at an extreme view, disintermediate the talent acquisition function as a whole.

2. E-recruitment and talent acquisition using social media

Electronic recruitment processes which involve hiring of candidates over the internet, talent management techniques for identification, tracking, evaluation, and selection of personnel increasingly are being adopted widely for acquisition of human resources in organizations today. These practices have been a matched by an exponential increase of social networking sites for recruitment purposes, which may have been prompted by cost efficiencies or talent scarcity [11]. The advantages of e-recruitment over traditional channels have been well documented, such as economy of time and money, larger candidate pool, and ease of use for both the recruiter and the candidate. E-recruitment led to improvement in time to hire and quantity of hire, by improving outreach to potential candidates, and scanning information across a wide range of sources, to lead to a better fit with the organization.

Online recruitment has the advantage of reciprocal communication, where the candidate and the recruiter may communicate with each other at minimal cost. While the advantages of the e-recruitment processes are significant, there are also several challenges that online hiring brings. The launch and maintenance costs of online hiring systems are high, and it requires hiring of personnel competent in dealing with the technology. Secondly, the number of candidates obtained through job boards is often extremely large, making optimal scanning difficult. Thirdly, there are also concerns of breach of confidential data and security, as platforms might store resumes for later references.

Various organizations may adopt differentiated strategies and tactics while embracing social media and e-recruitment. These are broadly classified under the pillars of *building employer brand*, *building relationships (for current or future requirement)*, *active recruitment for vacancies or new job roles*, and finally *cost optimization* [12]. Lastly, we assess the influence of these emerging trends on the pillars defining strategies and tactics adopted for social media and e-recruitment.

3. Method

Case study research focuses on the latest practices in a field, to better understand processes not well explored and to generate theories out of them. The present research incorporates three case studies on use of social media, E-recruitment and big data analytics for facilitating talent acquisition. All three organizations selected are involved in providing recruitment services to firms—using online resources. Each study demonstrates a different approach and demonstrates the latest trends in the e-recruitment domain in the emerging markets of the world.

3.1. Cases

- Case 1: This case focuses on the people analytics solutions marketed by the firm Belong.co, with reference to recruitment, the unique features of these offerings and their implications.
- Case 2: This case focuses on asynchronous recruitment solution offered by Talview which brings in efficiencies into the recruitment process through better pipeline management, keeping actively engaged applicants refreshed and enable better fit with the organization.
- Case 3: This case deals with a job portal iimjobs.com, positioned to attract high caliber applicants. The organization then used the large data pool of applicants to build intelligence around talent availability. The intelligence made available to HR enables better talent management.

A total of 22 semi-structured interviews were conducted in all, with 7 interviews each spanning over 2 hours conducted at firms 1 and 2. In firm 3, 8 semi-structured interviews were conducted, each spanning about 1.5–2 hours. The interviewees selected were either key position holders in the firms and subject matter experts on the product offering and value demonstrated or were members of the founding team of these firms. The author also interviewed seven members of the user community (HR and Talent acquisition heads), who had subscribed to the offering of these firms, three who were subscribing to Belong and two each who were using Talview and iimjobs.com solution offerings. The purpose of these interviews was to understand both the acceptance of the new solutions being offered and also their perceived value. These interviews spanned between 45 minutes to 1 hour each.

3.1.1. Case 1: Belong.Co

Belong.co [13] is a Bangalore based startup, which provides hiring solutions using predictive analytics and personalized engagement, which enable firms to identify, meaningfully engage, and recruit top, relevant talent in optimum time. The typical V-funnel of recruitment—represented by large number of applicants sourced through conventional channels, reduced number of candidates deemed fit for the role, and a much smaller number clearing the interview process and final candidate being hired—was found to be tedious and time consuming, with a lot of effort invested to screen, interview and filter out potential fits. Additionally, most applicants were active job seekers, which constituted only 20% of the available talent pool. Discussion with recruiters of multiple organizations reinforced the painstaking process of candidate filtration undertaken by each one.

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The organizations unique value proposition was to identify, connect with, and engage the passive talent pool which resulted in hires that were more engaged. Such candidates, selected through individualized consideration and matching, felt that they truly belonged to the organization. Calling this approach "Outbound hiring", there was also the realization that the best talent was not always available on popular job boards. The founders created a product offering based on machine learning and artificial intelligence, which allowed organizations to "Google Search" not just for skill fit, but also for ideology fit was born. The outbound hiring process is presented in **Figure 1**.

In the Belong system, artificial intelligence and predictive algorithms are used to scan publically available information on talent on the internet, to map and suggest profile fits. The data scanned include information that potential candidates put out on a blog, updates on Linkedin or other professional networking profiles, tweets sent, updates on social networking sites like Quora [14] or Kaggle [15] (a domain where data scientists hang out), contribution to sites like Github [16] or Stack overflow [17], personal websites, or any other public reference to the candidates. The analytics thus helped generate data that was far more comprehensive than a resume, and helped the recruiter identify which pools of talents were to be engaged. Again, based on information such as a potential candidate's prior employment tenure, or the average duration in the current organization before they would be considered for a role change/promotion, the tool was able to predict their likelihood of responding to an interest eliciting mail. The search results were therefore always customized for a particular job positing or organization, unlike a key-word search for skills, which would throw up the same set of candidate names, irrespective of the organization that was searching for it (**Figure 2**).

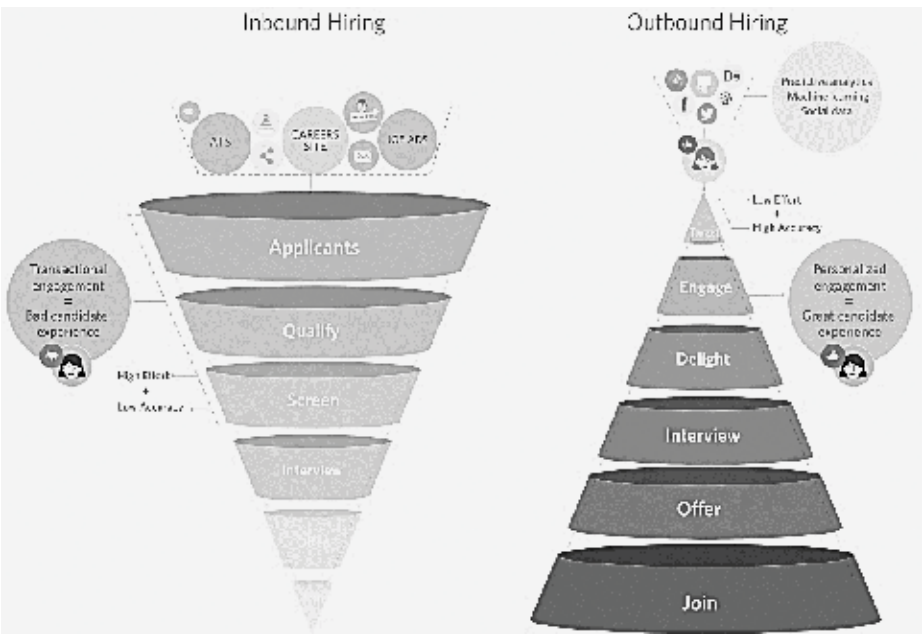

Figure 1. Flipping the recruitment pyramid by Belong.co. Source: https://belong.co/outbound-hiring/ last accessed on 07-01-2018.

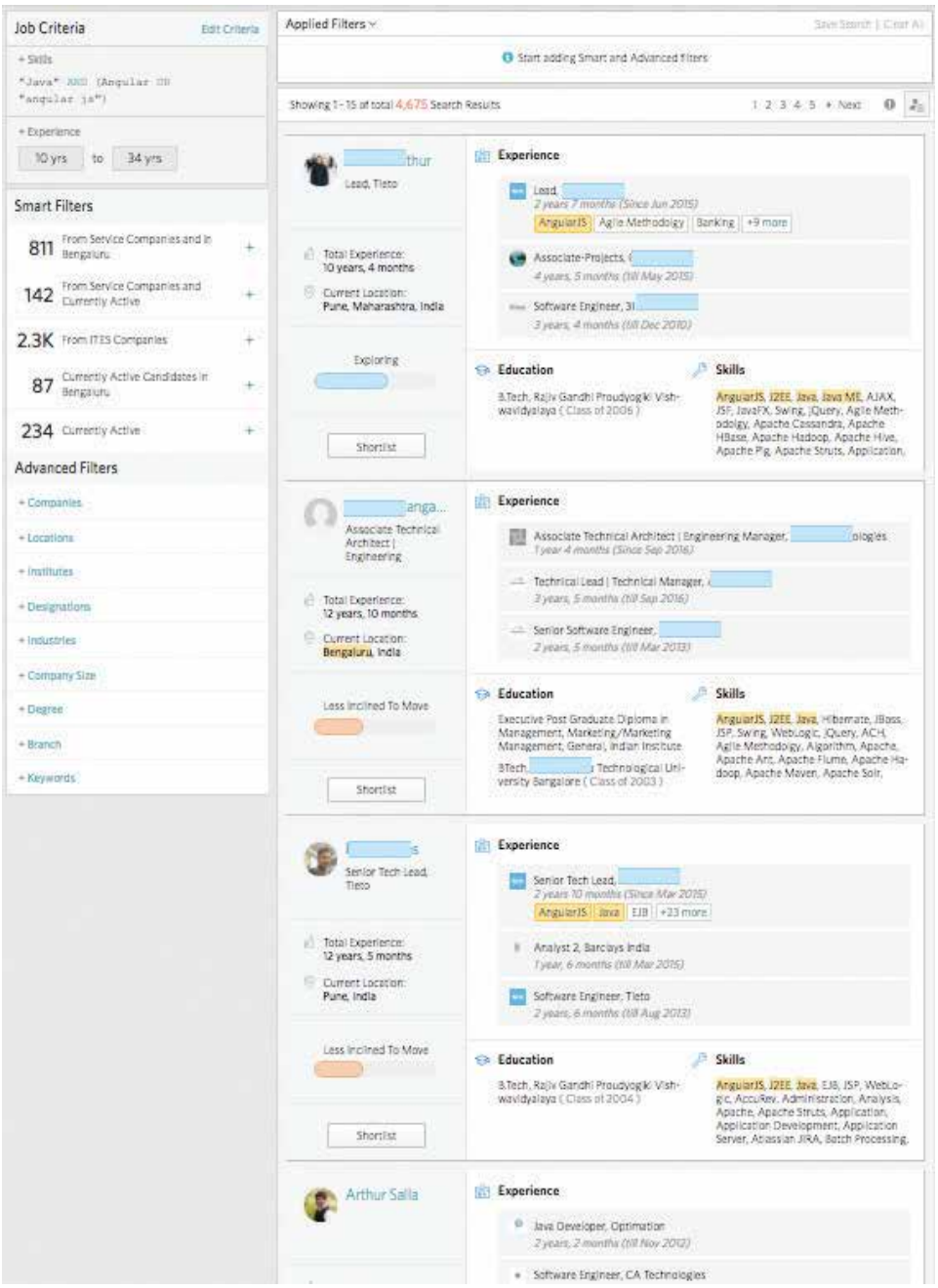

Figure 2. Prospective resume shortlist, probability of candidate interest and potential fit indication. Source: Company provided information.

The predictive analytics at Belong.co ensured that, unlike the normal talent funnel, the search identified 8–10 potential passive candidates. The recruiter would then shortlist out of these limited set of suggested candidates, thereby freeing up recruiter time and improving their

effectiveness. Next, a recruitment bot would send out personalized relevant emails on behalf of the recruiter which would elicit the interest of the passive talent for initiate a conversation with the recruiter and enhance engagement. The customers of Belong.co reported that candidate feedback on the personalized mail reflect the delight in the degree of personal attention and detail demonstrated in the approach. At the same time, recruiters, who saw a significant reduction in their manual effort in sourcing profiles (estimated to be 40% to their time), were delighted in the quality of candidates brought for interviewing, the higher conversion ratio, and the reduction in time to fulfill recruitment mandates.

The effectiveness of outbound hiring were demonstrated in multiple customer success stories [18], which documented instances of 50% reduction in sourcing time and significant reduction in overall recruitment time, better candidate engagement and better fit in terms of skills, interests and motivations. The value demonstrated by the offering was measured by different industries in terms of fit of hire, cost per hire and quicker demand fulfillment.

3.1.2. Case 2: Talview

Most organizations receive a large volume of unsolicited applicants, most of whom do not find matching opportunities within the organization. The applications of these potential recruits invariably lie unutilized and unscreened within the applicant tracking system or mailboxes of recruiters within organizations. Additionally, each job application tends to receive a large volume of potentially suitable candidates, as deemed by their resume, experience and skill sets. However, most recruiters experience a selection ratio between resumes received and final selection of candidates which could range from 20:1 to 1000:1. A lot of time and effort of recruiters and managers are spent in filtering through the potential set of candidates. Energy is dissipated in trying to arrange mutually convenient schedules for a face to face interview between candidate and interviewer, which could be arranged through technology enabling platforms such as Skype/Facetime, etc. In case physical meeting is to be arranged, travel delays add to the inefficiencies built into the selection process, which could also involve efficiency loss due to scheduling time/effort, synchronizing interview times, travel time and wait for interviews etc.

To solve both these issues and address efficient use of resumes and efficient use of applicant and hiring manager time, a Bangalore based technology firm Talview [19] introduced an asynchronous cloud based mobile enabled video interviewing platform. Candidates deemed as potential fit for current/future role are sent a link through the platform. Potential applicants could log onto the platform and pre-defined set of questions sequentially from any location and at any time. Once completed, the recorded interviews were then screened by the recruiter and hiring manager at their convenience. The platform also enabled psychometric, aptitude testing and coding testing for potential applicants. Additionally, the gamification feature of assessments made the process engaging for applicants and helped in enhancing employer brand (**Figure 3**).

Organizations using this platform were able to effectively build and manage a passive talent pipeline, efficiently filter through a larger number of applicants and quickly check for fit parameters. With the recorded interviews saved on the cloud, the convenience of candidates and recruiters was aided, ensuring better candidate experience. With over a million applicants

Figure 3. Example of competency based asynchronous video interview using Talview platform.

assessed through the platform, Talview has an impressive clientele of a large number of fortune 500 companies over 102 countries. The benefits of the platform range from 40% reduction in poor performance of new hires, 50% reduction in cycle time for recruitment and a 70% reduction in campus recruitment costs.

3.1.3. Case 3: iimjobs.com

iimjobs.com [20] had started as a job portal with a differentiated proposition. The founder Tarun Matta possessed qualification of engineering and management from some of the top institutes of India. Like a lot of his peers from these institutes, he found access to challenging and aspirational jobs difficult. Recruiters typically received a large volume of resumes and found it challenging to sift through and identify good talent. Additionally, candidates were more successful in obtaining desired jobs through referral process. To disintermediate this asymmetry between high caliber talent availability seeking jobs and recruiters looking for high caliber talent, iimjobs.com was born. The name alluded to talent pedigreed from IIMs (Indian Institutes of Management), which were considered the most premier management institutes within India. While a large segment of the applicants on this portal were from these institutes, applicants from other prestigious institutes also started applying on this portal. It additionally allowed applicants to only apply for jobs posted on the portal, and maintained the confidentiality of applicants who applied on it. Resumes of applicants were not openly visible to other recruiters for many years. When iimjobs.com finally opened resume search access, it was restricted only to corporate accounts and not made available to recruitment consultants and search firms. This helped maintain applicant confidentiality, which was a key requirement of high caliber talent.

By 2017, iimjobs.com had built a repository of over a million registered users as job seekers and over 70,000 recruiters using the platform to interact and find suitable fits. While working on database and listings, iimjobs.com got inputs from the clients about the challenges faced in taking talent decisions and discovered opportunities in leveraging this database to yield important job market trends. For instance, when a seeker registered and applied for a job, the system

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captured everything about their educational background, CVs, salaries (current and expected), etc. This provided an opportunity to synthesize this information and provide recruiters a clear understanding of the trends in the talent landscape for a particular segment or skillset.

A comprehensive visibility of the talent landscape continued to present a challenge for HR professionals, who struggled to identify key talent. Most HR professionals based their understanding of talent trends from some of peers in the industry to get a qualitative sense of the trends in their respective firms. However, organizations desiring quantitative data for decision making desired exact data. This was usually obtained through job market analyses conducted by consulting firms. Obtaining meaningful data tended to be painstaking, costly and a voluminous task for most organizations. Obtaining this kind of data meant mapping an entire industry or associated industries where such talent could be hired from. Additionally, the problem with these kinds of surveys was that the reports they generated were static, while, on the other hand, the actual workforce and talent trends changed dynamically. Finally, most organizations resorted to compensation benchmarking exercises, where specific job families were pegged against market compensation rates to understand and correct internal pay equity. These, compensation benchmarking reports tend to be highly expensive, putting the updated reports out of the reach of many small and mid-sized firms and start-ups.

While planning talent requirements for current/future state of business, the internal factors of talent availability, training capability and reward philosophy were also key factor influencing HR leaders decisions to build or buy talent. While demand/supply of labor presented the external market information, the planning and administering of compensation and reward systems would be influenced by the talent strategy adopted. For instance, inducting new skills/capabilities into the organization would influence the organizations' definition of key labor competitors, pay positioning with respect to the market, choice and/or expansion of the market basket used for compensation benchmarking, which in turn could dilute the benchmark relevance etc. The HR function was expected to provide informed decisions around costs of hiring/re-locating talent/upskilling talent/attrition trends and costs of attrition for future state talent needs of the organization. Absence of clear and dynamic data made these decisions challenging.

Detailing the offering being made available by iibjobs.com, Matta said.

> *'Recruiters and hiring managers are often pushed to fill vacancies, that too with unrealistic specifications and targets. So this tool enables them to know and talk about expectation of talent availability, in a more meaningful manner. They can now say that by relaxing a few parameters we can increase our supply side. It helps them to understand the industry trends and calibrate expectations accordingly'.*

The Calculus platform was created by the iimjobs.com team from the data available within the within the job portal The aim was to provide recruiters an interface where they could examine the trends reflected in the existing database of iimjobs.com, to answer their own specific requirements about the talent horizon. The interface of the Calculus was almost similar to that of database search so that recruiters were able to use it easily (**Figure 4**). All the recruiter needed to do was to define a query—using keywords, position looked for, or/short form/long (bullion operator), company, industry, and other search parameters, such as target, college (Tier 1/2/3), type of course (e.g., full time/part time), batch (e.g., 2010–2014), and notice period (e.g., 3 months).

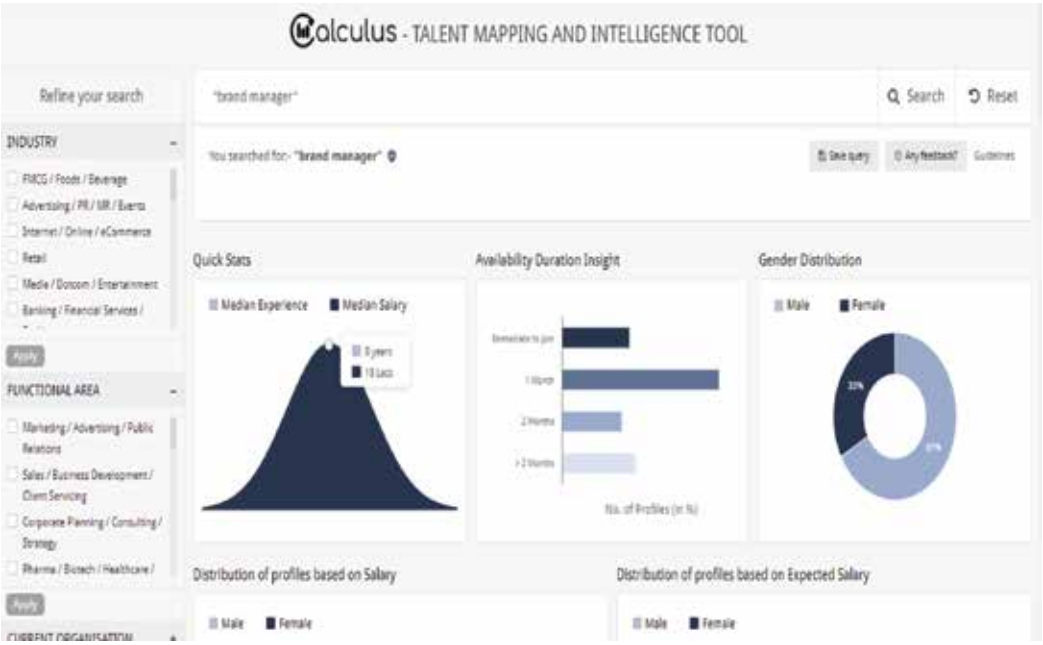

Figure 4. Talent demographics of salary, gender and availability on Calculus. Source: Company data.

The automation tool generated a sample set, based on the specifications, and studied the trends reflected in the sample in terms of the query generated. To make the sample representative, the tool removed all the outliers (extremes). Also, to keep the sample set recent, the search results were limited to profiles updated in the last 6 months, thereby revealing the dynamic trends and shifts within technologies, skills and domains.

The Calculus tool let HR examine five dimensions related to hiring (**Figure 5**):

a. Compensation: This data point allowed talent management functions to view the current and expected salary trends and understand the range, the mean and median salary; The compensation analytics also indicated gender, age, or experience-wise distributions of salary

b. Geographical location: This functionality used to determine the talent density in a particular location. It provided visibility to how many professionals of a certain profile are present in a geographical area). This enabled the manager to decide where to open a new branch. It also shows how salaries change as per locations, helping in zone-wise compensation management

c. Gender diversity: This reflects the gender-related distribution of talent, and its interaction with other factors such as experience, salary, location, notice period, etc.

d. Average tenure: For most recruiters, tenure of employment was a surrogate measure of expected stability and future attrition. Hence trends information in along skills/functions/age groups helped talent management teams calibrate talent expectations.

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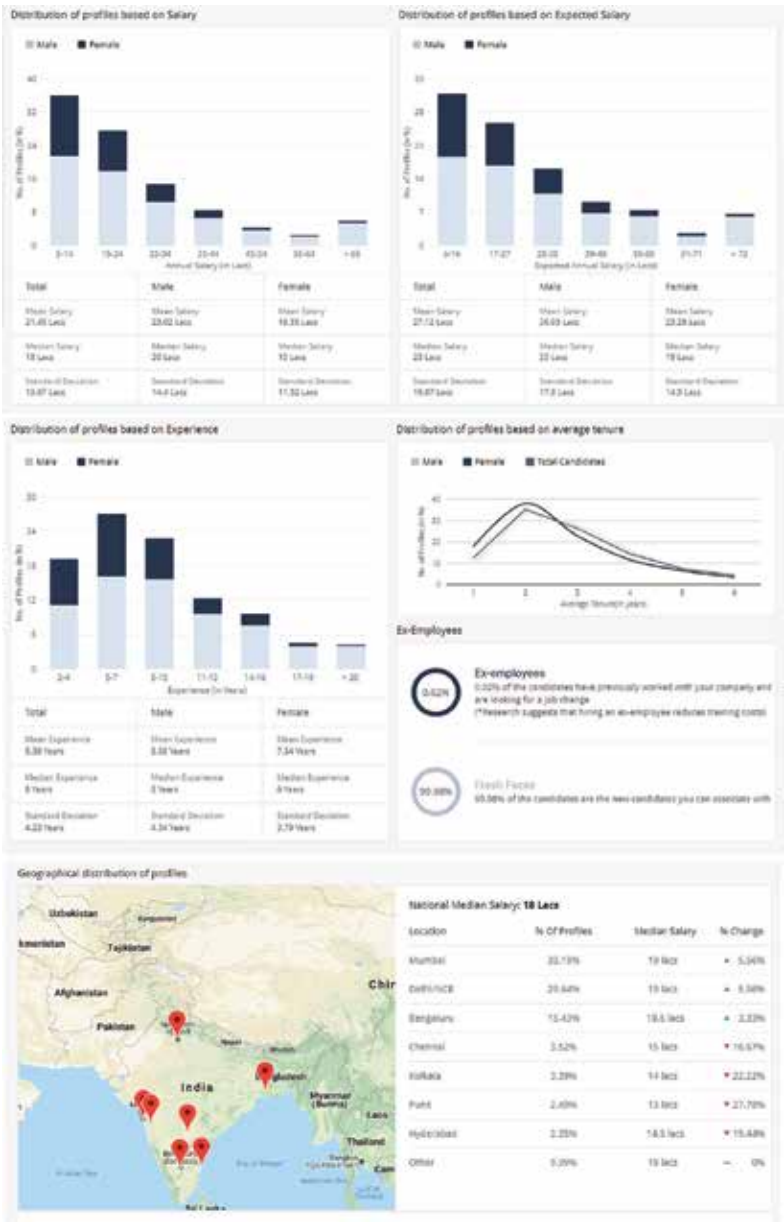

Figure 5. Talent availability basis experience, current and expected compensation and geographical distribution on Calculus. Source: Company data.

e. Availability index: Based on information provided by the applicant, the expected notice period across different roles/seniorities and functions was also indicated.

Since its launch in mid-2017, Calculus has been well received by the industry. The head of marketing, Amandeep Singh enthused:

> *'The feedback, in general, is highly positive for our offerings. HR heads have been telling me that Calculus simplifies their HR decision making a lot and also aids in realistic planning'.*

4. Discussion

Key analytical ability and developments in technology are enabling organizations to meet competitive threats and adapt to changing business and technology conditions. The use of machine learning and predictive analytics, combined with large information available on social media is clearly changing the ways recruitment is being done across organizations. With economies arising from large scale enterprise systems, globally connected networks and data available on the cloud, mobile devices enhancing connectivity and greater internet connectivity, globally connected networks and economies arising from large scale enterprise systems, online social graphs, mobile devices and enhanced connectivity, internet of things and open data/public data, Big Data has emerged as a potential solution to disintermediating talent requirement and availability. The ability of the platforms to "link various data streams using appropriately defined unique identifiers" [21] enables better understanding of candidates behaviors, motivations and expected fit with the organization.

Talent is operationalized into two components: ability component (innate abilities and systematic development) and affective component (which constitutes the motivation to invest and the interest areas). The difference in the various approaches of defining talent is presented in **Table 1**.

Talent has also been conceptualized through the exclusive approach is based on the notion of segmentation of the workforce, and proposed talent as an elite subset of the organizations' population [22]. The exclusive subject approach focuses on specific employees "who are exceptional in terms of skills and abilities, either in a specific technical area, a specific competency, or a more general area" [23]. Since talent acquisition focuses on hiring individuals based on their differentiated abilities, skills, competencies and fit to the role and organization, the exclusive subject approach to talent definition becomes relevant.

SHRM literature has no clear theory or principle to guide when and on which organizational pools should be targeted or classified but align with the view that "pivotal talent pools are vital targets for HR investment and leader attention" [24]. Thus it is important to develop

Classification approach	Subject approach	Object approach
Inclusive	In this approach, talent is defined as the entire workforce and human capital is considered as interchangeable.	This approach allows each employee to reach his or her potential. The research on "talent management' as a whole looks at talent through this perspective. This is similar to HR development or competency management across the organization
Exclusive	This approach is based on segmentation or differentiation of the workforce in terms of capability, performance and the ability to make a significant different to current and future organization performance. This is the approach taken in our research study.	This approach concentrates on exceptional, above-average ability employees in the organization. This is a focus of talent development and retention within organizations using HR practices for high performance and high potential individuals.

Table 1. Talent classification through various approaches.

some system of identification and segmentation of talent as it facilitates the ability to strategize organizational actions to attract or develop the talent pool [25]. All three cases demonstrate the ability to support recruitment functions in identifying talent.

While proposing that changes in technology produce changes in the quality of talent required by organizations, a classification was developed of talent along the dimensions of difficulty-to-replace and value-added [26]. The difficulty-to-replace dimension is thus linked with the labor market factors and the value-added dimension is a customer related factor [25]. This framework essentially makes it possible to do the segmentation of talent specific to each organization and the environment it operates in and takes into account the "economic geography of talent" [27]. The Calculus platform support talent management decisions by providing real time insights on talent availability and cost, thus supporting tactical recruitment decision or decisions in investment of capability development for certain skills required by the organization. Furthermore, it reinforces the "outside/in" approach that talent functions are adopting, creating value by integrating outside context to support decision making [3].

Lastly, we evaluate the impact of the three organizations under the lens of strategy for social media (**Table 2**).

The perceived supportive environment of the hiring organization would induce candidates hired through the Belong platform to utilize their efforts, skills and abilities to embrace organizational objectives. Belong's approach was also of keen interest to recruiters in all industries, who saw this tool as a potential ally in "hunting" passive talent. A longitudinal study along the lines of value of human capital through human capital metrics appreciated by the business functions [10] would help cement the perceived value delivered, apart from speed of hiring or the ability to find passive talent.

Technology has been found to increase efficiency and reduce administrative burden in HR [2]. The recruitment solution offered by Talview was able to contribute to first level efficiency metrics of improved productivity, reduced costs and improved recruitment cycle time [10]. Further, the offering of assessments by the system was able to set the decision criteria for

Strategy	Philosophy	Tactical outcome	Belong.co	Talview	Iimjobs
Relationship strategy	Trust building & collaboration through personalized engagement	Strategic talent inducted into the organization	√	√	
Employer branding	Establishing credibility, gaining attention, demonstrating employer value propositions.	Organization perceived as "preferred employer of choice"	√	√	
Active recruitment	Reactive demand fulfillment	Active recruitment positions closed	√	√	√
Cost optimization	Reducing costs of recruitment channels	Reduce recruitment spend on more expensive channels			√

Source: Adapted from [12]—alignment of strategy, philosophy out outcome of social media recruitment.

Table 2. Strategic and tactical outcomes of social media recruitment for the three organizations.

effective filtering to support the decision making discretion, which build agility within the organizations utilizing this offering. By having a repository of potentially suitable talent available when commensurate opportunities arise, better candidate experience and agility in recruitment is demonstrated. This agility would be valuable to organizational seeking to build this dynamic capability through quickly acquiring key talent faster than competitors [28, 31]. The organizations using and benefitting from Talview's offering grappled with large volumes of recruitment, where the demonstrated agility was keenly appreciated.

While the above mentioned cases illustrate the impact of social media and technology in disrupting candidate search, attraction and recruitment process, the emerging trends and their impact on recruitment approaches have the potential of reinforcing recruitment biases and discriminatory hiring practices. Big data algorithms used to screen and filter are based on specific patterns of social behavior. This approach presents a fundamental limitation in promoting a non-discriminatory approach to recruitment. With algorithms built on people characteristics rather than on job requirements, the algorithms are trained to predict desired behavioral outcomes and filter out candidates not meeting the criteria. For example, while publically posted photos of inappropriate behavior or offensive language are some of the obvious filtering logics used, spelling mistakes in resumes are also used as a measure of communication skills. These flout the norms of equal opportunity recruitment practices advocated and open up avenues for exposing organizations to lawsuits for discriminatory hiring practices.

Social media and technology also have the ability to influence employer brand. A few examples of employees demonstrating inappropriate behavior or even posting about unfair treatment at the workplace have resulted in huge social media backlash and poor PR for organizations [29]. Both journalists and media also leverage social media trends to promote and rank topics of interest. Websites like Glassdoor allow for anonymous reviews of companies, their management, the recruitment experience and provide a feel of the culture. Managing the social media PR has become increasingly important for HR functions. While an erstwhile approach adopted by organizations was to provide gated access to internet, with mobile access freely providing access, the approach of organizations to manage the social media engagement of their employees and thus the impact on employer brand has got changed. Social media allows individuals to meet social needs but with plausible deniability [30]. Most organizations have adopted social media and digital strategies and code of conduct to educate employees on desired social behaviors and consequences of inappropriate behaviors.

The illustrative cases are a demonstration of the morphing social media and digital trends shaping HRM practices in organizations. For practitioners looking for synergies with their strategic and tactical outcomes in recruitment, these illustrative cases suggest the relevant appropriateness of each case. These cases also open avenues for further research on multitude of dimensions in the domain of recruitment such as efficiency and effectiveness of the new trends as well as the unconscious bias of big data in recruitment [31–33]. Additionally, theoretical linkages of social media tactics and their alignment with organization strategy could further be explored. The emerging trends in social media and technology uses in recruitment are allowing for correlation between individuals' social media behaviors and recruitment outcomes. However, these trends are contributing to the development of societal norms for technology and social media adoption by organizations and also the socially accepted behaviors of individuals on these platforms, thereby having influences beyond HRM principles.

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Chapter 7

Evolving Networks and Social Network Analysis Methods and Techniques

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Additional information is available at the end of the chapter

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Abstract

Evolving networks by definition are networks that change as a function of time. They are a natural extension of network science since almost all real-world networks evolve over time, either by adding or by removing nodes or links over time: elementary actor-level network measures like network centrality change as a function of time, popularity and influence of individuals grow or fade depending on processes, and events occur in networks during time intervals. Other problems such as network-level statistics computation, link prediction, community detection, and visualization gain additional research importance when applied to dynamic online social networks (OSNs). Due to their temporal dimension, rapid growth of users, velocity of changes in networks, and amount of data that these OSNs generate, effective and efficient methods and techniques for small static networks are now required to scale and deal with the temporal dimension in case of streaming settings. This chapter reviews the state of the art in selected aspects of evolving social networks presenting open research challenges related to OSNs. The challenges suggest that significant further research is required in evolving social networks, i.e., existent methods, techniques, and algorithms must be rethought and designed toward incremental and dynamic versions that allow the efficient analysis of evolving networks.

Keywords: evolving networks, social network analysis

1. Introduction

One of the consequences of today's information society is the rise of the digital network society [1]. Organizations and individuals are increasingly connected through a wide range of online

and offline networks at different relational levels: social, professional, interaction, information flow, etc. The analysis and modeling of networks and also networked dynamical systems have been the subject of considerable interdisciplinary interest covering a wide range of areas from physics, mathematics, computer science, biology, economics and sociology, in the so-called "new" science of networks [2]. According to [3], media organizations, media content and audiences are no exception: news articles have hyperlinks to link other content; news organizations disseminate news via online social network (OSN) platforms like Twitter and Facebook; and users comment, share and react directly below online news. At the level of news events, recent observation proves that some events and news emerge and spread first using those media channels rather than other traditional media like the online news sites, blogs or even television and radio breaking news [4, 5]. Natural disasters, celebrity news, products announcements or mainstream event coverage show that people increasingly make use of those tools to be informed, discuss and exchange information [6]. Concerning the novelty and timely dissemination of news events, empirical studies show that the online social networking services like Twitter are often the first mediums to break critical natural events such as earthquakes often in a matter of seconds after they occur [4, 5]. Herewith, social networks' temporal dimension of information is of crucial importance and follows a time decay pattern, that is, posted messages in social media are exchanged, forwarded or commented in early stages and decrease in importance as time passes. The importance of information contained in those messages has their importance peak right after being posted or in the following hours or days [7]. Besides, the timing of many human activities, ranging from communication to entertainment and work patterns is characterized by bursts of rapidly occurring events separated by long periods of inactivity, following non-Poisson statistics [8]. The nature of the time decay pattern communication, bursts or peaks, and inactivity periods, enforces the importance of dynamic network analysis methods and techniques in a network analysis context as the best approaches to model these problems.

1.1. Solving problems with evolving networks

Typical tasks of social network analysis involve the identification of the most influential, prestigious or central actors, using statistical measures; the identification of hubs and authorities, using link analysis algorithms; the discovery of communities, using community detection techniques; the visualization the interactions between actors; or spreading of information. These tasks are instrumental in the process of extracting knowledge from networks and consequently in the process of problem-solving with network data. Specifically, in the areas of journalism and investigation the following topics have been discussed actively in the last years: ***Criminological research.*** In 2001, according to [9], social network analysis has the genuine potential to uncover the complexities of criminal networks. Ref. [10] introduced the intersection of terrorism studies and what was called the "networked criminology". In 2011, [9] concluded that the applications of social network analysis in criminology were still insufficient when compared to other research areas like sociology and public health [11]. Nevertheless, since then, social network analysis has become one of the major tools for criminal analysis with [12] identifying the three main areas of analysis and applications of social networks in criminological research. Other topics include the *influence of personal networks* on crime and,

more generally, on delinquent behavior [13, 11]; the analysis of *neighborhood networks* and their influence on crime [12]; and exploration and *modeling of the organization* of crime, that is, street gangs, terrorist groups and organized crime groups [12]. Concrete examples of criminological research using social network analysis are the Enron company dataset [14]; the Panama Papers analysis in connection with the economic network analysis of Portuguese companies; individuals with connections to offshore companies [15]; and the analysis of terrorist networks [16, 17]. Gill and Malamud [18] presented a broad overview, characterization and visualization of the interaction relationships between natural hazards using social network analysis. In addition to the previous contributions, essential and recent work regarding social network analysis and terrorism were published by Malm et al. [19], while Berlusconi [20] devoted an entire book to social network analysis and crime prevention. ***Research on journalism:*** Fu [21] presented an essay with the purpose of promoting social network analysis in the study of journalism. Starting with a communication network taxonomy [22, 23], their focus was on network relations in the study of journalism. The proposed framework presents the four types of communication relations that characterize different networked journalism phenomena [23]: *Affinity relations* describes the socially constructed relationships between two actors, such as alliances and friendships, with the valence of the relation being either positive or negative; *flow relations* refers to the exchange and transmission of data, resources and information; *representational relations* focuses on the symbolic affiliation between two entities; and *semantic networks* describes the associations, or semantic relations, among concepts, words or people's cognitive interpretations toward some shared objects in the network, aiming to build a knowledge base. Another relevant journalism research example is Ref. [24] that examines the temporal dynamics of reciprocity in the setting of legislative co-sponsorship in the 113th US Congress (2013–2015).

1.2. Related work

In the past years, several overviews of social network analysis can be found in the literature. Ref. [25] provide a general and succinct overview of the essentials of social network analysis, for static networks, with emphasis on simple statistical measures, link analysis, properties of real-world networks and community detection. Tabassum et al. [26] in an updated overview of social network analysis, based on Oliveira's and Gama's [25] work, included a full section devoted to evolving networks. Devoted explicitly to evolutionary network analysis, the Aggarwal and Subbian [27] survey provides an overview of the vast literature on graph evolution analysis. Although the scope of Aggarwal and Subbian [27] work was graph analysis in general, that is, it did not address specifically the social network analysis problem, many of the mentioned applications and particular contexts of applicability of the methods are social networks. The literature analyzed by Aggarwal and Subbian [27] covered both snapshot-based and streaming methods and algorithms, and critical applications of evolutionary network analysis on different domains such as the world wide web, telecommunication and communication networks, recommendation networks and social network events, among others, were given. Spiliopoulou [28] said that the advances on evolution is social networks into a common framework to model a network across the *time axis* and identified the four dimensions associated with knowledge discovery in social networks: dealing with time, objective of study,

definition of community, and evolution as an objective versus assumption. Spiliopoulou [28] enumerated the several challenges of the social network streams although this problem is generally conceived as a stream problem. An exciting application of temporal network theory and temporal networks to functional brain connectivity was presented by Thompson et al. [29]; in his work, the theory and methods that introduce the reader on how to add the temporal dimension to network analysis and precisely how many of well-known methods can be transposed from static networks to temporal networks were presented. Thompson et al. [29] included a complete list of network measures adapted or proposed for temporal networks.

2. Representation of social networks

A social network is a social structure consisting of a finite set of social actors, such as individuals or organizations, connected by interpersonal relationships. These relationships, also known as ties, can be of personal or professional nature and can range from casual friends, acquaintances or co-workers to the close family bonds. Besides the relations, social networks often represent flow of information, interactions and similarities, among the set of social actors. Social network analysis is the investigation of the relationship between actors. In network terminology, vertices—also known as nodes—refer to actors or subjects. Edges, also known as links or ties, describe the relationship between actors. Usually, this social structure, or network structure, is represented by graphs which are mathematical structures used to model pair-wise relations between objects. A graph in this context is made up of vertices, nodes or points which are connected by edges, arcs or lines. Therefore, a social network is a graph G composed of two fundamental components: a nonempty set of vertices V and a set of edges E. Formally it can be defined as $G = (V, E)$. Vertices represent objects, states, positions, placeholders and are represented by a set of unique vertices. No two vertices represent the same object or state where V can be represented by $\{v_1, v_2, v_3, \ldots, v_n\}$. For each graph edge $e \in E$, there is associated a pair of graph vertices u, v. Mathematically this can be formulated as $\forall_{e \in E} e \rightarrow (u, v)$ where $u, v \in V$. Edges can be directed or undirected and can be weighted (or labeled) or unweighted. An undirected edge $e = (v_i, v_j)$, with $v_i, v_j \in V$, indicates that the relationship or connection is bi-directional, that is, can go from v_i to v_j and vice versa. A directed edge $e = (v_i, v_j)$ specifies a one-directional relationship or connection, that is, can only go from v_i to v_j; this means that $(v_i, v_j) \neq (v_j, v_i)$. The total number of vertices n of graph G, mathematically $|V| = n$, is called the graph *order*. The total number of edges $|E| = m$ is known as the *size* of the graph G. The maximum number of edges in a undirected graph is $m_{max} = \frac{n(n-1)}{2}$, while for the directed ones, it is $m_{max} = n(n-1)$. The representation of graphs is done via two distinct types of graph-theoretic data structures: *list structures* and *matrix structures*. List structures, such as incidence lists and adjacency lists, reduce the required storage space for sparse graphs. Matrix structures such as incidence matrices, adjacency matrices, sociomatrices, Laplacian matrices and distance matrices are appropriated to represent the full matrices with dimension $n \times n$, where n is the total number of vertices of the graph. **Figure 1** shows several types of graphs that can be used to model different kinds of social networks. The classification of graphs is done according to

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Figure 1. (a) Types of edge graphs and their representation according to an adjacency matrix (b) or an adjacency list (c).

the direction of their links and according to the values assigned to each link. Graphs whose edges, or arcs, connect unordered pairs of vertices or, in other words, each edge of the graph that connects simultaneously two vertices in both directions are called *undirected graphs* or undirected networks. On the other hand, graphs whose all edges, or arcs, have an orientation assigned are called *directed graphs* or directed networks. Formally, a directed graph D is an ordered pair (V, A) consisting of a nonempty set, V, of vertices, and a set A of arcs. These arcs are disjoint from V. If e_{12} is an arc and v_1 and v_2 are vertices such that $e_{12} = (v_1, v_2)$ then e_{12} is said to join v_1 and v_2, v_1 being called the *initial vertex* and v_2 called the *terminal vertex*. Depending on the presence of values assigned to the edges or arcs, the distinction between *unweighted* or *weighted* graphs or networks is made. Unweighted graphs or networks are binary by definition. This means that it is only represented by the presence or non-presence of an edge or arc between two vertices. Unless it is explicitly said, we always assume that graphs are unweighted. In weighted graphs, each edge has associated a weight $w \in \mathbb{R}_0^+$ providing more information about the relation between the two vertices (i.e., the strength of the relation). If e_{12} is an arc between the two vertices v_1 and v_2, w_{12} defines the strength of the connection. For undirected and unweighted graphs, adjacency matrices are binary as a consequence of being unweighted and symmetric as a consequence of being undirected. The edge between vertices v_1 and v_2 is the same, $e_{ij} = e_{ji}$, with $w_{ij} = w_{ji} = 1$. The absence of edges between vertices v_k and v_l is represented by $w_{kl} = w_{lk} = 0$. For directed and weighted graphs, the matrices are nonsymmetric and values from the interval are thus: $[0, \max(w)]$.

3. From static to evolving networks

Previously, the network types and their representations in a static context were described. In real life, however, many networks are dynamic. As time passes by, new nodes are added to the network, existing ones are removed and edges come and go too. Static networks lack one of the most critical dimensions, that is, the temporal dimension of a network. So by definition static networks are assumed not to change or evolve over time, ignoring the temporal dimension. In this section, we cope with the representation of *evolving networks*. Evolving networks arise in a wide variety of application domains such as the web, social networks and communication

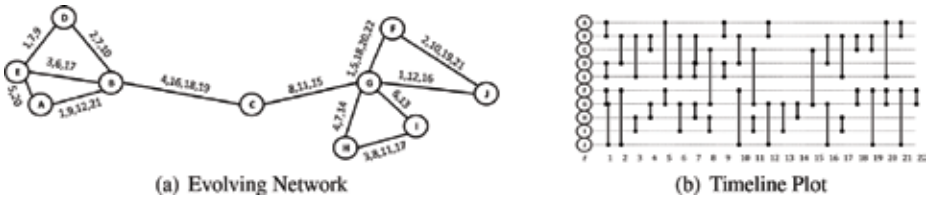

Figure 2. Example of contact evolving network: (a) shows a labeled aggregate network where the labels denote the times of contact, and (b) shows a time-line plot, where each of the lines corresponds to one vertex and time runs from left to right.

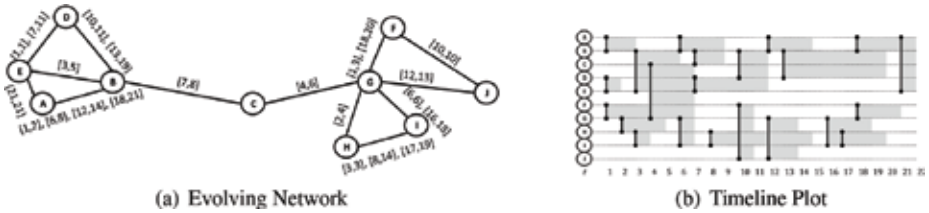

Figure 3. Example of interval evolving network: (a) shows the labeled aggregate network where the labels denote the time interval of the relation, and (b) shows a time-line plot, where each of the lines corresponds to one vertex and gray zones the time duration between two edges.

networks. In recent years the interest in the area of dynamic social networks leads to new research and the need of analysis of evolving networks. The evolution analysis in graphs has applications in a number of scenarios like trend analysis in social networks and dynamic link prediction—to mention two typical examples. **Figure 2** shows the example of a contact evolving network with instantaneous interactions between vertices. When the interaction between network peers has a time duration, we are in the presence of interval evolving networks as shown in **Figure 3(b)**. Assuming that the time T during which a network is observed is finite we can consider the start point as $t_{start} = 0$ and the end time as $t_{end} = T$. A dynamic network graph $G^{D}_{0,T}(V, E_{0,T})$ on a time interval $[0, T[$ consists of a set of vertices or nodes V and a set of temporal edges $E_{0,T}$. The evolving network is a set of graphs across the time axis within discrete time points $t_1, t_2, \ldots, t_{n-1}, t_n$. At time point t_n a graph instance $G(V_n, E_n)$ is observed also denoted as G_n where E_n is the set of temporal edges; $(u, v)_{t_n} \in E_{0,T}$ at time point t_n with edges between vertices u and v on time interval as $t_n = \left[t_{n_{begin}}, t_{n_{end}}\right]$ such that $t_{n_{begin}} \leq T$ and $t_{n_{end}} \geq t_{n_{begin}} \geq 0$. Examples of network changes that may occur between two time points t_{n-1} and t_n are the addition of new edges, that is, $E_n \supset E_{n-1}$, and the appearance of additional nodes, that is, $V_n \supset V_{n-1}$.

3.1. Models of temporal representation

Several models for representing evolving networks are available in the literature. Kim and Anderson [30] introduced the concept of a *time-ordered graph*, and Thompson et al. [29] with a similar conceptual representation chose the *time graphlet* to represent time-varying graphs.

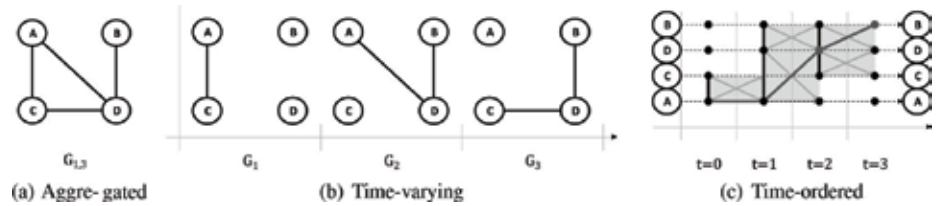

Figure 4. Comparison of aggregated representation (a) and time series representation (b). The corresponding time ordered (c) graph $\mathcal{G}$ is presented for the interval $[0, 3]$.

Casteigts et al. [31] presented the *time-varying graph* formalism (TVG) with the concept of a journey to catch the temporal information on graphs. Santoro et al. [32] used this formalism to describe several network measures. Although there are differences in the representation and nomenclature, these models are conceptually equal. **Figure 4** presents the concept of a time-ordered graph for an example network for the time interval $[0, 3]$. **Figure 4(a)** shows all the time intervals aggregated into a single graph $G_{1,3}$. The discretization of the network by converting the temporal information into a sequence of n snapshots is presented in **Figure 4(b)**. In this example the evolving network is represented as a series of static networks G_1, G_2, …, G_n. The time-ordered graph $\mathcal{G} = (\mathcal{V}, \mathcal{E})$ of **Figure 4(c)** assumes that at each time step, a message can be delivered along a single edge. It is an asymmetric directed graph with a vertex v_t for each $v \in V$ and for each $t \in \{0, 1, \ldots, n\}$ for each edge $(u, v) \in G_t$; it has a directed edge from u_{t-1} to v and vice versa. Although it was not represented in the figure, the time-ordered graph also has edges from v_{t-1} to v_t for all $v \in V$ for all $t \in \{1, \ldots, n\}$. The time-ordered graph $\mathcal{G} = (\mathcal{V}, \mathcal{E})$ constructed from n static networks of a dynamic network $G^D_{i,j} = \left(V, E_{i,j}\right)$ is a powerful tool to define network metrics and capture their temporal characteristics. In the example of **Figure 4 (c)**, the temporal shortest path from node $u = A$ to node $v = B$ is shown. The temporal shortest path from A to B in the interval $[0, 3]$ is $A_0 \rightarrow A_1 \rightarrow D_2 \rightarrow B_3$. The time-ordered graph of Kim and Anderson [30] will be the model used during the course of the rest of the document.

3.2. Timescale of evolving networks

Regarding the evolution of the networks, not all networks evolve equally. Some networks evolve faster than others or have edges that are being added at different rates. Two distinct timescale examples of networks are email networks, where edges are added at the timescale of seconds, and bibliographic networks, where edges are added at the scale of weeks or months. Different time-evolving scenarios require different types of analysis [27]. ***Slowly evolving networks***: When networks evolve slowly over time, *snapshot* analysis can be used very effectively. In this case, dynamic networks are discretized in time by converting temporal information into a sequence of n static snapshots. All the analysis can be done in each snapshot of the network at different times t_1, t_2, …, t_n using static analysis methods. Usually, in slowly evolving networks, a discretization of the time axis into intervals of equal length occurs. For a time discretization in years, days or seconds, a time window size w for each snapshot are set to T/n with n being the number of snapshots. Another solution consists of record buckets of equal size for numerical discretization—a window size w, in this case, is set to a given number

of network updates. In both cases the dynamic network can be represented as a series of static graphs $G_1, G_2, \ldots, G_n$ with $0 \leq n \leq t_n$. A time point t_n is the moment where the network suffers a set of changes in the network represented by the addition or removal of sets of edges ($\{+e_1, +e_2, -e_3, -e_4, \ldots, (+/-)e_n\}$) and/or appearance or disappearance of vertices ($\{+v_1, +v_2, -v_3, -v_4, \ldots, (+/-)v_n\}$). Signs + and − represent the additions or removals, respectively. ***Streaming networks***: When networks are built by a never-ending flow of transient interactions, such as email or telecommunications networks, they should be modeled and represented as graph streams. Graph streams typically require real-time analytical methods. The scenario of graph streams is more challenging because of the computational requirements and the inability to hold complete graphs on memory or disc. Velocity is also an issue because common methods require dealing with graph updates at very high edge rates. Time point t_i is the moment in which a single change in the network occurs. Guha et al. [33] defined this to be the stream model of computation with a stream being a sequence of records $x_1, x_2, \ldots, x_n$ arriving in increasing order of the index i, where x_i may be a new vertex v_i or a new edge e_i.

3.3. Landmark versus sliding windows

When the temporal dimension is added to the analysis of networks, different methodologies regarding the strategy to cope with data that is being analyzed vary. **Figure 5** shows three types of graph data windowing strategies. ***Landmark windows*** by Gehrke et al. [34] encompass all the data from a specific point in time up to the current moment. In the landmark window, the model is initialized in a fixed time point, the so-called landmark that marks the beginning of the window. In successive snapshots, the data window grows to consider all the data seen so far after the landmark. ***Sliding windows*** are better suitable when we are not interested in computing statistics over all events of the past but only over the recent past [35]. Datar et al. [36] incorporate a forgetting mechanism by keeping only the latest information inside the window and disregarding all the data falling outside the window. Usually, the sliding windows are of fixed size. The time-based length sets the window length as a fixed time span. Sliding windows can be overlapping and non-overlapping depending on whether two consecutive windows share some data between them or not. From the several window models presented in the literature [37, 38], two basic types of sliding windows are commonly defined: sequence-based models, where the size of the window is determined regarding the number of observations, and timestamp-based models where the size of the window is defined concerning duration. A timestamp window of size t consists of all elements whose timestamp is within a time interval t of the current period.

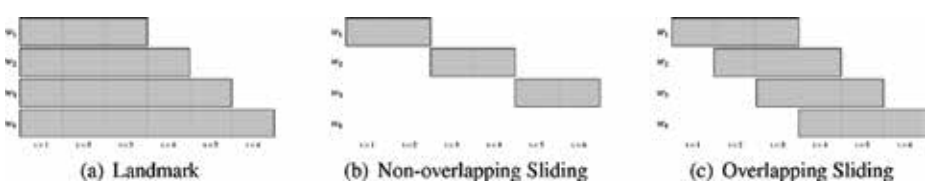

Figure 5. Types of data windows: Landmark window (a) non-overlapping sliding window (b) and overlapping sliding window (c).

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3.4. Types of evolving network analysis

Depending on the timescale of the network and the chosen strategy to cope with network data, distinct evolving network analysis methods are available. These methods are divided into one of the following categories [27]. ***Maintenance methods***: In these methods it is desirable to *maintain* the results of the data mining process continuously over time. Examples of maintenance methods are classification and clustering. ***Analytical evolution methods***: In this case it is desirable to directly *quantify* and *understand* the changes that have occurred in the underlying network. Such models are focused on modeling change. ***Bridge methods***: From a methodological point of view, and in the context of a few key problems, an overlapping of maintenance and analytical evolution methods occurs. These *bridge* methods, such as community detection, fall into both categories.

4. Elementary network measures

In this section, elementary network measures and popular metric used in the analysis of social networks are presented.

4.1. Actor-level statistical measures

Actor-level or node-level statistical measures determine the importance of an actor or node within the network. These measures reveal the individuals in which the most important relationships are concentrated and give an idea about their social power within their peers.

4.1.1. Degree or valency

$$D(v) = \sum_{u=1}^{n} a_{u,v}, 0 < D_v < n \tag{1}$$

$$D(v) = |N_v|, 0 < D(v) < n \tag{2}$$

The degree of valency of a node v is usually denoted as $D(v)$ and measures the involvement of the node in the network. It is computed as the number of edges incident on a given node or as the number of neighbors of node v. The neighborhood N_v is defined as the set of nodes directly connected to v. The degree is an effective measure to access the importance and influence of an actor in a network despite some of its drawbacks like not taking into consideration the global structure of the network. In static networks, the degree can be computed via the adjacency matrix by (1) or using the neighborhood of a node (2). Depending on the type of the networks different degree calculation methods should be made for directed and undirected networks and weighted and unweighted networks.

$$D^{+}_{i,j}(v) = \sum_{t=i}^{j} \sum_{u=1}^{n} a_{u,v} \tag{3}$$

$$D^{-}_{i,j}(v) = \sum_{t=i}^{j} \sum_{u=1}^{n} a_{v,u} \tag{4}$$

$$D^{w}_{i,j}(v) = \sum_{t=i}^{j} \sum_{u=1}^{n} a^{w}_{u,v} \tag{5}$$

For dynamic networks, and generalizing to a directed and unweighted network, the temporal degree $D_{i,j}(v)$ is the total number of inbound edges and outbound edges from a node $v \in V$ on a time interval $[i,j]$ where $0 \leq i < j \leq n$. If we disregard the self-edges from v_{t-1} to v_t for all $t \in \{i+1, \ldots, j\}$, $D_{i,j}(v)$ is equal to $\sum_{t=i}^{j} 2.D_t(v)$ where $D_t(v)$ is the degree of v in G_t (i.e., the dynamic graph at time t). For directed networks, there are two variants of degree centrality: considering *in degree*, denoted by $D^{+}_{i,j}(v)$, (3) is the number of incoming edges to node v or edges that end at v and considering *out degree*, denoted by $D^{-}_{i,j}(v)$, (4) is the number of outgoing edges from node v or edges that start at v. For weighted networks, *strength* is the equivalent to degree but is computed as the sum of the weights of the edges adjacent to a given node (5).

4.1.2. Betweenness

$$\mathcal{B}(v) = \sum_{s,\, d \in V(G)\ v} \frac{\sigma_{sd}(v)}{\sigma_{sd}} \tag{6}$$

$$\mathcal{B}_{i,j}(v) = \sum_{i \leq t < j} \sum_{\substack{s \neq u \neq d \in V \\ \sigma_{t,j}(s,d) > 0}} \frac{\sigma_{t,j}(s,d,v)}{\sigma_{t,j}(s,d)} \tag{7}$$

Node betweenness $\mathcal{B}(v)$ measures the extent to which a node lies between the other nodes in the network. For static networks, (6) is used, where σ_{sd} denotes the number of shortest paths between vertices s and d (usually $\sigma_{sd} = 1$) and $\sigma_{sd}(v)$ expresses the number of shortest paths passing through node v. Nodes with high betweenness occupy critical roles in the network structure once their position allows them to work as an interface between different regions of the network. The temporal betweenness $\mathcal{B}_{i,j}(v)$ (7) for a node $v \in V$ on a time interval $[i,j]$ where $0 \leq i < j \leq n$ is the sum of the proportion between all the temporal shortest paths passing by the vertex v and the total number of temporal shortest paths passing over all pairs of nodes in each time interval $\{[t,j] : i < t \leq j\}$. The temporal betweenness for node v is given by (7). Examples of betweenness algorithms are the Brandes algorithm [39], the incremental algorithm proposed by Nasre et al. [40] and the algorithm proposed by Kas et al. [41] for evolving graphs.

4.1.3. Closeness

$$\mathcal{C}(v) = \frac{1-n}{\sum_{u \in V\ v} d(u,v)} \tag{8}$$

$$\mathcal{C}_{i,j}(v) = \sum_{i \le t < j} \sum_{u \in V\ v} \frac{1}{\Delta_{t,j}(u,v)} \tag{9}$$

Closeness measures the overall position of an actor in the network giving an idea of how long it will take, on average, to reach other nodes from a given starting node. It is represented by the average length of the shortest path between the node and all other nodes in the graph. Thus more central a node is, the closer it is to all other nodes. In general, it is only computed for nodes within the largest component of the network as shown in (8). The temporal closeness is defined by considering m intervals $\{[t,j] : i < t \le j\}$ where $m = j - i$ by varying the start time t of each time interval from i to $j-1$ instead of one time interval $[i,j]$ with the starting time as i. Formally the temporal closeness for a node v is given by (9) where $\Delta_{t,j}(u,v)$ is the temporal shortest path distance from u to v on a time interval $[t,j]$. If there is no temporal path from v to u on a time interval $[t,j]$, $\Delta_{t,j}(u,v)$ is defined as ∞. Since the time-ordered graph $\mathcal{G}$ is a directed graph, $\Delta_{t,j}(u,v)$ is different from $\Delta_{t,j}(v,u)$. Regarding the update of closeness centrality in evolving graphs, it was worked on by Kas et al. [42] and Sariyuce et al. [43]. Kas et al. [42] developed incremental closeness centrality algorithms for dynamic networks. An extension of the Ramalingam and Reps [44] algorithm computes the closeness values incrementally, using all-pairs shortest paths for streaming, dynamically changing social networks.

4.1.4. Eigenvector centrality

$$x_v = \frac{1}{\lambda} \sum_{t \in M(v)} x_t = \frac{1}{\lambda} \sum_{t \in G} a_{v,t} x_t \tag{10}$$

$$\mathbf{A}\mathbf{x} = \lambda \mathbf{x} \tag{11}$$

For a given graph $G = (V,E)$ with $|V|$ vertices, let $A = (a_{v,t})$ be the adjacency matrix of an unweighted network, that is, $a_{v,t} = 1$ if vertex v is linked to vertex t, and $a_{v,t} = 0$ otherwise. The relative centrality score of vertex v can be defined by (10), where $M(v)$ is a set of the neighbors of v and λ is a constant. This definition can be rewritten in vector notation as the eigenvector equation using small arrangements is shown in (11). The classical eigenvector centrality had improvements or variants developed to approach the evolving graphs' problem. Examples are Google's PageRank [45] and Katz centrality [46] as the possible variants of this measure as proposed by Society [47]. The concrete implementation of PageRank variants to evolving networks was developed by several researchers, for example, by Bahmani et al. [48], Desikan et al. [49] and Kim and Choi [50]. These improvements over the original PageRank measure show significantly faster results when compared with the original PageRank that, for being an

iterative process, did not scale well to large-scale graphs. This algorithm will be discussed in detail in Section 5.1 .

4.1.5. Laplacian centrality

$$E_L(G) = \sum_{i=1}^{n} \lambda_i^2 \tag{12}$$

$$E_L(G) = \sum_{i=1}^{n} x_i^2 + 2\sum_{i<j} w_{i,j}^2 \tag{13}$$

The Laplacian centrality permits to consider *intermediate* environmental information around a vertex or node to compute its centrality measure. The centrality of some vertex v is then characterized as a function of the number of 2-walks that vertex v takes part in the network. To estimate the centrality of a vertex, we need to reflect not only the first-order connections but also the importance of their neighbors. These results and related calculations describe the so-called Laplacian energy of the network. Therefore this strategy is known as the Laplacian centrality. The Laplacian energy $E_L(G)$ for a weighted network $G = (V, E, W)$ with n vertices and $\lambda_1, \lambda_2, \ldots, \lambda_n$ eigenvalues of its Laplacian matrix is defined by (12). Considering that $x_1, x_2, \ldots, x_n$ are the vertex sum weights calculated by $x_i = \sum_{j=1}^{n} w_{i,j}$ where $w_{i,j}$ is the weight of the edge from vertex i to j, the Laplacian energy $E_L(G)$ can be computed by (13). The motivation for the incremental Laplacian centrality is supported by the fact that it is known to be a local measure [17, 51].

4.1.5.1. Locality of the Laplacian centrality

The Laplacian centrality metric is not a global measure, that is, it is a function of the local degree plus the degrees of the neighbors (with different weights for each). Qi et al. [17, 51] show that local degree and the 1-order neighbors' degree are all that are needed to calculate the metric for unweighted networks (**Figure 6**).

4.1.5.2. Dynamic Laplace centrality

Regarding the original Laplace centrality algorithm proposed by Qi et al. [51], despite being a static algorithm, it can be used to calculate centralities in changing networks. This is true by

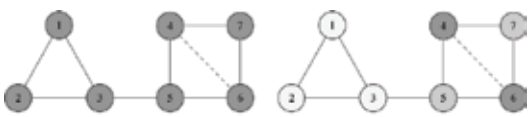


Figure 6. Calculated node centralities with edge {(4, 6)} added. Dark gray nodes affected by addition of edges. Light gray nodes centralities need to be calculated due to their neighborhood with affected nodes.

considering full calculations of the centralities for each network snapshot. In Sarmento et al. [52] proposal, Qi et al. [51] principles were adapted and resulted in two incremental algorithms. The incremental Laplace algorithm by Sarmento et al. [52] presents better computational efficiency, by performing careful Laplace centrality calculations only for the nodes affected by the addition and removal of edges in each one of the snapshots. Thus, it reuses information of the previous snapshot to perform the Laplace centrality calculations on the current snapshot, for unweighted networks only.

4.2. Network-level statistical measures

Before describing network-level statistical measures, it is important to describe three fundamental concepts that are common to static and dynamic networks. ***Path*** represents a sequence of nodes in which consecutive pairs of non-repeating nodes are linked by an edge. When adding the temporal dimension of dynamic networks, the concept of path slightly changes, because non-repeating nodes are now considered only within the same snapshot or time step in what is called a temporal path. Temporal paths can have repeating nodes in different time steps, for example, $A_0 \rightarrow B_0 \rightarrow C_1 \rightarrow B_1 \rightarrow A_2$. ***Geodesic distance***, or the shortest path, between nodes u and v is denoted as $\delta(u, v)$ and defines the length of the shortest path, or minimal path, between nodes u and v in a static graph. For a given time-ordered graph $\mathcal{G}$, a temporal path from node u to node v on time interval $[i, j]$ where $i \leq i < j \leq n$ is defined as any path, $p =< u_i, \ldots, v_i >$ where $i < k \leq j$, having the path length $|p| = \min_{i<l\leq j}\delta(u_i, v_l)$. $\delta(u, v)$ is the shortest path distance, in a static graph, from u to v. The temporal shortest path from node u to node v is defined as the temporal path connecting u to v which has minimum temporal length. In **Figure 4**, an example of a temporal shortest path in a time-ordered graph was shown. ***Eccentricity*** is the greatest geodesic distance between a given vertex v and any other in the graph, that is, $\varepsilon_v = \min_{i \in V(G)\setminus v} d(v, i)$.

4.2.1. Edge bursts

$$\mathcal{B}_{ij} = \frac{\sigma(\tau_{ij}) - \sigma\left(\mu_{ij}\right)}{\sigma(\tau_{ij}) + \sigma\left(\mu_{ij}\right)} \tag{14}$$

A hallmark of a bursty edge is the presence of multiple edges with short interconnect times, followed by longer and varying interconnect times [29]. One of the methods available to quantify bursts is the burstiness coefficient $\mathcal{B}$. Presented by Goh and Barabasi [53], it can be formulated for discrete graphs [54] where bursts are computed by edges using (14), with τ_{ij} being a vector of the intercontact times between nodes i and j though time, $\sigma(\tau)$ is the standard deviation and $\sigma(\mu)$ is the mean. For temporal connectivity being considered as bursty, that is, $\mathcal{B} > 0$, it occurs when the standard deviation $\sigma(\tau)$ is greater than the mean $\sigma(\mu)$.

4.2.2. Fluctuability

$$\mathcal{F} = \frac{\sum_i \sum_j U(A_{i,j})}{\sum_i \sum_j \sum_t A_{i,j}^t} \tag{15}$$

$$\mathcal{F}_i^N = \frac{\sum_j U(A_{i,j})}{\sum_j \sum_t A_{i,j}^t} \tag{16}$$

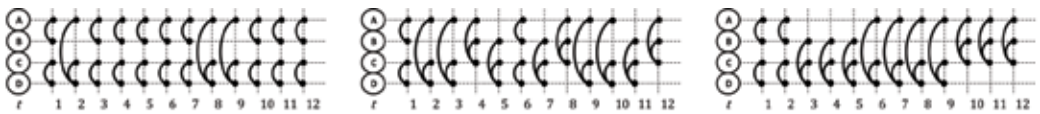
As discussed before, centrality measures provide information about the degree of temporal connectivity while bursts describe the distribution of the temporal patterns of connectivity at the node level. Also, *fluctuability* can be used to retrieve information about the global state of a temporal network, in this case, the quantification of the temporal variability of connectivity [29]. The fluctuability $\mathcal{F}$, as shown in (15), is the ratio of the number of edges present in A over the sum of A_t, with U being a function of the binary output: $U(A_{i,j})$ is set to 1 if at least one of the edges occurs between nodes i and j across time $t = 1, 2, \ldots, T$ and 0 if not. T is the number of time points. The maximum value of $\mathcal{F}$ is 1 and occurs only when every edge is unique and occurs only once. The definition of fluctuability $\mathcal{F}_i^N$ at the node level, when $U(A_{i,j}) > 0$, is defined using (16); when $U(A_{i,j}) = 0$, $\mathcal{F}_i^N$ is equal to 0 (**Figure 7**).

4.2.3. Volatility

$$\mathcal{V} = \frac{1}{T-1} \sum_{t=1}^{T-1} D(A^t, A^{t+1}) \tag{17}$$

$$\mathcal{V}_{i,j}^L = \frac{1}{T-1} \sum_{t=1}^{T-1} D\left(A_{i,j}^t, A_{i,j}^{t+1}\right) \tag{18}$$

The *volatility* $\mathcal{V}$ is a global measure of temporal order that represents how much, on an average, the connectivity between consecutive temporal time-ordered graphs changes [29]. This measure indicates how volatile the temporal network is over time and is computed by (17), where D is a distance function and T is the total number of time points. The distance function quantifies the difference between the temporal time-ordered graph G_t and the



(a) Network with the lowest fluctuability (F = 0.125) and volatility (V = 0.73).

(b) Network with highest volatility (V = 2.55) and fluctuability (F = 0.25) equal to the network C

(c) Lower volatility than B (V = 1.27) but equal fluctuability (F = 0.25) equal to B

Figure 7. Variation of Fluctuability and volatility measures over three different evolving contact networks.

temporal time-ordered graph G_{t+1}. One example of a distance function for volatility can be the Hamming distance. Volatility can be defined at the local level, for example, a per-edge volatility can be computed using (18). An estimate of the volatility centrality of node i can be computed by taking the mean $V^L_{i,j}$ over j (**Figure 7**).

4.2.4. Reachability latency

$$\mathcal{R}_r = \frac{1}{TN}\sum_t \sum_i d^t_{i,k} \tag{19}$$

$$\mathcal{R}_1 = \frac{1}{TN}\sum_t \sum_i \max_j d^t_{i,j} \tag{20}$$

Reachability measures, like *reachability ratio* and *reachability time*, focus on estimating the time taken to reach the nodes in a temporal network [55]. While the reachability ratio is the percentage of edges that have a temporal path connecting them, the reachability time is defined as the average length of all temporal paths. When applying these reachability measures to most real-world networks, if we consider a sufficient time interval, any vertex or node of the networks can reach all the others within that time span. With this assumption in mind, Thompson et al. [29] defined the *reachability latency*, which quantifies the average time it takes for a temporal network to reach an a-priori-defined reachability ratio as defined in (19), where d^t_i is an ordered vector of length N of the shortest temporal paths for node i at time point t. Value k represents the $[rN]$th element in the vector. In case $r = 1$, that is, all nodes are reachable, the former formula can be simplified to (20), which is also known as the *temporal diameter* of the network [56].

4.2.5. Temporal efficiency

$$\mathcal{E} = \frac{1}{T\left(N^2 - N\right)}\sum_{i,j,t}\frac{1}{d^t_{i,j}}, i \neq j \tag{21}$$

For static networks, efficiency is computed as the inverse of the average shortest path for all nodes [29]. *Temporal efficiency*, at first, is calculated at each time point as the inverse of the average shortest path length of all nodes; subsequently, these values are averaged across time points to obtain an estimate of global temporal efficiency as shown in (21).

4.2.6. Diameter and radius

The diameter D is given by the maximum eccentricity of a set of vertices $D = \max\{\varepsilon_v : v \in V\}$ and, analogously, the radius R is defined as the minimum eccentricity of the set of vertices $R = \min\{\varepsilon_v : v \in V\}$.

4.2.7. Average geodesic distance

$$L(G) = \frac{1}{\frac{1}{2}n(n-1)} \sum_{u \geq v} \delta(u, v) \tag{22}$$

$$L(G) = \frac{1}{n(n-1)} \sum_{u \geq v} d(u, v) \tag{23}$$

The average geodesic distance L gives an idea on how far apart nodes will be, on average. For static networks, all combinations of vertex pairs in a network are computed as in (22), where $\delta(u, v)$ is the geodesic distance between nodes u and v and $\frac{1}{2}n(n-1)$ is the number of possible edges in a network of n nodes. Tang et al. [57, 58] defined the *characteristic temporal path* length as the natural extension of the average geodesic distance to time-varying graphs. It is defined as the average temporal distance over all pairs of nodes in the graph as shown in (23), with the temporal distance $d_{u,v}$ between u and v as the temporal length of the temporal shortest path from u to v.

4.2.8. Average degree

$$D(G) = \frac{1}{n}\frac{1}{t} \sum_{i=0}^{t} \sum_{u=1}^{n} \sum_{v=1}^{n} a_t[u, v] \tag{24}$$

The average degree is the mean of the edges of all vertices in a network for all time steps t, with a_t being the adjacency matrix at time t, as shown in (24).

4.2.9. Reciprocity

$$r = \frac{\#mutual}{\#mutual + \#asymmetric} \tag{25}$$

For static networks, reciprocity r is a specific quantity of directed networks that measures the tendency of pairs of nodes to form mutual connections between each other. The value of reciprocity represents the probability that two nodes in a directed network point to each other. For each of the $(n(n-1))/2$ dyads in the network are assigned to one of the three types: mutual, that is, node i has a tie to node j and node j has a tie to i; asymmetric, that is, either i has a tie to j or j has a tie to i but not both; or null, that is, neither the i to j tie nor the j to i tie is present [59]. Given this, reciprocity can be computed using (25), where *#mutual* denotes the number of mutual dyads and *#asymmetric* the number of asymmetric dyads. In an undirected network, reciprocity is always maximum ($r = 1$) because all pairs of nodes are symmetric, that is, dyads are of the type mutual. Brandenberger [24] analyzed the temporal dynamics of reciprocity in congressional collaborations using relational event models.

4.2.10. Density

$$\rho(G) = \frac{m(G)}{m_{max}(G)} \tag{26}$$

Density ρ explain the general level of connectedness of a network. It is computed by measuring the proportion of edges in the network relative to the maximum possible number of edges as seen in (26), where $m(G)$ is the total number of edges of network G and $m_{max}(G)$ the number of possible edges of network G, which is $\frac{n(n-1)}{2}$ for undirected networks and $n(n-1)$ for directed ones.

4.2.11. Global clustering coefficient

Cui et al. [60] propose two definitions of the temporal clustering coefficient of a temporal network. The definitions are temporal-delayed clustering coefficient and the temporal-weighted clustering coefficient.

5. Link analysis

In network theory, link analysis is a data analysis technique used to evaluate relationships (connections) between nodes. Link analysis has been used for the investigation of fraud detection, terrorist networks, computer security analysis, search engine optimization (SEO), market research and medical research, among others. To find the most valuable, authoritative or influential node or the list of nodes in networks, link analysis algorithm were devised to solve this problem in the past. By exploring the relationship between links and the content of web pages, the PageRank algorithm [45] is one of the seminal methods employed to the build of modern and efficient search engines and the information retrieval system in the web.

5.1. Incremental PageRank algorithm

There have been several attempts to improve the original PageRank algorithm [45]. The purpose of several of these improvements was to adapt this algorithm for streaming data. In the original algorithm, each page rank is dependent of the ranks of the pages pointing to it. The PageRank value of a page p is mathematically written as:

$$PR(p) = {}^{d}/_{n} + (1-d) \sum_{q,\, p \in G} {}^{PR(q)}/_{OutDegree(q)} \tag{27}$$

where n is the number of vertices/pages in the graph and $OutDegree(q)$ is the number of hyperlinks on the node/page q. Eq. (27) illustrates an example of computing PageRank of a page P from the pages (**Figure 8(a)**) P_1, P_2 and P_3 pointing to it using (28):

$$PR(p) = {}^{d}/_{N} + (1-d)\left(\frac{PR(P_1)}{OutDeg(P_1)} + \frac{PR(P_2)}{OutDeg(P_2)} + \frac{PR(P_3)}{OutDeg(P_3)}\right) \tag{28}$$

Desikan et al. [49] provided a solution for the update of nodes' PageRank values in evolving graphs in an incremental fashion. The algorithm explores the fact that the web evolves incrementally and with small changes between updates. **Figure 8(b)** shows the two partitions created; one of them, partition P, is unchanged since the last computation, and it has only outgoing edges to the other partition. The other partition, partition Q, is the rest of the graph, which has changed since the last time the metric was computed. The principal idea is to find a partition P in a way that there are no incoming links in the graph from the other partition Q (includes all changed nodes). Then the computation of the PageRank of partition Q can be done separately, scaled and merged with the rest of the graph to get the updated PageRank values of the vertices in this partition. The PageRank of partition Q is computed, taking the border vertices that belong to partition P and have edges pointing to the vertices in partition Q. The PageRank values of partition P are obtained by simple scaling, due to the addition of new nodes. Let the graph of **Figure 8(b)** at the new time be $G(V, E)$: V_b is the vertex on the border of the left partition (only outgoing edges to the right partition); V_{ul}, vertex on the left partition remains unchanged; V_{ur}, vertex on the right partition remains unchanged but whose PageRank is affected by vertices in the changed component; V_{cr} is the vertex on the right partition which has changed, or there has been a new addition. Desikan et al. [61] proposed a divide and conquer approach for efficient PageRank computation based on these assumptions. Other page rank analysis algorithms, in which it is desirable to estimate the page rank on a dynamic evolving graph stream, are available in [62, 63]. Sarma et al. [62] developed a method that can estimate the page rank distribution, the mixing time and the conductance of the graph. Bahmani et al. [63] developed a method for real-time estimation of the personalized page rank in graph streams. Zhang et al. [64] proposed a method for an approximate personalized PageRank on dynamic graphs. The update of PageRank node values in dynamic graph streams has been extensively used to leverage the efficiency of large-scale link analysis, inclusively with applications that have known issues with scalability like, for example, text streams [65].

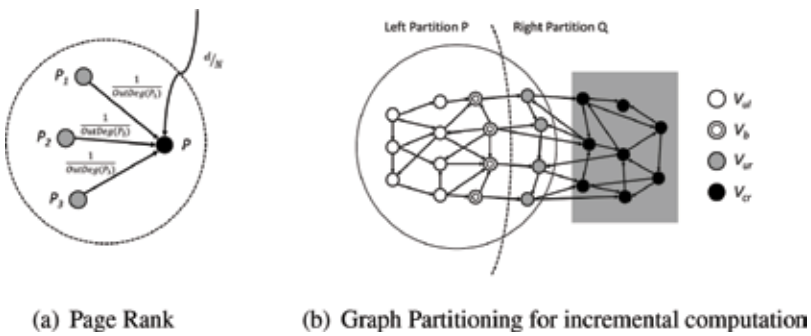


Figure 8. PageRank and graph partitioning used in Desikan et al. [49] incremental page rank.

5.2. Link prediction

To understand the association between two specific nodes, researchers commonly study the dynamics of evolving graphs. In link prediction, the problem we wish to solve is the prediction of the likelihood of a future association between two nodes, knowing that there is no association yet between the nodes, that is, no edge between the nodes. Link prediction is used in bioinformatics, where potential protein connections are inferred from known connections, and during the research of terrorist/criminal networks, where potential criminal connections are inferred from current knowledge of the relationships between criminals. Link prediction is a complex problem. For a social network $G(V, E)$, there are $n^2 - m$ possible edges to infer from our current graph. This is true if we randomly select a non-existing edge. If G is sparse, then $m \approxeq n$. Thus, in limit situations, with a high amount of nodes, we have a n^2 edges to choose from, and the probability of inferring correctly at random is $1/n^2$. Commonly, social networks derived from real-world phenomena are sparse, so inferring random edges is expected to have low accuracy. As networks evolve, it is expected that nodes are added to the network, and the number of possible links grows quadratically while it is expected that new edges grow in a linear fashion with added new nodes. Thus, it is a problem that gets worse in evolving networks as time goes forward.

5.2.1. Common neighbors

Newman has verified a significant correlation between the number of common neighbors of u and v at time t, and there is the probability that u and v will connect or collaborate at sometime after t [66]. The common-neighbors predictor concept is based on the assumption that two—not yet connected—nodes with common neighbors will get connected sometime in the future. This introduction between unconnected nodes means the effect of "closing the triangle".

5.2.2. Jaccard coefficient

The Jaccard coefficient is a common metric in measuring the similarity between different samples. It is used throughout validation tasks in information retrieval research. It measures the probability that both u and v have a feature f, for a randomly selected feature f that either u or v has.

$$JC = \frac{|N_u \cap N_v|}{|N_u \cup N_v|} \tag{29}$$

where N_u is the list of neighbors of u, and N_v is the list of neighbors of v. Thus, in (29), the numerator is the number of common neighbors, and the divisor is the number of unique u and v neighbors.

5.2.3. Adamic/Adar

This measure—also called frequency-weighted common neighbors—refines the simple counting of common features in *JC* by weighting rarer features more heavily [67]. The Adamic/Adar predictor is based on the intuitiveness of considering unusual features more critical in predicting future outcomes. In this example u and v would have to be introduced by

a common friend z, person z will have to choose to introduce the pair (u,v) from N_z pairs of his connections.

$$PA = \sum_{z \varepsilon N_u \cap N_v} \frac{1}{\log|N_z|} \tag{30}$$

5.2.4. Preferential attachment

Another concept, this time with lower complexity, is the preferential attachment [68]. This metric is only in need of node degree information. The intuitiveness is that those nodes with a higher degree have more probability to connect to each other than with a neighbor with a lower degree.

$$PA = |N_u| * |N_v| \tag{31}$$

5.2.5. Katz

The Katz concept [46] is based on the assumption that the closer connected nodes are with a higher number of paths in the network, and these nodes will have more probability of connecting in the future. The concept is also called "exponentially damped path counts".

$$Katz_{score} = \sum_{L=1}^{\infty} \beta^L |Path_{u,v}^L| \tag{32}$$

where β^L is exponentially damped by length $|Path_{u,v}^L|$ of the *Path*, with L being the number of hops between u and v.

5.2.6. Recent developments

Ibrahim and Chen [69] present a method for link prediction in dynamic networks by integrating temporal information, community structure and node centrality in the network providing greater weights for frequently occurring links. Wahid-Ul-Ashraf et al. [70] described the parallelism between Newton's law of universal gravitation and the link prediction tasks. To apply this law, the authors attributed nodes with the notion of mass and distance. Node centrality could be considered as mass, and the authors inclusively tested this concept with degree centrality. The distance between nodes was considered obtainable through several possible methods, that is, by retrieving the shortest path, path count or inverse similarity, by using previously stated measures like Adamic/Adar, Katz score or others. Choudhury and Uddin [71] considered the evolutionary aspects of community network structure. They build dynamic similarity metrics or dynamic features to measure similarity/proximity between actor pairs.

6. Community detection

As a consequence of both global and local heterogeneity of edge distribution in a graph, specific regions of a graph evidence the high concentration of edges within particular regions,

called *communities*, whereas interregions have low concentrations of edges. In the context of networks, these occurrences of groups of nodes in a network that are more densely connected internally than with the rest of the network are called *community structures*. Also known as *modules* or *clusters*, communities can, therefore, be straightforwardly defined as similar groups of nodes. A complete definition using the concept of density can be the following: communities can be understood as densely connected groups of vertices in the network, with sparser connections between them.

6.1. Finding communities in static networks

Fortunato [72] has a comprehensive survey about methods and techniques regarding finding communities. Hierarchical clustering methods can be of two types: agglomerative algorithms, in which clusters are iteratively merged if their similarity is sufficiently high, and divisive algorithms, in which clusters are iteratively split by removing edges connecting vertices with low similarity. ***Divisive algorithms***: One of the most known divisive algorithms is the one proposed by Girvan and Newman [73]. The philosophy of divisive algorithms is the idea that a simple way to identify communities in a graph is to detect the edges that connect vertices of different communities and remove them so that the clusters get disconnected from each other. ***Agglomerative algorithms***: Examples of agglomerative algorithms are the ones that assume that high values of modularity indicate good partitions. So the partition corresponds to maximum value of modularity on a graph. Therefore a modularity measure $\mathcal{Q}$ is used to evaluate the quality of the community structure of a graph. Modularity serves as the objective function during the process of calculating the communities [74]. Modularity $\mathcal{Q}$ with higher values means better community structures. Therefore, to obtain a global higher modularity, the objective is to find community assignments for each one of the nodes of the network such that $\mathcal{Q}$ is also maximized. A greedy algorithm based on modularity optimization has been introduced by Blondel et al. [75] where initially all vertices of the graph are put in different communities (**Figure 9(b)**). The first step consists of a sequential sweep over all vertices, for each of the neighbors picks the community that yields the largest increase of modularity

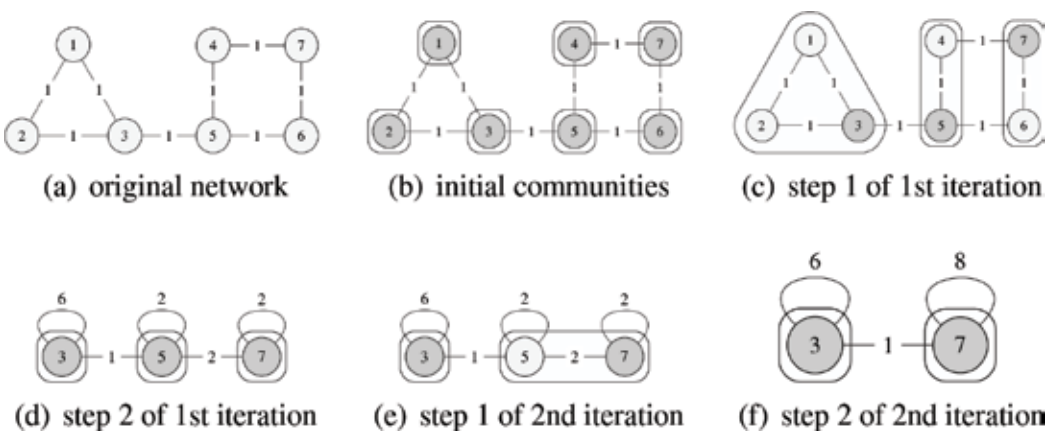


Figure 9. Example of an agglomerative community detection algorithm. In this case the original Louvain [75] with all algorithm steps.

(**Figure 9(c)**). At the end of the sweep, one obtains first-level partition. In the second step, communities are replaced by super vertices, and the weight of the edge between the super vertices is the sum of the weights of the edges between the represented communities at the lower level (**Figure 9(d)**). The two steps of the algorithm are then repeated, yielding new hierarchical levels and supergraphs (**Figure 9(f)**).

6.2. Finding communities in dynamic networks

When discussing methods for finding communities in dynamic networks, the division of methods for slowly evolving networks and streaming networks is consensual [27]. In the following section, an algorithm for both scenarios will be presented and analyzed.

6.2.1. Slowly evolving networks

When moving from static community detection to dynamic community detection, often, static techniques are used to detect communities in evolving network. The Louvain algorithm by Blondel et al. [75] is no exception, and it is still one of the fastest ways to perform community detection on evolving networks by considering individual static snapshots. Frequently employed in dynamic network community detection scenarios by performing individual runs of the algorithm in snapshots of the network, this approach is computationally inefficient and does not allow the tracking of communities in a fine-grained way between static snapshots. The community detection work referenced in the Fortunato [72] survey was later complemented by an incremental community detection algorithm based on modularity and was proposed by Shang et al. [76]. The algorithm applies the principles of events in the life of communities (growth, contraction, merging, splitting, birth and death) as defined by Palla et al. [77] and, in each one of the iterations, calculates the modularity gain of affected communities. This allows to detect and track communities over time in incremental networks. This algorithm only considers the addition of new edges and relies on the original two-step approach used in community detection for static communities. The QCA [78], presented as a fast and adaptive algorithm, provides efficient identification of the community structure of dynamic social networks by allowing the addition and removal of nodes and edges dynamically. The algorithm starts with the initial communities calculated via the Louvain method, and then it applies the adaptive node community changes by considering each node as an autonomous agent demonstrating flocking behavior toward their preferable neighboring groups [79]. The AFOCS [80] community detection algorithm for dynamic networks shares the same principles of QCA being only modified in order to allow the possibility of detection of overlapping communities. A detailed comparison between QCA and AFOCS was presented by Nguyen et al. [80]. Label propagation techniques and specifically speaker-listener label propagation (SLPA) were used in community detection over large networks. LabelRank [81] and GANXiSw [81, 82] used the SLPA technique to perform static network community detection while LabelRankT [83] was designed to handle dynamic networks. Being designed for overlapping community detection, all of the previous algorithms also work in a non-overlapping mode, with satisfactory performance for low overlapping density networks [84].

http://dx.doi.org/10.5772/intechopen.79041

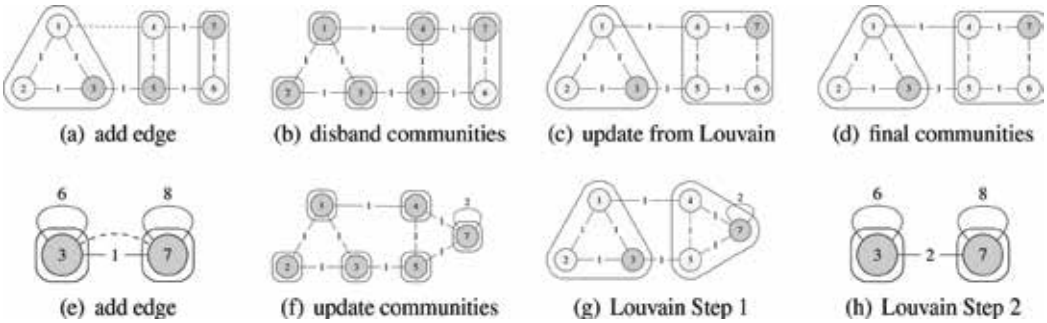


Figure 10. Example of Cordeiro et al. [85] dynamic Louvain for the addition of a cross-community edge (1–4). Top figures show the lower-level network. At the bottom, are shown, the corresponding upper-level network with aggregated communities.

Cordeiro et al. [85] presented a modularity-based dynamic community detection algorithm. The algorithm is a modification of the original Louvain method where dynamically added and removed nodes and edges only affect their related communities. In each iteration, the algorithm remains unchanged in all the communities that were not affected by modifications to the network. By reusing community structure obtained by previous iterations, the local modularity optimization step operates in smaller networks where only affected communities are disbanded to their origin. The stability of communities is also an improvement over the original algorithm (**Figure 10**). Given that only parts of the network change during iterations, the nondeterminism of the algorithm will have a reduced effect on the community assignment. Most node-community assignments remain unchanged between snapshots, providing better community stability than its counterparts.

6.2.2. Streaming networks

For the cases when a large number of edges, representing interactions, arrive continuously, in some cases at high or very high rates, and are superposed over much larger networks, streaming graph algorithms should be preferred to perform community detection. In streaming scenarios, the ability to perform the deletion of edges in community detection algorithms is important. In short, as discussed in Section 3.3, this will dictate if the method of analysis is to be performed over the sliding window of edges, and therefore edges are deleted from the tail end of the sliding window, or over a landmark window, in case there is no possibility to delete or forget old edges. Several methods were proposed for dynamic community discovery in graph streams. Wang et al. [86] motivated by the variability of the underlying social behavior of individuals over different graph regions modeled the problem according to the so-termed *local heterogeneity*, where a local weighted-edge-based pattern (LWEP) summary is efficiently maintained and used afterward to cluster the graph stream and perform dynamic community detection in weighted graph streams. Taking an almost linear time, Raghavan et al. [87] investigated a simple label propagation algorithm that uses the network structure alone as its guide and requires neither optimization of a predefined objective function nor prior information about the communities. By analyzing the problem of real-time community detection in large networks and having by baseline the algorithm proposed by Raghavan et al. [87] with

linear time $O(m)$ on a network with m edge-label propagation, or "epidemic" community detection, Leung et al. [88] proposed a method with near-linear time community detection in graphs. Leung et al. identified the characteristics and drawbacks of the base [87] algorithm and extended it by incorporating different heuristics to facilitate reliable and multifunctional real-time community detection. Yun et al. [89] proposed two efficient streaming memory-limited clustering algorithms for community detection based on spectral methods. Yun and Proutière [90] proposed community detection via random and adaptive sampling. Sariyuce et al. [91] proposed SONIC, a find-and-merge type of overlapping community detection algorithm that can efficiently handle streaming updates. Recently, Hollocou et al. [92] proposed SCoDA, a linear streaming algorithm, for community detection in very large networks.

7. Visualization of evolving networks

The visualization of networks is known to be challenging, and this task gains additional complexity when moving from static to evolving networks. In this section an overview of the methods and techniques is presented, currently used for the visualization of evolving networks.

7.1. Challenges of evolving networks' visualization

The dynamics of social networks remain a challenge regarding visualization [93]. Many researchers argue that traditional graph visualization methods have issues when applied to evolving networks. Additionally, the application of conventional node-link methods to large-scale networks provides low-quality cluttered insights. The overlap of nodes in these conditions is not appropriated when trying to extract information from the network. Zaidi et al. [94] and Aggarwal and Subbian [27] presented an overview of the different techniques and methods that exist for the analysis and visualization of dynamic networks. It included the discussion of the basic definitions, formal notations and a set of the most important and recent work regarding analysis and the visualization of dynamic networks. While static graph visualizations are often divided into node-link and matrix representations, Beck et al. [95, 96] presented a hierarchical taxonomy of dynamic graph visualization techniques. This survey about the state of the art in visualizing dynamic graphs identified the representation of time as the major distinguishing feature for dynamic graph visualizations. Two major visualization categories were found: in one category, graphs are represented as animated diagrams or in a second one, visualizations are a set of static charts based on a timeline. Similar conceptual dynamic network visualization categories were devised by Moody et al. [97], and the authors divide dynamic network visualizations also called as network movies into static flip books, where the node position remains constant but edges cumulate over time and dynamic movies, where nodes move as a function of changes in relations. The graph animation is often used to lower the cognitive effort required to follow the transition from one visualization to the next, according to Brandes and Corman [98]. To facilitate the simultaneous analysis of state and change, a layered three-dimensional network visualization was proposed by Brandes and

Corman [98] in which the evolution of the network is unrolled, and each step is represented as a layer. A complex network with a larger number of links may prevent users from recognizing salient structural patterns. To overcome this common problem with visualization, two widely known link reduction algorithms, namely minimum spanning trees (MSTs) and pathfinder networks (PFNETs), were analyzed and compared by Chen and Morris [99]. Bender-deMoll and McFarland [100] propose a framework for visualizing social networks and their dynamics and presented a tool that enables debate and reflection on the quality of visualizations used in empirical research. With the focus on the evolution of communities over time, Falkowski et al. [101] proposed two approaches to analyze the evolution of two different types of online communities on the level of subgroups. This analysis was conducted by observing changes in the interaction behavior of the members of the communities. Chen [102] devised a generic approach for detecting and visualizing emerging trends and transient patterns in scientific literature. Other recent work of interest is presented by Beck et al. [103, 104] and the visualization of evolving graphs with multiple visual metaphors of Burch [105]. The combination of dynamic network visualization with graph sampling techniques is often used [106].

8. Conclusion and future trends

This chapter provided an overview of the methods and techniques for modeling, analyzing, measuring and visualizing evolving social network analysis. In the past, static techniques were adapted to dynamic networks with relative success, but nowadays, with the advent of social media, scale and velocity of most of those static techniques reveal weaknesses that only can be addressed by methods and techniques designed for dealing with evolving data. After presenting two areas of direct applicability of evolving network analysis such as criminological research and research on journalism, the ways on how dynamic networks can be represented and modeled according to their timescale, windowing strategies and methods of analysis were discussed. These theoretical aspects were then used to present elementary network measures, link analysis methods, community detection methods and visualization techniques. It is clear that in recent years this area of research will continue to have significant development in the future, several problems are still unsolved and many of them can be significantly improved. The areas of applicability of evolving networks and social network analysis are also broader, with many of the abovementioned techniques moving from well-succeeded areas like world wide web, communication, telecommunication and mobile networks, to newer areas like social network recommendations, news and blog analysis and social network event detection. Specifically in the area of social network event detection, the detection of unusual patterns, anomalies or changes in trends in the social streams can lead to valuable information, which can be used timely in many real-word scenarios [107]. Cordeiro [108] addressed the monitoring and tracking of the dynamics of social network communities with the objective to unveil real-world events, whereas Cordeiro [109] was devoted to the problem of mining the twitter stream to unravel events, interactions and communities in real time. Future trends of social network analysis will continue to be driven by future trends and characteristics of the network data, such as the size of data, which is incredibly getting large,

and changes in space and time. On one side, there is the urge for scalable and efficient social network analysis methods, and on the other side, there is the need for methods to study the dynamics and evolution of social networks, able to deal with future velocity and timescale dimensions of the network data. Stray [110] focused network analysis as a tool to bridge the "research to reporting" gap in journalism, starting with two use cases (Seattle Art World [111] and Hot Wheels [112]) and the recent state-of-the-art network analysis and visualizations applied to the Panama Papers case [113] where graph databases and entity recognition were used to build interactive network maps from structured data and raw documents. Therefore, it is expected that the study of evolving networks will continue to be a significant strand of research in the context of social network analysis in the near future.

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Nowadays, social media are amongst the most frequently used entertainment and information sources, offering the most recent news. National, international and global issues of social media journalism involve a wide spectrum of complex questions related to the production, distribution and reception of media contents, as well as a plethora of social, cultural, economic, legal and ethical aspects to consider. The publication you are holding in your hands is an attempt to provide various theoretical and empirical frameworks that may help us better understand social media journalism from different points of view and in diverse contexts. The individual chapters are written by authors with various scholarly affiliations working in international academic circles. Even though the methods they use and problems they discuss vary, they all pursue the same objective – to find out more about the implications of the existence and popularity of social media, especially social media journalism.

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