Article

Assessing the Impact of Digital Alternative News Media in a Hybrid News Environment: Cases from Taiwan and Hong Kong

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Abstract: As consumption of mainstream news media declines and alternative news media proliferates, in this paper, we seek to assess the impact of digital alternative news media (DANM) in relation to mainstream news media (MNM). We examine the range of DANM, especially public Facebook pages, related to two large-scale social movements neighbouring mainland China as case studies of social movement media exerting maximalist effects. The assessment relies on academic sources, archival materials, descriptive social media metrics, and an original analysis of external content shared on public Facebook pages and groups using data collected from the Facebook Graph API. A six-dimensional scheme is proposed to guide the assessment. Sorting through and piecing together multiple sources, we arrive at a multi-faceted description, comparison, and analysis of the impact of DANM during two social movements.

Keywords: alternative media; alternative news media; digital alternative media; digital alternative news media; Facebook; social movement media; Sunflower Movement; Umbrella Movement

1. Introduction

Riding on the rise of networked digital media, the proliferation of DANM is changing what people know and how they think about the world. Consumption of mainstream newspapers has declined, and with the weakening of their gatekeeping power on public information and formation of public opinion, political polarization is troubling many countries around the world (Bradshaw and Howard 2019). This is often attributed to the creation of echo chambers and filter bubbles through network communication on social media (Barberá et al. 2015a; Conover et al. 2011). The spread of disinformation (Faris et al. 2017) has made large-scale commercial social media platforms the target of criticism for their failure to filter harmful content (Lauer 2021). At the same time, in some parts of the world, including where this study is situated, pro-democracy activism is thriving online. In the face of these changes, far more attention has been directed towards the enablements and failings of digital media; but DANM, which produces alternative news that has an impact on their audiences, has received far less attention. In this paper, we attempt to assess the role and impact of DANM in the hybrid news media ecology (Chadwick 2017) where MNM and DANM interconnect via social media. We examine the public Facebook pages of DANM amid a range of digital media related to two large-scale protest movements in Taiwan and Hong Kong. The decision of focusing on social movement news media on Facebook is driven by three considerations: (1) the impact of DANM varies across national and temporal contexts, and social movement media, as a type of alternative media, is expected to be the most active during protest movements; (2) social media has made significant impacts in recent protests; and (3) Facebook was the most popular social media platform in Hong Kong and Taiwan when the protests occurred there. We expect this decision would help us find the maximalist impact of DANM. Similarities in the cultural heritage of the two places with different political systems and media contexts provide opportunities for

enriched understanding. The findings of this study contribute to knowledge of interest to scholars, journalists, and activists.

2. Defining DANM

When the 2018 Reuters Digital News Report surveyed the popularity of alternative and partisan news brands, they were defined as "websites or blogs with a political or ideological agenda with a user base that tends to share these often partisan views" (Newman et al. 2018, p. 44). We consider such a definition appropriate where the survey was conducted, i.e., in the USA and Europe, where hyperpartisan, especially right-wing, news media have grown, but regard it too narrow for the experience of other national contexts in general. Building on previous works including Atton (2002), Holt et al. (2019) articulated a broader definition of alternative news media as perceived (primarily by self, but also by the audience or a third party) correctives to the hegemony of the mainstream news media, in which "alternativeness" could manifest at one or more of four levels: (1) content producers, (2) content/genre/format, (3) media organization and routines, and (4) media system. To explain alternativeness at the level of media systems, Holt et al. (2019) cited the ecosystem of the alt-right news media as an example of an alternative media system in contrast to the mainstream media system, and said the two could interweave although they followed different logics. By this logic, if the alt-right news media can be regarded to form an alternative media system, news media of other political ideologies, such as the left-wing news media, could form another competing alternative news media system, and all of them could coexist with the mainstream news media system within a single country. The definition is culturally neutral and can accommodate variations across national contexts. It is also technologically neutral, and consistent with this position, Holt (2019) discussed some Swedish social media accounts as right-wing alternative media. In China, individuals or organizations that publish content via social media accounts are considered to be "self-media", and are governed as a type of news manufacturer.[1] However, we note that the element of perception in Holt et al.'s (2019) definition encompasses an inherent uncertainty as it opens the possibility of disagreeing perceptions made by different parties.

Holt et al.'s (2019) definition is broader than what is usually considered alternative media in Taiwan, and to a lesser extent, Hong Kong, where the term continues to be defined in association with pro-democracy activism, as has been the case in the west before the rise of alt-right media (Holt et al. 2019). On this ideological position, Cheng (2009) articulated 10 characteristics of alternative media based on Western conceptualizations: (1) aim, (2) content, (3) receptors, (4) revenue, (5) distribution, (6) content copyright, (7) sources of perspective, (8) structure, (9) organization, and (10) innovation and adaptation, which together defined alternative media as citizen-supported and democratically run productions aimed at protecting marginal voices. Cheng (2009) further identified advocacy and grass-roots media as two main types of alternative media. This understanding was grounded on the development of alternative media in Taiwan, which in the 1970s–90s was part and parcel of the process of political democratization (Chen 1998; Lee 1994), and which from the 1990s has become a struggle against inadequacies following media liberalization guided by neo-liberal capitalism (Kuan 2017). Measured against this ideal-type definition, Kuan (2017) identified four forms of existence of alternative media in Taiwan: (1) university-affiliated news media providers such as limedianews; (2) digital native collectives associated with an NGO focused on specific social issues, such as News & Market; (3) individual independent professional journalists; and (4) citizen journalists. In Hong Kong, the term "independent media" is more commonly used than "alternative media". With an emphasis on financial independence from media conglomeration (Ip 2009), different business models and diverse ideologies have characterized independent news media in Hong Kong (Leung 2015; Nip 2019). As compared with Holt et al.'s (2019) definition, Cheng's (2009) ideal-type definition better describes the characteristics of our object of study, although since it is an ideal-type definition, it cannot be expected to match reality entirely. With these observations, we assess the role and impact of DANM's public Facebook pages on the Sunflower Movement (SM)

in Taiwan and the Umbrella Movement (UM) in Hong Kong, contextualized among other digital media technologies and in interconnections with MNM. Some of the prominent DANM providers during the two movements used a website in addition to social media accounts for disseminating news, but for some DANM providers social media accounts were their only channels of news distribution.

3. The Role of Digital Media Technologies in Social Movements

Social media, together with other digital technologies, have been extensively studied in recent social movements (Caren et al. 2020). Their uses in social movements could be simplistically summarized into two types: as instruments of communication and as social spaces of identity and community formation (Nip 2004). As instruments of communication, digital media technologies help social movements in spreading information (Barberá et al. 2015b; Chiu and Hsu 2017; Tufekci and Wilson 2012), networking (Juris 2012; Zhang and Lee 2018), coordination (Wilson and Dunn 2011), and mobilization (Bastos et al. 2015; Chen et al. 2015; Chu 2018; Tang 2015; Vasi and Suh 2016). Among them, the informational function is the most elemental, which underlies the other instrumental functions. In turn, instrumental functions enable the social functions of digital media: networked digital technologies support the expression and exchange of opinions, permitting consultation and discussion (Chadwick and Dennis 2017; Lim 2012), as well as sharing of sentiments about events and experiences, which cultivate emotional bonds between adherents and build their identification with the movement (Kavada 2015; Onuch 2015; Valenzuela 2013). These studies are primarily interested in the implications of the technologies of digital media, although with such interest they also discuss who deploys the technologies (producers, media organizations), and what and how messages (content/genre/format) are crafted especially in significant moments (production routines). The relative significance of DANM as compared with MNM has received less research attention. This paper complements existing studies by highlighting the inter-relationships between DANM and MNM in examining the uses and impact of digital media including Facebook in two social movements. Our assessment focuses on the informational and mobilizational functions of DANM relative to that of MNM.

Research that focuses on digital technologies in social movements, while illuminating new communication practices and mobilization dynamics, does not cater well to assessing the impact of DANM in social movements for three main reasons. First, in addition to deploying digital technologies, social movement actors often spread their messages using older media, such as leaflets and pamphlets, posters (Costanza-Chock 2012; Eleftheriadis 2015), and face-to-face communication including in cabs, around food vendors, mosques, and soccer fields (Lim 2012). This means the impact of digital media technologies on the movement cannot be easily isolated from the impact of traditional media technologies. Second, social movements create and use DANM, but they also strategize to gain favourable coverage by MNM (Costanza-Chock 2012; Rohlinger and Corrigall-Brown 2019), on which many potential social movement supporters rely upon for information (Rane and Salem 2012; Wilson and Dunn 2011). In addition, since the content and production of DANM and MNM affects each other in an interconnected hybridity (Chadwick and Dennis 2017; Jackson and Welles 2015), the real impact of DANM cannot be assessed without considering the relative role of MNM. Third, social movement actors are not the only ones that use digital media. MNM, journalists, governments, and social movement opponents/opposing social movements also use them during periods of protest mobilizations (Howard and Hussain 2011; Lotan et al. 2011), sometimes to demobilize the movement. The impact of DANM on a social movement needs to take into consideration contesting uses by its opponents (Arlt et al. 2019; Freelon et al. 2016). These reasons have led scholars to call for more contextualized assessments of the impact of DANM (Mattoni 2017; Olorunnisola and Martin 2013). In the same spirit, we embark on this study that attends to the impact of DANM in relation to MNM. Informed by the media ecology perspective, and guided by

the concepts of communications effects research and journalism practice, we propose an assessment scheme consisting of six dimensions.

4. DANM in a Hybrid Media Ecology

In this study, we follow the media ecology perspective as a framework for conceiving relationships between DANM and MNM as both competitive and interdependent. Within this framework, we draw on three bodies of literature: theories of (1) alternative media, (2) media systems, and (3) journalism production to contextualize our study. Media ecology is a broad perspective that considers communication technologies, i.e., symbolic and technical means of communication, as human extensions, which form an environment that, in turn, shapes human understanding, feelings, relationships, culture, and social institutions (McLuhan 1962, 1964; Postman 1970).[2] Harold Innis, whose work formed the foundation of Marshall McLuhan's theory, observed that in every historical stage of Western civilization a dominant medium of communication exerts a determinate influence on social organization and culture, but the hegemony arising from groups controlling the dominant media inevitably leads to competition from disenfranchised groups searching for new forms of communication technologies to compete for social power (Carey 1967). This analysis forms the theoretical basis for conceiving DANM as competition against MNM in their challenge and opposition to the hegemony of MNM, a view most often adopted by scholars of alternative media.

Cheng's (2009) definition of alternative media, for example, positions alternative media as anti-theses of mainstream media. Among the 10 characteristics articulated, the aim of alternative media differs from mainstream media by promoting social progress not self-maintenance, in contrast to mainstream media's aim of profit maximization. Alternative media differ from mainstream media in the sources of perspective–ordinary people, especially the underprivileged, rather than experts, academics, government officials, corporate public relations, and media celebrities sourced by mainstream media (Cheng 2009). An antithetical definition highlights DANM's existence as an oppositional component in a media ecology, as suggested in Wang's (2018) analysis of alternative news media in Hong Kong. This oppositional nature alerts us to ask how far DANM succeeds in reaching an audience in their competition against MNM. Centering on their informational and mobilization functions, we also ask whether DANM becomes the main news suppliers of protesters and how effective their mobilization is in social movements.

A competitive relationship does not necessarily preclude relationships of connection. Within Holt et al.'s (2019) broad definition of alternative news media, Holt (2018) proposed a 2 × 2 matrix of a typology of "anti-systemness" for understanding differences among alternative media, based on two independent dimensions: the outlet's self-positioning (relational anti-systemness) and foundational ideologies (ideological anti-systemness). "Ideological anti-systemness refers to the degree of antagonism and distrust displayed by actors in the specific alternative media toward mainstream media and their institutions within the established media system of a nation" (Holt 2018, p. 53). Ideologically, anti-system alternative media would work to replace the entire system, whereas non-ideologically anti-system media would just call for changes to the system (Holt 2018). "Relational anti-systemness refers to media that may, but do not necessarily meet the criteria of ideological anti-systemness, but still . . . may have an impeding and/or polarizing effect on the media environment as a whole" (Holt 2018, p. 53) by holding views that are very far from any other media's, or being unwilling to connect with others (Holt 2018). The difference in "relational anti-systemness" is expected to be manifested in the difference in the way DANM outlets connect to MNM (outlets).

Responding to the digital age, theories of media systems, which used to concentrate on MNM alone (Hallin and Mancini 2004; Siebert et al. 1956), have incorporated nonprofessional participation in media as a relevant dimension of defining media systems (Mattoni and Ceccobelli 2018). In the context of political newsmaking, Chadwick (2017) acknowledged hybridity of older/mainstream and newer/alternative media, and postulated that

"any medium is best understood in terms of its position in a system of interdependent relationships with other media" (p. 24). Holt's (2018) four ideal types of "anti-systemness" (including non-anti-systemness" as one type) of alternative media offers a conceptual framework for analyzing different relationships between DANM and MNM, which may see the co-existence of one or even multiple alternative media systems existing alongside a mainstream media system in a single country (Holt et al. 2019).

In journalism studies, content produced by nonprofessionals (in what is sometimes called citizen journalism) has become integrated into routines of mainstream news production. Bruns (2003) coined the term "gatewatching" to refer to this process: news organizations "observing the stories covered in other mainstream, as well as alternative outlets and linked to shared, and expanded on these stories in their own coverage" (Bruns 2018) (p. 2). In addition, casual observation has revealed that many DANM republish news published by MNM, often added with their own slant. This interaction suggests an interdependence between DANM and MNM, which can be accommodated within the media ecology perspective, as "a media ecosystem is defined in analogy with a traditional biological ecosystem as a system consisting of human beings and the media and technology through which they interact and communicate with each other" (Logan 2010, pp. 33–34). The interdependent nature of DANM and MNM motivates us to ask about DANM's influence on the news agenda of MNM. We are less concerned about whether DANM providers in Taiwan or Hong Kong form one or multiple alternative media systems (the answer of which may differ), and therefore, focus on DANM versus MNM as two categories.

5. Assessing the Impact of DANM Relative to MNM

Alternative media can be considered to be either a product or a process (Atton 2002). As a product, alternative media impact through the alternative or oppositional information and analysis provided, and counter-public spheres formed, as is the case in studies of alternative media in Taiwan and Hong Kong (Ip 2009; Kuan 2009, 2017; Lee 2015; Lee et al. 2015; Leung 2015; Leung et al. 2011; Yung and Leung 2014). But their impacts depend on the size of their audience. Audience market research of traditional media outlets commonly relies on circulation or ratings to measure outlet performance. Alternative news media providers rarely employ audit or rating services, but KPFT, a community radio in Houston-Galveston, which did, found that it occupied less than 1% of the entire radio audience in the hyperlocal U.S. market (Guo 2017). A 2005 report found that ethnic media reached about a quarter of the entire U.S. adult population of 51 million, and among them, 57% preferred ethnic media to mainstream media (Shi 2009). A 2018 Reuters Digital News survey found that the weekly usage of national DANM outlets ranged from 1% to 17% in the USA and 10 European countries. On social media, the number of page likes or followers of a public account is an indicator of its audience reach. The best known hyper-partisan news sites in Norway had fewer followers than national mainstream news outlets on their Facebook pages, but the average number of their followers exceeded that of regional news outlets (Larsson 2019). These numbers, while confirming that alternative news media only reach a minority, also suggest that at least some alternative news outlets have a bigger audience following than some may think.

Earlier studies of audience research in communication studies have assumed the dominance of a particular medium, often television, and have sought to study the relationship between television content and audience behaviours. The relative dominance of DANM as news suppliers of their users is, therefore, a relevant indicator of the impact of DANM.

The micro level of content exposure of individual consumers is probably studied the most in communications research of media effects. On digital media, frequency/duration of exposure and subsequent user interactions are captured by web and social media metrics. In this study, we focus on the number of post shares of individual DANM outlets as a measure of user interaction with dual significance. On the one hand, news sharing is an indicator of audience behavioural effect contingent upon news access. On the other hand, news sharing is an act of online mobilization. Although, on Twitter, some users declare that

retweet ≠ endorsement, retweets have been found to indicate interest, trust, and agreement (Boyd et al. 2010; Metaxas et al. 2015). Users of alternative news, especially partisan ones on the political right, shared news more than users of mainstream news in the USA and Norway (Hiaeshutter-Rice and Weeks 2021; Larsson 2019) and have been found to be the mechanism responsible for the spread of disinformation (Faris et al. 2017). In the context of social movements, the impact of DANM is ultimately manifested in the degree of success in mobilizing news users to participate in offline protests.

Beyond influencing the audience directly, intermedia agenda setting, which focuses on the interdependence of news outlets on each other in the news making process, is a mechanism for influencing the audience indirectly through other media outlets. Intermedia agenda setting (McCombs and Valenzuela 2020) has been found at the levels of the story (Harder et al. 2017), issue, and attribute (Ragas and Kiousis 2010; Vonbun et al. 2016). Harder et al. (2017) found that speed (or immediacy) was a key factor in an outlet's agenda setting power. Hence, being the first to break news could set off a process of intermedia agenda setting, apart from being an indicator of journalistic performance. To what extent DANM and MNM rely on each other as news sources is a measure of the comparative intermedia agenda setting power of the two media sources. Populist right-wing media in northern Europe are more likely to set the agenda of MNM in countries where their ideologies are considered legitimate as compared with where they are considered to be deviant (Nygaard 2020). When blogs emerged as a form of DANM in the early 2000s in the USA, cases in which political blogs set the story agenda of MNM drew high attention.[3] A study in the USA, in 2007, found that partisan blogs of similar ideology were more likely to share an issue agenda; networks of left-leaning and right-leaning political blogs were separately able to set the online news agenda of traditional media (Meraz 2011).

Research Questions and Methods of This Study

Based on the above theoretical and empirical reviews, we aim at an integrative assessment, which considers six dimensions of DANM's impact on the SM and the UM, answered by three main research questions. Different from many empirically oriented academic studies, which have highlighted specific aspects of impact for investigation, we pull together results from existing studies and materials, and supplement them with metric searches and an original analysis of Facebook data. Our research questions are:

- What is the audience reach of DANM relative to MNM during the SM and the UM?

To answer this question, we rely on (1) Facebook page follower/like counts recorded by published studies, (2) Facebook post share counts reported in published work and presently retrieved by us, and (3) an original analysis of external content shared in the posts of the most shared public Facebook pages/groups of the two social movements.

- Did DANM serve as the main supplier of news for protesters in SM and UM?

To answer this question, we rely on (1) a review of published materials, (2) checked against newly collected Facebook metrics, and (3) supplemented by the same original analysis of shared external content.

- Did DANM set the agenda of MNM during the SM and the UM?

To answer this question, we (1) check back-dated Facebook posts on various MNM and DANM pages to find out whether DANM broke news about the movements and (2) we look for mentions of MNM sourcing news from DANM in published documents.

Three sources of information and data are used: (1) Published materials consisting of academic studies, news reports, commentator observations, and participant self-reports about the two movements that have accumulated over time. We start from Google and Google Scholar to identify relevant materials. From these documents, which we do not claim to be exhaustive, we follow a network approach and further search for some of the references mentioned in them and some that cite them. Among the sourced documents, we inspect the temporal and spatial relationships of events, compare and contrast their claims, and identify connections about the uses and impact of news media providers between

them. (2) Descriptive metrics that we newly collect from CrowdTangle, a social monitoring platform owned by Meta (formerly Facebook), to which we gained access in late 2020. We use them to supplement and check information gleaned from published documents. (3) An original analysis of external content shared in the posts of the most shared public Facebook pages/groups of the two social movements, based on data collected from Facebook's Graph API. The methods of this original study are explained in Section 10.1.

Our method of combining a qualitative literature review, back-dated descriptive metrics, and an original quantitative analysis of content is unconventional. But together, they effectively answer our research questions. Although a sizable body of academic studies has been published about the SM and the UM, they mainly revolve around the use and impact of digital media, rather than DANM. Our review produces a rich description of the role of DANM during the SM and the UM, while back-dated metrics help to counter check and sometimes query inconsistencies identified. The original quantitative analysis helps to fill in gaps of the literature review by answering the important question of whether it is DANM or MNM content that is shared on social media. Before we report our original study, first, we introduce the contexts of the two social movements and report our integrated review about the use and impact of digital media (including but beyond Facebook) during the two movements.

6. Socio-Political and Media Contexts of the SM and the UM

The SM erupted in Taipei, the capital of Taiwan, on 18 March 2014 when students occupied the Taiwan legislative chamber after the legislature passed the Cross-Strait Service Trade Agreement (CSSTA) with China in 30 s without allowing legislative deliberation. Prelude to the UM in Hong Kong happened on 26 September 2014, when students who opposed a restrictive blueprint announced by China for electing the Hong Kong Chief Executive in 2017 broke into the gated square, which they called "Civic Square", outside the central government offices. The movements were both unprecedented in scale in the recent history of Taiwan and Hong Kong: The 24-day SM won 48% support from the then 23.4 million population in Taiwan for its occupation of the legislative (and later executive) chamber and aroused a support rally of allegedly 350,000 to half-a-million people outside the presidential office in Taipei on March 30 (Ho 2015); the 79-day UM spanned September to December, involving 18–20% of the adult population of Hong Kong (Lee and Chan 2016), and won 31–38% support from (a total of 7.3 million) people in Hong Kong at various points of the movement.[4] Despite being often described as student movements, both movements involved a broader socioeconomic demographic. The population of both Taiwan and Hong Kong are overwhelmingly Chinese by ethnicity but, in 2014, the two places were each governed by a political system different from that of the People's Republic of China (PRC). Taiwan is formally the Republic of China (ROC), the regime replaced by the PRC at the loss of a civil war that moved to Taiwan in 1949 when the PRC was established; Hong Kong is a special administrative region of the PRC under the "one country, two systems" arrangement, created by China in agreement with Britain when the British colonial rule over Hong Kong ended in 1997. In Taiwan, increasing connections with China under the Ma Ying-jeou administration (2008–2016) have raised an alarm about China's influence; in Hong Kong, the slow pace of democracy and increasing influence from China since 1997 has created long-standing frustration and discontent about China.

The SM and the UM both built on their history of alternative media and networks of civil society organizations in their struggle for press freedom and democracy. When Taiwan was ruled by martial law (decreed as a state of emergency during the period of hostility towards the PRC) between 1949 and 1987, small-scale political magazines gave voice to aspirations for democracy. After a democratic political system was institutionalized in 1996, a wave of underground radio stations and television appeared before media liberalization was legislated. Since 2008, China's influence on the news media via pro-Beijing media tycoons has spurred online left-wing activist and community news media (Kuan 2009) and a series of pro-democracy social movements.[5] In Hong Kong, elections were introduced into

the legislature in 1981 in preparation for the change in sovereignty, but since 1997, China has refused to allow full democratization in the territory. While many of the MNM have been co-opted to support China, *Apple Daily* (Hong Kong), the tabloid-style broadsheet launched in 1995 shone as an exception to the captured MNM (Frisch et al. 2018). A range of online pro-democracy alternative news media sprang up from the early 2000s (Nip 2019), while waves of large-scale protests persisted over the years. Pro-China DANM outlets also appeared from 2013 (Nip 2019). In anticipation of China's electoral announcement due in August 2014, civil society organizations in Hong Kong had been planning, since 2013, to stage an occupation of the central business district of the city (the Occupy Central with Love and Peace Movement, OCLP) on 1 October 2014, in the event of a disappointing announcement. But it was the tertiary students who had been striking since 22 September and who occupied the Civic Square at the end of their strike that jump started the movement. Eventually, the SM achieved its immediate goal, and the Taiwan government stalled the trade agreement with China, but the UM failed in achieving further democratization in Hong Kong.

The two movements benefited from the freedom of information afforded by an uncensored telecommunications environment, where in 2014, Facebook had an adoption rate of 65% in Taiwan and 63% in Hong Kong, and where smartphones were adopted by 65% of the population in Taiwan and 87% of those in Hong Kong.[6] We choose to study DANM during the SM and the UM because we considered social movement news media the most significant among other alternative news media given the history of pro-democracy activism in the two places.

7. DANM during the SM

The scale and sophistication in the use of digital media technologies during the SM have pushed the transformation of the news ecology to the front and centre of communications research in Taiwan (Lai et al. 2016). Based on interviews with the SM organizers, Liu and Su (2017) concluded that the success of the movement depended on an interdependence between SM's use of digital media and MNM, with public and private social networks on social media, notably Facebook and LINE, playing an indispensable role in amplifying news about the movement. While there is broad agreement that the monopoly of MNM in public information distribution has been eroded by new media (Lai et al. 2016), the relative importance of MNM and DANM during the SM is an unsettled question.

7.1. Information Provision by DANM during the SM

The alternative informational function of DANM stood out from the moment when students broke into the legislative chamber on the night of 18 March 2014 after a protest gathering against the "black box" process of the passage of the trade agreement. G0v, a civic hacker collective formed in 2012 after a hackathon[7] tasked with live broadcasting the gathering, became the first to record and publish the impromptu occupation before MNM set up their satellite news gathering links on the scene.[8] Inside the legislative chamber, a web engineer started live streaming the occupation using an iPad held up by a pair of slippers on UStream (Cheng 2015).[9] Within 24 h of the occupation, a list of protester demands in 29 languages was made available on the website g0v.tw for Internet users to share.[10] To ensure continued 24/7 live broadcasting of the occupation, g0v relied on a WiMax router (later changed to a self-setup LAN) to live stream 17 video feeds and three text feeds (one of which was in English, all updated every minute) of the occupation from inside and outside the chamber using webcams.[11] G0v also set up a publicly accessible hackfoldr, later transformed into g0v.today,[12] to consolidate information, including "speech and meeting transcripts, discussion forums, news archives and even lunch order sheets" (Cheng 2015; Lee 2015, p. 36) coming out from the legislative occupation. On 26 March 2014, g0v formalized its status as a DANM provider by issuing press cards to friends of g0v and citizen reporters.[13] From 2 April 2014, g0v.public was set up on the LAN of the

legislative complex to publish live broadcasts of MNM and their self-produced news about the occupation on the same interface for access by passersby.[14]

Throughout the movement, the public Facebook page of social movement organization Black Island Youth (@lslandnationyouth), whose leaders were among the legislative occupiers, and the Facebook page @antiblacktw, created by g0v, were the main sources of news about the developing action, according to a journalism student who was part of the 24/7 citizen news production, NewseForum, formed in the early days of the occupation by approximately 90 journalism students from at least six universities in Taiwan.[15] Other notable SM DANM outlets were musou.tw, a live broadcasting site created by citizen media; *Watchout*, credited for breaking the news about the passage of the trade agreement by the legislature before MNM[16]; and 4am.tw, created alongside a fundraising campaign (Cheng 2015; Liu and Su 2017). A total of 12 digital platforms including Facebook, Youtube, UStream, niconico, and PTT (a Taiwanese bulletin board system) were used in publishing and discussing information about the movement.[17] Together, the SM DANM created an informational world about the movement very different from that provided by MNM, many of which portrayed the occupiers as rioters.[18]

Before the rally on 30 March 2014, information about it was predominantly disseminated via Facebook.[19] In preparation, organizers set up a hardware network of mobile communications in the planned congregation area to enable and facilitate participants to share news about the rally using their smartphones.[20] They also set up large video screens every 400 metres[21] for broadcasting camera input from segmented locations of the area, akin to live television broadcasting (Liu and Su 2017). Beyond providing information, which could be mobilizing in nature, DANM during the SM organized mobilization. An example was the 123.g0v.today website, which enabled people to petition their legislators easily [22] and the crowdfunding website flyingV.cc was launched to raise funds (Cheng 2015).[23]

7.2. Offline Mobilization Effects of DANM during the SM

In the absence of MNM reporting, a call made on the night of March 18 via the Facebook pages of student organizations for others to join the occupation succeeded in mobilizing over a thousand people to arrive within a few hours (Liu and Su 2017). Half a million turned up to the March 30 rally in front of the presidential office in Taipei,[24] and outside Taiwan, Taiwanese students and expatriates in 49 cities across 21 countries joined supportive rallies.[25] Donations received were so overwhelming that unused tents, blankets, raincoats, safety helmets, loudspeakers, medical supplies, food, electronic equipment, and other items filled 20 vans when they were redonated to other users at the end of the occupation.[26] Over USD 200,000 were raised on flyingV.cc within three hours for placing a full-page advertisement "Democracy at 4 a.m." in the *New York Times* and the *Apple Daily* (Taiwan) (run by the same company that published *Apple Daily* (Hong Kong)).[27]

A survey sampled by a combination of geographical and temporal stratifications among 989 occupiers around the Taiwan legislative chamber on 25–29 March 2014 (Chen et al. 2016), however, found that the effect of mobilization for participation by online connections (which could have happened in the online communities of DANM outlets) was small (7%), as far more decided "on their own" (48%) or were invited by offline interpersonal contacts (37%) to participate. Yet, it is not clear to what extent news provided by DANM and shared among interpersonal contacts contributed to the motivation of joining the protests.

Controlling demographic factors, those who relied on online and social media as main sources of information were more likely to be committed offline protesters spending many more hours on scene than those who relied on MNM (Chen et al. 2016). Another study (Chen 2016) corroborated with one other finding of Chen et al. (2016) that heavier users of social media/Facebook were more likely to participate in offline protests during the SM. Users of Facebook for non-social informational purposes were found to search for Facebook

pages related to the SM or independent media to meet their need for information about the SM (Chen 2016).

7.3. Audience Reach and Reader Interactions with DANM during the SM

The SM DANM certainly tapped into a need for information about the movement. During the initial hours of the occupation, the live UStream of the occupation had 800,000 real-time views. In 22 days, UStream had over 2 million accumulated views, and Niconico, which received and published the UStream live video, had an accumulated 90 million views.[28] Discussion on the PTT bulletin board exploded, to the extent that the full capacity of 150,000 users on the board was reached multiple times during the movement.[29] Facebook page likes of @Islandnationyouth jumped from several thousand to over 200,000 in several days;[30] the page following of @antiblacktw increased from 6000+ to over 300,000 in three days,[31] and that of @NewseForum swelled from 890 to over 130,000 in 22 days.[32] The SM organizers suggested that information outlets established by g0v.tw and online forums relied on networked social media especially Facebook for amplification (Liu and Su 2017).

Inspired by Ukrainian Yulia Marushevska's "I am a Ukrainian" YouTube video (made in 2014 after the EuroMaidan Revolution in Ukraine), which fetched 8 million views and landed her on CNN, the SM organizers encouraged the production of dozens of "I am a Taiwanese" videos in four languages, but none of them came close to the success of the Ukrainian video.[33] An English-language post on the Reddit "Ask Me Anything" forum only drew 2400 votes and 791 comment, according to our observation on 4 December 2020.

While there is little doubt that DANM contributed to successes in domestic mobilization, the part played by MNM is uncertain. During the SM, the ratings of television news channels that were supportive of the SM increased (the top three by 39.2% to 96.3%), while some of those that opposed the SM decreased.[34] During the SM, the traffic of the top MNM websites in Taiwan also increased. Alexa metrics showed that *Apple Daily* (Taiwan) enjoyed the largest increase in absolute numbers among the top four newspapers, and *Liberty Times*, a pro-Taiwan identity newspaper, showed the highest growth in proportion, coming close in absolute number to *China Times*, which ranked third (the second was *United Daily*).[35] *Apple Daily* (Taiwan) started live broadcasting the legislative assembly occupation the afternoon after the occupation started until its end (Liu and Su 2017). Before the 30 March 2014 rally, *Apple Daily* (Taiwan) also reported supportively about the upcoming event. The hit rate of its website the day after the occupation of the executive offices (which occurred on 23 March 2014) surpassed 24 million, 40% higher than usual (Liu and Su 2017). If we consider the initial invasion of the legislative chamber and subsequent intrusion into the cabinet offices of having comparable news value, then the 24 million *Apple Daily* (Taiwan) hits indicate a much larger audience reach than the 800,000 UStream views. A commentator observed that during the SM, other than information shared by friends (the original suppliers of which are not easily identifiable), *Apple Daily* (Taiwan) was the main supplier of news about the movement for the Taiwan population.[36] The number of post shares on the top three pro-SM DANM Facebook pages, @lslandnationyouth, @NewsEforum, and @antiblacktw, totalled 363,000, higher than the total post shares of the three Facebook pages of two pro-SM MNM, *Apple Daily* (Taiwan) and *Liberty Times* (*n* = 203,000), according to back-dated metrics we collected from CrowdTangle on 24 June 2022 (Table 1). This comparison does not involve a representative sample; nevertheless, given that the other two of the most read newspapers and the television stations in Taiwan mostly opposed the SM, it gives an indication of the relative activeness of DANM versus MNM in online pro-SM mobilization as measured by post sharing.

Table 1. Share counts of Facebook posts during the SM (18 March and 10 April 2014) *.

Facebook Page Owner	Facebook Page	Media Category	Total Post Shares	Majority Type of Shared Posts
Liberty Times	@m.ltn.tw	(pro-SM) MNM	193.7k	Links (99.9%)
Black Island Youth	@lslandnationyouth	(pro-SM) DANM	151.2k	Statuses (54.6%)
NewsEforum	@NewsEforum	(pro-SM) DANM	135.3k	Photos (76.7%)
Anti-CSSTA Democracy Alliance	@antiblacktw	(pro-SM) DANM	76.4k	Statuses (42.6%)
Apple Daily (Taiwan)	@appledaily.tw	(pro-SM) MNM	4.7k	YouTube Videos (43.8%)
Apple Daily (Taiwan)	@apple.realtimenews	(pro-SM) MNM	4.6k	Links (99.7%)
United Daily	@myudn	Neutral MNM	3.5k	Links (89.3%)
China Times	@CTfans	(anti-SM) MNM	2.7k	Statuses (63.0%)

* Total post shares of DANM and MNM Facebook pages mentioned in documents cited in the main text above are retrieved from CrowdTangle, and those with the highest total post share counts are reported in Table 1.

7.4. Importance of DANM as a News Supplier during the SM

Most of the respondents in Chen et al.'s (2016) survey relied on social media (mostly Facebook) as the most important source of information about the SM (59.1%), far exceeding those who relied on online sources (22.7%) or traditional media (12.9%). What is unknown is whether the suppliers of news on Facebook were DANM or MNM. The number of post shares reported above suggests the suppliers might have been more likely to be DANM than MNM. However, some of the DANM posts (which were heavily shared) might have been republished MNM news. Our original study addresses this question partially by comparing the extent of DANM versus MNM news published outside but shared on Facebook.

7.5. News Sourcing from DANM by MNM during the SM

Being first-hand sources of action, the SM DANM became sources of MNM news about the occupation. They also became sources against which MNM checked information found online (Liu and Su 2017). It is also likely that DANM also sourced materials from MNM. The many forms in which MNM and DANM mutually sourced from each other are not easily identifiable. One unusual form that it took during the SM was that *Apple Daily* (Taiwan) opened the "instant news" space on its website (in fact, since January 2014, due to concerns about its circulation, unrelated to the SM) to more than 10 alternative news media (of which *Watchout* seemed to be the only one of the prominent ones mentioned above that was included) for publishing news digests and commentaries (Chang 2014).[37] An operator of one of those curated DANM outlets said only about 10% of those who accessed their news on *Apple Daily* (Taiwan) would follow the link of the digest to view the full story on their website.[38]

Sourcing by international MNM, either from the SM DANM or directly from SM leaders, was less common, despite press releases being published in 13 languages by a team of 80 on roster in the legislative chamber, and a team of English-speaking SM occupiers was tasked with arranging interviews for international news media with occupation leaders.[39] There were few news reports in foreign media about Taiwan's legislative occupation (Rowen 2015).

8. DANM during the UM in Hong Kong

Similar to during the SM, scholars have observed that the success of the UM mobilization relied on a broad range of media including MNM, DANM, social media, and interpersonal communication (Lee and Ting 2015; Lin 2017). The group that had long planned an occupation, OCLP, for example, initially used mass media to disseminate their ideas by contributing to newspaper columns, but later adjusted their communication

strategy in response to the media habits of the UM supporters (Lin 2017). However, both organizers and participants of the UM considered social media, especially Facebook, the most important media platform during the UM (Lin 2017).[40]

8.1. Information Provision by DANM during the UM

Based on historical data collected from CrowdTangle, we found that at least one DANM outlet, the Social Record Channel (@socrec), was live broadcasting on Facebook alongside MNM providers at the end of the protest gathering on the night of 26 September 2014, when students pushed open the gate and entered the Civic Square. Soon, citizens flooded the vicinity of the square in support of the students, and after police fired 87 tear gas bombs on 28–29 September 2014, many more joined the occupation, which spread and continued in several other business centers of Hong Kong until 15 December 2014. In that period, the massive public occupation dominated the news agenda of MNM and DANM alike.

The public Facebook pages of the two student groups that initiated the occupation, i.e., Scholarism (@Scholarism) and the Hong Kong Federation of Students (@hkfs1958), became "official" suppliers of the group's public statements and announcements of action.[41] Long-standing pro-democracy alternative media *In Media Hong Kong* (@inmediahknet), *Passion Times* (@passiontimes), and SocRec also published abundant original reports about the UM on their Facebook pages and live YouTube channels.[42] During the UM, multiple new public Facebook pages were launched.[43] One of them was the "People on the Streets" page, which published photos and short stories of individual UM participants.[44] In addition to Facebook pages that posted in Cantonese targeting the domestic population, some Facebook pages, such as the Political Reform Concerns Group of Hong Kong People in Korea, were newly created in other countries using foreign languages (Cheng and Hung 2017). On the one hand, Twitter accounts in multiple languages, supported by almost 800 translators,[45] were used to target audiences elsewhere.[46] The twitter account of OCLP (@oclphk), on the other hand, retweeted English news about the UM.[47]

Launched by several artists, the "Stand by you: 'Add oil' machine for OCLP" project used high-power projectors to display supportive messages received on a newly launched website onto giant LED billboards in occupation locations.[48] Within two months, 30,000 messages from 70 countries were projected.[49] Online hubs established by collectives of computer programers, such as Code4HK (whose name was later usurped by a mobile malware app), helped to aggregate and disseminate information. On today.code4.hk, "a livestream from four TV channels covering the events, a map of local rest stops and supply centres, a Google Doc that's updated with relevant news (events, police presence, headcount estimates), and a Google Doc that tracks and organizes supply distribution", plus a load of live streams, news, and advice information released by various supporting groups were available. Its "Go Out Info" tab, for example, recommended nine useful apps for protests.[50] However, the information capability of pro-movement DANM sites was compromised by hackers who knocked their sites offline for 10 days after the start of the Civic Square occupation,[51] which was followed by threats from the supporting hacktivist group, Anonymous, to take down websites of the Hong Kong government.[52]

8.2. Offline Mobilization Effects of DANM during the UM

Despite the inconveniences created by the large-scale occupation, the UM received strong territory-wide support throughout, according to a series of territory-wide surveys. However, support might have fallen slightly in December (34%) as compared with October 2014 (38%), whereas non-support rose (from 36% in October to 42% in December).[53] Success in offline mobilization of the UM was also reflected in the holding of supportive rallies in at least 64 cities around the world,[54] and expression of support from popular musicians domestically and internationally.[55] Within a week from the start of the occupation, the

umbrella, used by students to protect themselves from police pepper spray and tear gas, became a widely recognizable symbol of solidarity.[56]

Offline mobilizing effects of DANM were found in a territory-wide telephone survey conducted before the UM, in April 2013, which reported that the frequency of reading DANM news predicted participation in protests and support for democracy, whereas the use of social media to acquire news predicted the use of DANM (Leung and Lee 2014). However, a later representative telephone survey conducted in September 2013 involving one of the authors of the April 2013 study, when OCLP was in planning, found that mere frequent pro-democracy DANM exposure did not predict support for OCLP; instead, being able to name social movement groups and leaders was a factor that mediated support for OCLP (Lee 2015).

On the whole, the mobilization effect of DANM seemed smaller than that of MNM during the UM. Another survey among occupiers, conducted in Hong Kong in October 2014, found that 55.8% of them decided to join the UM action on 28 September 2014 (Tang 2015). The timing of their decision suggests that they were driven by police use of tear gas on the students, which was shown live both on DANM and MNM.[57] Lin's (2017) interviews with occupiers on site found that 37 of 52 of them (71.2%) said they joined because they saw the live television broadcasts of police use of tear gas.

8.3. Audience Reach and Reader Interactions with DANM durring the UM

On Facebook, the page likes of both DANM and MNM recorded growth during the UM period: Eight DANM pages (one of them anti-movement) saw a growth in page likes from 42% to 377% between 28 September and 15 December 2014 (Kwong 2015). @inmediahk, which had the highest number of page likes among the pages studied, saw a growth of 128% in page likes, from 180,000 to 411,000 (Kwong 2015). The other seven pro-movement DANM outlets had page likes ranging from 43,000 to 286,000 at the end of the UM, on 15 December 2014. However, another study, conducted by a journalism professor and his students in the Chinese University of Hong Kong, over a shorter period, reported a higher number of page likes for @inmediahk on 28 September, 247,000 (instead of 180,000), and 390,000 on 2 November 2014, which represented 58% growth during the shorter period.[58] The study found that the growth of page likes of the instant news page of a politically neutral newspaper *Ming Pao* (@mingpaoinews) (the only news page of the newspaper) during 28 September–2 November 2014 was much higher: 370% from 35,500 to 167,000, and the Facebook page of *Apple Daily (Hong Kong)* (@hk.nextmedia) increased more modestly during this period by 15% from its already large following of 1.05 million to 1.2 million. Figures calculated from Tables 3 and 4 of the same study showed that posts published by @hk.nextmedia between 1 September and 2 November 2014, on average, fetched 884.9 shares and 426.5 comments each, far higher than the pro-movement citizen media @inmediahk (on average 270.4 shares and 70.7 comments), which, in turn, was higher than the instant news pages of politically neutral MNM, @mingpaoinews (on average 124.8 shares and 48.1 comments). Back-dated data about @hk.nextmedia was not available from CrowdTangle after Next Media Hong Kong closed down in 2021; its estimated share count of posts was higher than the total share counts of multiple pro-UM DANM we collect from CrowdTangle on 22 June 2022 (Table 2). However, a word of caution is necessary for the share counts of DANM presently retrievable, as these numbers show that the share count of @inmediahk is only 111.6% of that of @mingpaoinews's, different from the much larger difference reported between the two in the Chinese University study. We interpret this discrepancy as the result of deletions of Facebook accounts and posts by DANM followers under fear of the National Security Law, enacted in Hong Kong in 2020. Based on this interpretation and informed by the comparative numbers reported in the Chinese University study, we believe the actual total shares of DANM were higher during the UM. If we extrapolate from the comparative numbers reported in the Chinese University study, which found that the daily share count of @hk.nextmedia was 235.6% of the share count of @inmediahk, then the aggregate of the share counts of the most shared

DANM pages during the UM would have surpassed the share count of the most shared MNM. Frequent sharing of political information via social media increased the predictive power of a number of social psychological factors in the supportive attitude of the UM, according to a survey conducted among university students in November 2014 (Lee et al. 2017).

Table 2. Share counts of Facebook posts during the UM (28 September and 15 December 2014) *.

Facebook Page Owner	Facebook Page	Media Category	Total Post Shares	Majority Type of Shared Posts
Apple Daily (Hong Kong)	@hk.nextmedia	Pro-UM MNM	1.003–3.026m #	Unknown
Passion Times	@passiontimes	Pro-UM DANM	742.9k	Links (44.1%)
In Media Hong Kong	@inmediahk	Pro-UM DANM	474.6k	Links (57.9%)
SocRec	@socrec	Pro-UM DANM	431.9k	Facebook videos (50.7%)
Ming Pao	@mingpaoinews	Neutral MNM	425.4k	Links (96.2%)
Scholarism	@scholarism	Pro-UM DANM	145.5k	Links (50.4%)
Hong Kong Federation of Students	@hkfs1958	Pro-UM DANM	141.8k	Photos (66.1%)
memehk.com	@memehkdotcom	Pro-UM DANM	141.0k	Links (78.6%)
i-Cable	@icable.news	Neutral MNM	108.4k	Facebook videos (97.4%)
Now TV	@now.comNews	Neutral MNM	13.7k	Links (82.6%)
USP United Social Press	@UnitedSocialPress	Pro-UM DANM	12.8k	Photos (49.7%)
Metro Daily Hong Kong	@MetroHK	Neutral MNM	9.1k	Links (99.8%)
am730	@am730hk	Neutral MNM	8.7k	Links (79.3%)

* Total post shares of DANM and MNM pages mentioned in documents cited in the main text above, and those included in the sample in Kwong (2015) are checked on CrowdTangle and the top ones are included in Table 2. The Facebook pages of several MNM outlets have either been closed or do not show any posts during the UM period. The most viewed (free-to-air) television news service, TVB, does not have a Facebook page dedicated to its news service. # This count is an estimate based on @mingpaoinews's and @inmediahk's total share counts retrieved from CrowdTangle and their daily share counts compared with *Apple Daily* (Hong Kong)'s during 28 September to 2 November 2014 reported in Table 4 in So et al. (2015).

Other than being mobilized to share pro-movement DANM news, supporters also produced mobilizing information. We observed that some of the comments on a Facebook post that reported about the student invasion of Civic Square on the night of 26 September 2014, for example, called upon others to come to the scene to support. The social networks among pro-movement supporters were activated via their news sharing and action coordination via mobile apps such as FireChat (which could work without wifi, and which saw several hundred thousand downloads within the first two weeks of occupation),[59] WhatsApp,[60] and Google Talk,[61] as well as their Facebook profiles, Facebook groups and events, and Instagram accounts.[62] The most popular online forum, Hong Kong Golden Forum, was another digital space where users published updates about the movement and planned protest actions.[63] Twitter reported that 1.3 million tweets about Hong Kong were published during the first few days of the movement, between 26 and 30 September 2014.[64] The initiator of the public Facebook page in Korea also organized an offline signature campaign at Gwanghwamun in Seoul through social media and attracted reporting by the Korean MNM (Cheng and Hung 2017).

8.4. Importance of DANM as News Supplier during the UM

Between two surveys conducted in early September and early November 2014, the importance of Facebook as the main source of political information increased among the population in Hong Kong across all ages except the most elderly, from 10% to almost 20%; however, an increase in using specific DANM or MNM outlets as main sources of political

information did not occur except in two mainstream paid television services, Cable TV and Now TV, which saw an increase of about 5%.[65] Towards the end of the UM, during 8–12 December 2014, another representative territory-wide telephone survey among those aged 15 and above found that 19% of the population relied on Facebook as their main source of political information, after Television Broadcasts Ltd. (TVB) (67%) and *Apple Daily* (Hong Kong) (33%) (Lee et al. 2015). Where Facebook is cited as a source of information, we do not know whether the supplier of the news is a DANM or MNM outlet or movement participants. The post share numbers reported above give an indication of the comparative reach of individual DANM and MNM Facebook pages on the Facebook platform; our analysis reported below indicates the extent of DANM versus MNM content external to Facebook that was shared in public Facebook posts during the two movements. Lee's (Lee 2015) survey also found that DANM usage might substitute not supplement MNM consumption, as the frequency of visits to pro-democracy DANM sites was not significantly correlated with time spent on reading newspapers or watching TV news (Lee 2015). Those who had spent more time in the occupied areas, nevertheless, perceived the mass media as less important sources of UM information (Lee and Chan 2016).

8.5. News Sourcing from DANM by MNM during the UM

An analysis of the front-page headlines of 17 newspapers between 29 September and 16 December 2014 found that 53% of them were negative about the UM and 32% were neutral (Kwong 2015). However, their editorial position did not stop them from monitoring pro-movement DANM as news sources (Lee and Ting 2015) and drawing images and stories from them.[66] Even videos published on private social media accounts were republished by MNM outlets thanks to social media newswire Storyful Video.[67] A drone video of the massive gathering on 27 September 2014, published on a private Facebook page, was later republished by multiple international MNM outlets.[68] Taiwan academic Kuan Chung-hsiang, who closely follows developments of alternative media in Chinese-language societies in Asia, observed that *In Media Hong Kong* reported in great detail about the UM, and became news sources in the form of information and visuals of many MNM outlets, including *Apple Daily* (Taiwan) and TVBS.[69]

9. Summary of the Review of DANM's Impact on the SM and the UM

The above review, organized along six dimensions (Table 3), reveals that both the SM and UM DANM were either exclusively or in conjunction with MNM the first to break news when the movement started. This is not surprising given that social movement organizers were the initiating actors of the movement. Instead of being considered a failure, simultaneous live broadcasting of the beginning of the occupation during the UM by both DANM and MNM could, in fact, be considered a victory of the UM organizers by having news of their actions spread by MNM. The review found an offline mobilizing effect by DANM in the initial hours of the SM; afterwards, the effect was the combined result of DANM and MNM, as MNM especially *Apple Daily* (Taiwan) started reporting about the SM. During the UM, the offline mobilization effect of DANM during the initial stage was smaller than that of MNM, based on available evidence. The portion of mobilization effect of DANM versus that of MNM ultimately depends on the audience reach and level of reader interactions (which could be considered a form of online mobilization) of the news providers. It is a given that the audience reach of even the largest DANM provider is no comparison to that of the largest MNM provider. The exact audience reach of individual DANM brands is usually difficult to identify as territory-wide surveys usually include too few consumers of individual DANM outlets to enable drawing any conclusion. In both the SM and the UM, the review found that the following/page likes of public Facebook pages of DANM increased tremendously but viewership of MNM also increased, some with a higher percentage of growth. While we acknowledge that the figures reported in the review do not represent the comprehensive range of media channels used by either DANM or MNM as individual news provider or as a news system, respectively, the numbers

show that some DANM Facebook pages had a bigger audience reach than some MNM Facebook pages. However, even when DANM enjoy an inherent advantage as publishers of original information of the most eye-catching events, individual MNM providers can benefit more than DANM in growing their audiences. As for reader interactions, the review found that on Facebook, the largest DANM pages during SM had a total higher level of reader shares than the largest MNM pages together and we suspect it was the same in UM. This pattern may not repeat on the web, which is an important, if not more important, channel of distribution for mainstream newspapers than alternative news media. Our analysis below addresses this question partially by comparing the level of sharing of the web content of DANM versus MNM, in so far as the destination of sharing was public Facebook pages/groups. The review found good evidence that social media, especially Facebook, was the main source of news for the majority of protesters in both the SM and the UM. In the whole of Hong Kong, the percentage of people who used Facebook as compared with those who used MNM as their main source of news was low. The committed UM participants considered mass media as less important news sources and committed DANM consumption substituted MNM consumption. Perhaps coincidentally, the percentage of people who used Facebook as their main source of information during the UM (19%) (Lee et al. 2015) was the same as the percentage (18–20%) of the population in Hong Kong that had participated in the UM (Lee and Chan 2016). As expected, MNM sourced news from DANM during the SM and the UM. This may reflect intermedia agenda setting at the story level, but the review does not find details about whether the DANM agenda at the issue or attribute level impacted on MNM. An exception was the publication of news by DANM on the *Apple Daily* (Taiwan) website, which in effect made *Apple Daily* (Taiwan) a mini portal of DANM alongside its own news products. Such cooperation, no doubt, would help the distribution of DANM, at the same time, it could risk creating DANM's dependence on *Apple Daily* (Taiwan). Observations of the review are summarized in Table 3.

Table 3. Impact of DANM on the Sunflower Movement and the Umbrella Movement.

Indicator of DANM's Impact	In SM	In UM
Facebook following/page like	Lower than the largest MNM	Lower than the largest MNM but higher than smaller MNMs
Facebook reader interaction	Together higher than the largest MNMs	Together higher than the largest MNMs?
Offline mobilization	Lower than MNM?	Lower than MNM
As main news supplier	Likely the main news supplier of movement participants	DANM likely substitute MNM as news supplier for movement participants
Breaking news of occupation	✔	✔ x
News sourcing by MNM	✔	✔

10. External Content Shared in Facebook Posts during the SM and the UM

As part of the above review, we assessed the relative dominance of DANM and MNM content during the SM and the UM on the public Facebook space based on a descriptive comparison of the share counts of public Facebook pages. Our original analysis aimed to understand the extent of external content published by DANM versus MNM shared on public Facebook pages/groups during the two movements.

10.1. Data and Methods

The method involved three steps: (1) locate public Facebook pages relevant to the SM and the UM, (2) identify a similar number of pages on the SM and the UM for inclusion in the analysis, and (3) identify the hyperlinks appearing on these pages that were external to Facebook and categorize them into DANM, MNM, or otherwise.

The two movements had encouraged the creation of new Facebook pages. However, given the history of networked activism in Taiwan and Hong Kong, we decided to go

beyond the pages that specialized in the movements as in some other studies (Caren and Gaby 2011; Harlow 2012). In a previous study (Nip et al. 2020), we used an identical snowball sampling strategy in the two places to find pages relevant to the two movements. In each place, we started with five public Facebook pages that were widely known for supporting or opposing the movement, taking into consideration their ideologies to ensure diversity. We used them as seed pages to snowball other pages, using sharing of at least three unique posts from a seed page during an extended movement period (1 March–30 April 2014 in Taiwan and 1 July–20 December 2014 in Hong Kong) as the criterion. After six rounds of snowballing, 1397 pages in Hong Kong and 57 pages in Taiwan were identified. The snowballed pages were then checked manually and, if their profile page description and the country information of most of their fans (provided by the Facebook Insights API) were based in Hong Kong/Taiwan, and the pages published extensively about the movements, they were included. This sampling method, which requires access to post sharers' IDs, was implementable in 2014 but is no longer possible under the tightened data collection policy of Facebook after the Cambridge Analytica scandal.[70]

Starting from these two samples of SM/UM pages, we embarked on a new sampling strategy to locate pages whose posts contain hyperlinks for analysis for this study. Checking the 57 pages in Taiwan, we found that the posts of 31 of the pages contained hyperlinks in an extended period of the SM, 1 March–30 April 2014, and included these 31 pages as the sample for the SM part of analysis. With this knowledge, we turned to the results of the community detection analysis in Chan and Fu's (2017) study of the OCLP to help identify a comparable number of Facebook pages in Hong Kong. Their study identified 10 communities of at least 30 (and up to 605) pages each (Chan and Fu 2017), including a total of 1644 pages. Based on the content of the posts of the most shared pages in each of the 10 communities, they found three ideological positions among the communities: pro-activist, pro-autonomy (both of which pro-UM), and pro-establishment. We obtained access to a list of the top 10 pages (whose posts were shared the most) in each of the three ideological categories of communities, and included these 30 pages as the sample for the UM period, set as 22 September–12 December 2014. We acknowledge that our method of identifying UM pages for inclusion differs from that used for the SM, but given the vast difference in the number of UM and SM pages, the present strategy achieves a sample of comparable size in the two places while including pages of various political persuasions (not just the pro-movement ones) which were shared the most. We collected all the hyperlinks (generated when external content is shared) in the dataset of all the posts of the two samples of pages during the sampled movement periods. We excluded Facebook links (11,627 on the SM and 53,499 on the UM) (which had been generated when a Facebook post was shared, the scenario of which is already covered by the metrics of post shares, or when the Facebook page owner uploaded a photo or video) from the dataset and only analyzed hyperlinks that pointed to content external to the Facebook platform.

10.2. Results

10.2.1. External Content Shared on Facebook during the SM

In Taiwan, the top five domains of the external hyperlinks in the 31 SM pages are three pro-SM MNM sites (*Liberty Times*, *Apple Daily* (Taiwan), and *SETN*) totalling 2567 unique links, which far surpasses the number of links shared of the other two domains combined, YouTube and PTT (*n* = 953) (Table 4 columns A–C). This is the reverse of what is observed in the review of the SM above, where DANM posts were shared more than MNM posts (Table 1). Trying to understand whether MNM and DANM share each other's content, we turn to CrowdTangle and find that during 1 March–30 April 2014, @m.ltn.tw published 2900 posts, and @apple.realtimenews 2000 posts. Since their post numbers are larger than the numbers of unique hyperlinks shared of them (Table 4), we suppose that it was the Facebook page of the MNM themselves that most likely shared the links on Facebook. We note that the Facebook posts shared of *Liberty Times* (@m.ltn.tw) and of the real time news page of *Apple Daily* (Taiwan) (@apple.realtimenews) comprised over 99% of links, whereas

the shared posts of the top DANM were mainly in other formats (Table 1). This means most of the large volume of post shares of DANM was not MNM content. Considering Tables 1 and 4 together, we conclude that MNM relied more on the web and DANM relied more on Facebook as the first space of publishing.

Table 4. Top five domains in external content shared on public Facebook pages/groups during the SM (1 March–30 April 2014).

A	B	C	D	E	F	G
Domain name owner	Nature of domain name	No. of unique hyperlinks shared	Top 5 publishers of accessible 826 shared YouTube videos	Nature of YouTube video	No. of Facebook posts among 31 pages that shared the video	No. of shares among 31 pages
Liberty Times	Pro-SM MNM	1606	long561	Individual republishing of (pro-SM) Era News's TV news segment	6	10,127
YouTube	International social media	826	Zhang Yu-huan	Citizen-produced video	5	3467
Apple Daily (Taiwan)	Pro-SM MNM	495	bad12345	Individual republishing of Era News's TV news programme	12	3218
SETN	Pro-SM MNM	466	K yin ying	Citizen edited version of (pro-SM) SETN news segment	1	3095
PTT	Domestic BBS	127	Anti-Ma Ying-jeou, anti-CSSTA	Individual republishing of (pro-SM) NextTV news segment	1	3069

To obtain a sense of the sources of the YouTube videos shared on Facebook, we identified the five most shared YouTube videos in late 2018, when 7.7% ($n = 64$) of the YouTube links were not accessible. We checked and learned that they were all uploaded by individuals, and three of the videos were simply republications of MNM TV. Only one of the videos was an original citizen production, and the other video was a re-edit of MNM TV (Table 4D–G). As compared with the use of Facebook public pages, this suggests that YouTube was more a platform of individual expression than a platform of information or mobilization by social movement organizations during the SM.

10.2.2. External Content Shared on Facebook during the UM

In Hong Kong, the top five most shared domains consist of two pro-UM DANM outlets (*In Media Hong Kong* and *Passion Times*), totalling 4009 links, far more than the links of the two MNM outlets (*Apple Daily* (Hong Kong), and *Ming Pao*) combined ($n = 1654$ links) or YouTube ($n = 1678$) (Table 5). No matter what accounts the YouTube domain links go to, it seems clear that more external content from DANM than from MNM was shared on the public Facebook pages/groups on the UM. Checking Table 2, we see that the posts shared of @inmediahk, @passiontimes, and @mingpaoinews were mainly links but the percentage of links in the shared posts of @inmediahk (57.9%), and @passiontimes

(44.1%) was much lower than @mingpaoinews (96.2%) (Table 2). Metrics obtained from CrowdTangle show that during 22 September–12 December 2014, @inmediahk published 2700 and @passiontimes published 2200 posts. These post numbers are higher than the numbers of their hyperlinks shared on Facebook (Table 5); therefore, it is possible that it is their own Facebook page that shared all the links of their own web stories.

Table 5. Top five domains in external content shared on public Facebook pages/groups during the UM (22 September–12 December 2014).

Domain Name Owner	Nature of Domain Name	No. of Unique Hyperlinks Shared
In Media Hong Kong	Pro-UM DANM	2501
YouTube	International social media	1678
Passion Times	Pro-UM DANM	1508
Apple Daily (Hong Kong)	Pro-UM MNM	1141
Ming Pao	Neutral MNM	513

10.2.3. Interpreting External Content Sharing on the SM and the UM

Comparing the pattern of external content sharing on Facebook during the two movements, we see more unique external content from DANM than MNM on the UM but the reverse on the SM. This difference could be the result of greater use of the web by DANM in Hong Kong for publishing news. Indeed, among the three most shared DANM pages on SM (Table 1), only NewsEforum had a website for publishing news. Another factor that contributed to the difference was the larger number of DANM providers related to the UM as compared with the SM, which together supported a more active alternative news media system during the UM (actually more than one, according to results of Chan and Fu 2017) than in SM.

11. Discussion and Conclusions

The study of external content sharing on Facebook provides evidence, beyond the review, towards the dimension in our proposed assessment scheme of audience reach and reader interaction, as well as the importance of DANM as main news suppliers. During the SM, the finding that DANM post shares (Table 1) involved mostly DANM content adds weight to the side that DANM providers were the main suppliers of news for those protesters who relied on Facebook as the main source of news during the SM. Conversely, the greater sharing of DANM than MNM external content on Facebook during the UM (Table 5) provides further evidence to the conjectured observation of DANM dominance over MNM as news suppliers among Facebook users during UM.

Throughout the study, we have counted *Apple Daily* (Hong Kong) as a MNM outlet. but it could well be considered to be a DANM provider according to Holt et al.'s (2019) definition, given its vocal anti-Communist stance in Communist-ruled China. If *Apple Daily* (Hong Kong) is counted as an alternative news provider, then the dominance of the alternative news media system during the UM would be overwhelming. Indeed, when the National Security Law was enacted in Hong Kong in 2020, *Apple Daily* (Hong Kong) was the first of a series of critical news providers that were closed and had their publishers and editors arrested. The vibrancy of DANM during the UM was possible in 2014 thanks to the existence of press freedom in Hong Kong, despite political and economic pressure on MNM from Beijing. This is no longer the case under the National Security Law, under which the news ecology in Hong Kong has fundamentally changed. The findings of this study were specific to the SM and the UM, and the two movements were selected as cases of maximalist DANM effects, but they could serve as a benchmark for future comparisons in the two places. We also believe these findings are relevant to societies of high political contention and mobilization in which sufficient press freedom supports

DANM. The scheme of assessment proposed for the exercise is applicable to other national and temporal contexts.

Observers in Taiwan have remarked that, although DANM provided abundant multi-channelled real-time news using sophisticated digital technologies during the SM, its news was too fragmented and the information load too heavy to be easily consumable by the less engaged audience (Liu and Su 2017). It was for this reason that a commentator concluded that MNM beat DANM in influence during the SM by being able to offer condensed and well-edited news reports.[71] In this logic, it was in news gatekeeping and packaging that DANM lost to MNM during the SM, despite their victory in communication technologies. In Hong Kong, the social media divide prevented DANM from exerting effects on the audience who did not use Facebook: while over 43% of the UM supporters very frequently used Facebook, only 23.6% of the non-supporters did so.[72] These observations, although made on SM and UM separately, are applicable to the impact of alternative news media elsewhere.

This study benefits from multiple studies that have been published about the SM and the UM and draws on archival data to piece together a picture about the role and impact of DANM relative to MNM. Its conclusions are only as valid as the sources it uses. One limitation, as mentioned earlier, is the possible deletion of data by Facebook users themselves over time. We also found that the Facebook pages of several continuing MNM outlets have either closed or are not showing posts of the UM period anymore. This affects the comparative post share counts we access presently, and is likely to affect Hong Kong more than Taiwan due to concern under the National Security Law. However, if we expect the pages to be affected similarly, then the comparison results should continue to hold. Another limitation of the study is that the referenced studies rarely covered exactly the same research periods; and therefore, our comparisons are imperfect. One factor that underlies the post and content shares, but which goes beyond our inspection, is the algorithm embedded into the Facebook platform. Since 2018 the company has tried to encourage meaningful social interactions by reducing political content in users' news feed.[73] How this may affect users' interactions with political content in social movements like the SM and UM is uncertain.

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Notes

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3 https://www.nytimes.com/2005/02/14/technology/resignation-at-cnn-shows-the-growing-influence-of-blogs.html (accessed on 3 June 2022); https://www.wired.com/2002/12/blogs-make-the-headlines/ (accessed on 3 June 2022).

4 http://www.com.cuhk.edu.hk/ccpos/images/news/TaskForce_PressRelease_141218_English.pdf (accessed on 18 June 2022).

5 https://daybreak.newbloommag.net/2017/07/25/wild-strawberry-movement/ (accessed on 18 June 2022).

6 https://www.taipeitimes.com/News/biz/archives/2014/02/28/2003584495 (accessed on 20 June 2022); https://www.ejinsight.com/eji/article/id/404128/20140725-hong-kong-facebook-users-top-4-4-million (accessed on 20 June 2022); https://www.nielsen.com/ph/en/insights/article/2014/asian-mobile-consumers/ (accessed on 18 June 2022); https://mic.iii.org.tw/english/AsiaExpress_Detail.aspx?doc_sqno=10234&year=2014&m=12&domain_name=Mobile%20Communications&domain_sqno=6 (accessed on 20 June 2022).

7 https://www.ithome.com.tw/tech/86462 (accessed on 18 June 2022).

8 http://ntujournal.blogspot.com/2014/05/blog-post_1475.html (accessed on 18 June 2022).

9 https://thediplomat.com/2014/04/how-technology-revolutionized-taiwans-sunflower-movement/ (accessed on 20 June 2022).

10 Same as note 8.

11 Same as note 9.

12 https://www.ithome.com.tw/news/86701 (accessed on 18 June 2022).

13 Same as note 12.

14 Same as note 12.

15 Same as note 8.

16 Same as note 8.

17 https://www.ntdtv.com/b5/2014/06/15/a1116510.html; https://www.ithome.com.tw/tech/86460 (accessed on 20 June 2022).

18 https://www.cool3c.com/article/77154 (accessed on 18 June 2022).

19 Same as note 9.

20 Same as note 12.

21 Same as note 12.

22 Same as note 12.

23 Same as note 9.

24 Same as note 9.

25 http://www.taipeitimes.com/News/taiwan/archives/2014/04/01/2003587023 (accessed on 20 June 2022).

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28 https://www.ithome.com.tw/tech/86460 (accessed on 18 June 2022).

29 Same as note 28.

30 Same as note 9.

31 Same as note 8.

32 https://www.facebook.com/NewseForum/about/?ref=page_internal (accessed on 21 June 2022).

33 Same as note 9.

34 https://www.bnext.com.tw/article/31781/BN-ARTICLE-31781? (accessed on 18 June 2022).

35 https://www.businessweekly.com.tw/business/blog/6874 (accessed on 20 June 2022).

36 Same as note 35. The Facebook pages of television channels in Taiwan were, by comparison, far less active on Facebook during SM. The most popular SET News (https://www.bnext.com.tw/article/31781/BN-ARTICLE-31781, accessed on 20 June 2022) only published five posts during 18 March–10 April 2014, which were shared 128 times.

37 https://www.storm.mg/article/27688 (accessed on 20 June 2022).

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44 https://www.facebook.com/peopleonthestreets.hk?module=inline&pgtype=article (accessed on 21 June 2022).

45   Same as note 43.

46   Same as note 40.

47   https://www.newyorker.com/tech/annals-of-technology/social-media-hong-kong-protests (accessed on 21 June 2022).

48   https://www.scmp.com/news/hong-kong/article/1605962/artists-project-messages-support-around-world-occupy-central (accessed on 21 June 2022).

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50   https://www.techinasia.com/code4hk-visual-guide-hong-kongs-online-hub-umbrella-revolution (accessed on 18 June 2022); https://globalvoices.org/2014/10/02/hong-kong-protesters-shore-up-mobile-communications-tools-in-face-of-technical-threats/ (accessed on 20 June 2022); see also note 40.

51   https://advox.globalvoices.org/2014/10/06/the-invisible-violence-of-cyber-war-in-hong-kongs-umbrella-revolution/ (accessed on 20 June 2022).

52   https://www.scmp.com/news/hong-kong/article/1607579/anonymous-hacker-group-declares-cyber-war-hong-kong (accessed on 21 June 2022).

53   Same as note 4.

54   Same as note 40.

55   https://www.nytimes.com/2014/10/25/world/asia/hong-kong-stars-face-mainland-backlash-over-support-for-protests.html (accessed on 21 June 2022); also see note 49.

56   Same as note 47.

57   Same as note 43.

58   https://app3.rthk.hk/mediadigest/media/pdf/pdf_1421824475.pdf (accessed on 25 June 2022).

59   https://www.nytimes.com/2014/10/06/technology/hong-kong-protests-propel-a-phone-to-phone-app-.html (accessed on 21 June 2022).

60   Same as note 47.

61   https://globalvoices.org/2014/10/02/hong-kong-protesters-shore-up-mobile-communications-tools-in-face-of-technical-threats/ (accessed on 20 June 2022).

62   Also see note 42; https://www.wsj.com/articles/BL-CJB-24276 (accessed on 21 June 2022).

63   https://www.yzzk.com/article/details/%E5%B0%88%E9%A1%8C%E5%A0%B1%E9%81%93/2014-50/1418269357873/%E9%AB%98%E7%99%BB%E7%81%AB%E7%88%86%E7%B6%B2%E7%B5%A1%E9%A6%99%E6%B8%AF%E6%BF%80%E9%80%B2%E6%B4%BE%E5%B9%B3%E5%8F%B0 (accessed on 21 June 2022); also see note 42.

64   Same as note 40.

65   http://www.com.cuhk.edu.hk/ccpos/research/article20141204.pdf (accessed on 25 June 2022).

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71   https://www.thenewslens.com/article/3157 (accessed on 20 June 2022).

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