

## Supplemental Materials

### **Social movements and social media:**

### **The evolution of scholarship in the age of datafication**

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## Section A: Search Method

The search method used in this study is based on the model developed by Huang et al. (2015) to delineate research on an emerging technology. The search term was built in three stages: core lexical search, expanded lexical search, and specialized journals search.

### 1. Core search

Table A1: Core lexical search

Expert sources	Core search term	Results	Date performed
Burgess et al., 2018	TS=(“social media” OR “Facebook” OR “Twitter”)	3,262	October 29, 2023
Della Porta & Diani, 2015	AND TS=(“social movement*” OR “social-movement*” OR “collective action” OR “protest*” OR “contentious politics”)		

### 2. Expanded lexical search

For the expanded search, we compiled a list of 81 candidate terms based on the 100 most frequent keywords and keywords plus in the core dataset (N=7,959), removing terms already included in the core search, generic words, spelling variations, and single/plural variations. For each candidate term, we determined whether it was related to the social media field (category A), social movements field (category B), or combined (category C).

We then calculated the hit ratio (Huang et al., 2015) for each candidate term, adjusting the formula to scholarship at the intersection of two fields. The adapted formula calculates the share of the results retrieved by a candidate term from one category in conjunction with at least one term from the other category that are already included in the core search (“hits”), out of the total number of results that the combined search yielded:

$$\text{Hit ratio} = X \& Y / Y$$

Where

X=results of core search

Y=results obtained from the combination of a candidate term from one category and one or more of the core search terms of the second category

For candidate terms in category C (related to both social media and social movements), there was no need to include core search terms from the other category. Hence, their calculation was as follows:

Hit ratio =  $X \cap Y / Y$

Where

X=results of core search

Y=results obtained by the candidate search term

Thresholds used (Huang et al., 2015):

Hit ratio  $\geq 70\%$ : Accept

Hit ratio  $\leq 30\%$ : Reject

$30\% < \text{Hit ratio} < 70\%$ : Manual check (noise ratio)

Noise ratio  $\leq 50\%$ : Accept

For the manual check of candidate terms in the middle range, we created a random sample of 10% of records that constituted potential noise, that is, they were retrieved by the combined search of the candidate term and one of the core terms of the other category, but were not included in the results of the core search (Y not X). Based on canonical definitions of social media and social movements from the literature, we trained a coder to determine whether each record in the sample is relevant for the field.

Table A2: Expanded lexical search

Candidate term	Category	Hit ratio	Noise ratio	Decision
political protest	B	1.00	NA	All results included in core search
protest behavior OR protest behaviour	B	1.00	NA	All results included in core search
indignados	B	0.88	NA	Include
sentiment analysis	A	0.86	NA	Include
occupy wall-street OR occupy wall street or OWS	B	0.86	NA	Include
hashtag	A	0.84	NA	Include
instagram	A	0.81	NA	Include
youtube	A	0.62	0.13	Include
black lives matter	B	0.58	0.20	Include
internet use	A	0.58	0.70	Exclude
digital media	A	0.55	0.38	Include
collective identity	B	0.55	0.60	Exclude
big data	A	0.53	0.88	Exclude
machine learning	A	0.51	1.00	Exclude
connective action	C	0.51	0.13	Include
online	A	0.46	0.76	Exclude
arab spring	B	0.46	0.38	Include
mobilization or mobilisation	B	0.45	0.46	Include
media	A	0.43	0.88	Exclude
activism	B	0.41	0.14	Include
internet	A	0.41	0.63	Exclude
movement*	B	0.39	0.50	Include
social network analysis	A	0.35	0.88	Exclude
network analysis	A	0.33	1.00	Exclude
hashtag activism	C	0.33	0.00	Include
digital activism	C	0.31	0.00	Include
content analysis	A	0.29	NA	Exclude
social network*	A	0.29	NA	Exclude

online activism	C	0.26	NA	Exclude
communication*	A	0.26	NA	Exclude
egypt	B	0.24	NA	Exclude
political participation OR political- participation	B	0.21	NA	Exclude
hong kong	B	0.21	NA	Exclude
information	A	0.19	NA	Exclude
revolution	B	0.18	NA	Exclude
resistance	B	0.17	NA	Exclude
network*	A	0.17	NA	Exclude
technology	A	0.17	NA	Exclude
feminism	B	0.17	NA	Exclude
framing	B	0.15	NA	Exclude
democracy	B	0.15	NA	Exclude
civic engagement	B	0.14	NA	Exclude
public sphere	B	0.14	NA	Exclude
politics	B	0.14	NA	Exclude
censorship	B	0.14	NA	Exclude
violence	B	0.12	NA	Exclude
citizenship	B	0.11	NA	Exclude
populism	B	0.09	NA	Exclude
participation	B	0.08	NA	Exclude
conflict	B	0.08	NA	Exclude
discourse	B	0.08	NA	Exclude
race	B	0.08	NA	Exclude
identit*	B	0.07	NA	Exclude
political communication	B	0.07	NA	Exclude
Power	B	0.07	NA	Exclude
affordance*	B	0.06	NA	Exclude
climate change	B	0.06	NA	Exclude
coverage	B	0.06	NA	Exclude
leadership	B	0.06	NA	Exclude
expression	B	0.06	NA	Exclude
diffusion	B	0.05	NA	Exclude
youth	B	0.05	NA	Exclude
organization*	B	0.05	NA	Exclude
journalism	B	0.05	NA	Exclude

culture	B	0.04	NA	Exclude
news	B	0.04	NA	Exclude
surveillance	B	0.04	NA	Exclude
women	B	0.04	NA	Exclude
engagement	B	0.03	NA	Exclude
china	B	0.03	NA	Exclude
efficacy	B	0.03	NA	Exclude
opinion	B	0.03	NA	Exclude
gender	B	0.02	NA	Exclude
emotion*	B	0.02	NA	Exclude
community	B	0.02	NA	Exclude
exposure	B	0.02	NA	Exclude
behavior OR behaviour	B	0.02	NA	Exclude
attitude*	B	0.02	NA	Exclude
trust	B	0.02	NA	Exclude
perception*	B	0.01	NA	Exclude
covid-19	B	0.01	NA	Exclude

### 3. Specialized journals

Table A3: Specialized journals search.

<b>Criteria for selection</b>	<b>Journals on social media</b>	<b>Journals on social movements</b>
(1) The journal's purview is entirely within the scope of research on either social movements or social media	<i>Social Media + Society</i>	<i>Social Movements Studies</i> <i>Mobilization</i>
(2) The journal is indexed in the WoS journal citations reports.		

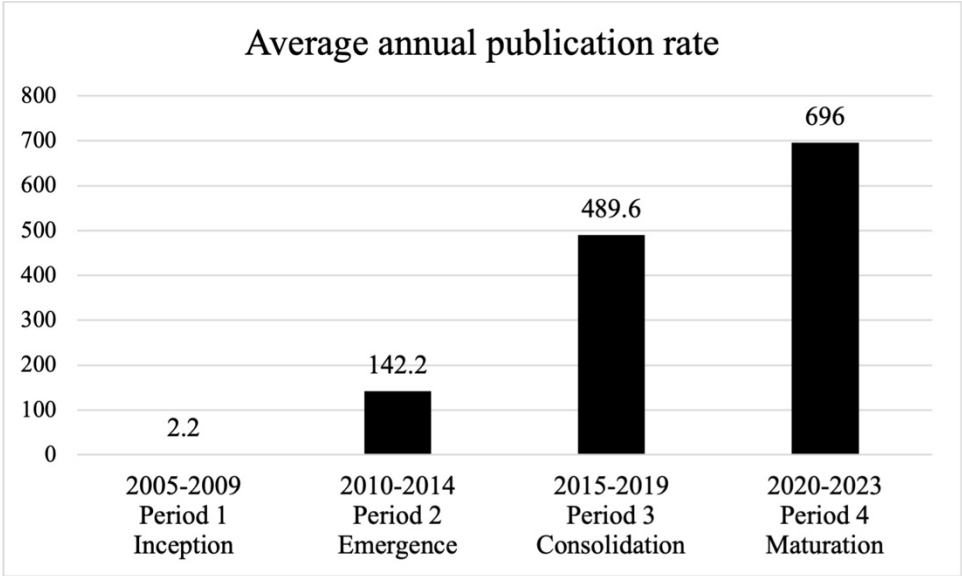
4. Final search

Table A4: Details on final search.

<b>Boolean search term</b>	<b>Results</b>	<b>Duplicates</b>	<b>Dataset size</b>	<b>Date performed</b>
((TS=("social media" OR "Facebook" OR "Twitter" OR "sentiment analysis" OR "hashtag" OR "instagram" OR "youtube") OR SO="SOCIAL MEDIA SOCIETY") AND (TS=("social movement*" OR "social-movement*" OR "collective action" OR "protest*" OR "contentious politics" OR "Indignados" OR "occupy wall street" OR "occupy wall-street" OR "OWS" OR "activism" OR "Black Lives Matter" OR "Arab Spring" OR "mobilization" OR "mobilisation") OR SO=("SOCIAL MOVEMENT STUDIES" OR "MOBILIZATION"))) OR (TS=("digital activism" OR "hashtag activism" OR "connective action")))	6,710	10	6,701	January 1, 2024

**Section B: Dataset Timeline**

Figure B1: Average annual publication rate by period.



## Section C: Analytic Settings for Maps

Following recommended procedure (van Eck & Waltman, 2023), we used the following map settings on VOSViewer:

1. Thesaurus files.
2. Full counting option.
3. After testing several cluster resolution parameters, using the 0.9 resolution parameter, which gave the most coherent and useful clustering.
4. Minimum number of 3 keywords per cluster.
5. Adjusting cluster colors and map orientation to facilitate chronological comparison of periods.

Additional resources on VOSviewer mapping and clustering techniques:

1. van Eck, N. J., Waltman, L., Dekker, R., & Van Den Berg, J. (2010). A comparison of two techniques for bibliometric mapping: Multidimensional scaling and VOS. *Journal of the American Society for Information Science and Technology*, 61(12), 2405–2416. <https://doi.org/10.1002/asi.21421>
2. Waltman, L., van Eck, N. J., & Noyons, E. C. M. (2010). A unified approach to mapping and clustering of bibliometric networks. *Journal of Informetrics*, 4(4), 629–635. <https://doi.org/10.1016/j.joi.2010.07.002>

Additional resources for creating literature maps on VOSviewer:

1. van Eck, N. J., & Waltman, L. 2023. *Manual for VOSviewer version 1.6.20*. Univeriteit Leiden. [https://www.vosviewer.com/documentation/Manual\\_VOSviewer\\_1.6.20.pdf](https://www.vosviewer.com/documentation/Manual_VOSviewer_1.6.20.pdf).
2. Shoshan, A., & Oser, J. (2025). Visualizing Scientific Landscapes: A Powerful Method for Mapping Research Fields. *PS: Political Science & Politics*, 58(1), 147–154. <https://doi.org/10.1017/S1049096524001057>

## Section D: Co-citation References by Cluster

Table D1 shows the list of the 101 most cited references in the dataset, the number of citations of each reference, and the thematic cluster to which it belongs.

Table D1: Most cited references by cluster.

Cited reference	Citations	Cluster	Full reference
tufekci & wilson 2012	390	Political participation	Tufekci, Z., & Wilson, C. (2012). Social media and the decision to participate in political protest: Observations from Tahrir Square. <i>Journal of Communication</i> , 62(2), 363–379.
morozov 2011b	220	Political participation	Morozov, E. (2011). The Net Delusion: The Dark Side of Internet Freedom. Public Affairs.
gladwell 2010	217	Political participation	Gladwell, M. (2010, October 4). Small change: Why the revolution won't be tweeted. <i>The New Yorker</i> , 4.
shirky 2011	208	Political participation	Shirky, C. (2011). The political power of social media: Technology, the public sphere, and political change. <i>Foreign Affairs</i> , 90(1), 28–41.
valenzuela 2013	187	Political participation	Valenzuela, S. (2013). Unpacking the use of social media for protest behavior: The roles of information, opinion expression, and activism. <i>American Behavioral Scientist</i> , 57(7), 920–942.
lim 2012	183	Political participation	Lim, M. (2012). Clicks, cabs, and coffee houses: Social media and oppositional movements in Egypt, 2004–2011. <i>Journal of Communication</i> , 62(2), 231–248.
lotan et al. 2011	164	Political participation	Lotan, G., Graeff, E., Ananny, M., Gaffney, D., & Pearce, I. (2011). The Arab Spring. The revolutions were tweeted: Information flows during the 2011 Tunisian and Egyptian revolutions. <i>International Journal of Communication</i> , 5, 31.
eltantawy & wiest 2011	152	Political participation	Eltantawy, N., & Wiest, J. B. (2011). The Arab Spring. Social media in the Egyptian revolution: reconsidering resource mobilization theory. <i>International Journal of Communication</i> , 5, 18.
putnam 2000	148	Political participation	Putnam, R. D. (2000). <i>Bowling alone: The collapse and revival of American community</i> . Simon and Schuster.
boyd & ellison 2007	141	Political participation	Boyd, D. M., & Ellison, N. B. (2007). Social network sites: Definition, history, and scholarship. <i>Journal of Computer-mediated Communication</i> , 13(1), 210–230.
de zúñiga hg, 2012	139	Political participation	Gil de Zúñiga, H., Jung, N., & Valenzuela, S. (2012). Social media use for news and individuals' social capital, civic engagement and political participation. <i>Journal of Computer-mediated Communication</i> , 17(3), 319–336.
king et al. 2013	139	Political participation	King, G., Pan, J., & Roberts, M. E. (2013). How censorship in China allows government criticism but

			silences collective expression. <i>American Political Science Review</i> , 107(2), 326–343.
boulianne 2015	131	Political participation	Boulianne, S. (2015). Social media use and participation: A meta-analysis of current research. <i>Information, Communication &amp; Society</i> , 18(5), 524–538.
granovetter 1973	131	Political participation	Granovetter, M. S. (1973). The strength of weak ties. <i>American Journal of Sociology</i> , 78(6), 1360–1380.
kaplan & haenlein 2010	128	Political participation	Kaplan, A. M., & Haenlein, M. (2010). Users of the world, unite! The challenges and opportunities of Social Media. <i>Business Horizons</i> , 53(1), 59–68.
valenzuela et al. 2012b	128	Political participation	Valenzuela, S., Arriagada, A., & Scherman, A. (2012). The social media basis of youth protest behavior: The case of Chile. <i>Journal of Communication</i> , 62(2), 299–314.
howard & hussain 2013	125	Political participation	Howard, P. N., & Hussain, M. M. (2013). <i>Democracy's fourth wave?: digital media and the Arab Spring</i> . Oxford University Press.
anduiza et al. 2014	119	Political participation	Anduiza, E., Cristancho, C., & Sabucedo, J. M. (2014). Mobilization through online social networks: the political protest of the indignados in Spain. <i>Information, Communication &amp; Society</i> , 17(6), 750–764.
verba et al. 1995	116	Political participation	Verba, S., Schlozman, K. L., & Brady, H. E. (1995). <i>Voice and equality: Civic voluntarism in American politics</i> . Harvard University Press.
gonzález-bailóns, 2011	112	Political participation	González-Bailón, S., Borge-Holthoefer, J., Rivero, A., & Moreno, Y. (2011). The dynamics of protest recruitment through an online network. <i>Scientific Reports</i> , 1(1), 1–7.
bond et al. 2012	106	Political participation	Bond, R. M., Fariss, C. J., Jones, J. J., Kramer, A. D., Marlow, C., Settle, J. E., & Fowler, J. H. (2012). A 61-million-person experiment in social influence and political mobilization. <i>Nature</i> , 489(7415), 295–298.
van zomeren et al. 2008	105	Political participation	Van Zomeren, M., Postmes, T., & Spears, R. (2008). Toward an integrative social identity model of collective action: a quantitative research synthesis of three socio-psychological perspectives. <i>Psychological Bulletin</i> , 134(4), 504.
howard & hussain 2011	102	Political participation	Howard, P. N., & Hussain, M. M. (2011). The role of digital media. <i>Journal of Democracy</i> , 22, 35.
wolfsfeld et al. 2013	92	Political participation	Wolfsfeld, G., Segev, E., & Sheaffer, T. (2013). Social media and the Arab Spring: Politics comes first. <i>The International Journal of Press/Politics</i> , 18(2), 115–137.
mcadam 1986	89	Political participation	McAdam, D. (1986). Recruitment to high-risk activism: The case of freedom summer. <i>American Journal of Sociology</i> , 92(1), 64–90.
norris 2001	89	Political participation	Norris, P. (2001). <i>Digital divide: Civic engagement, information poverty, and the Internet worldwide</i> . Cambridge University Press.

boulianne 2009	86	Political participation	Boulianne, S. (2009). Does Internet use affect engagement? A meta-analysis of research. <i>Political Communication</i> , 26(2), 193–211.
khondker 2011	85	Political participation	Khondker, H. H. (2011). Role of the new media in the Arab Spring. <i>Globalizations</i> , 8(5), 675–679.
christensen 2011b	83	Political participation	Christensen, H. S. (2011). Political activities on the Internet: Slacktivism or political participation by other means?. <i>First Monday</i> , 16(2).
de zúñiga hg, 2014	83	Political participation	Gil de Zúñiga, H., Molyneux, L., & Zheng, P. (2014). Social media, political expression, and political participation: Panel analysis of lagged and concurrent relationships. <i>Journal of Communication</i> , 64(4), 612–634.
howard 2010	82	Political participation	Howard, P. N. (2010). <i>The digital origins of dictatorship and democracy: Information technology and political Islam</i> . Oxford University Press.
yang 2009	82	Political participation	Yang, G. (2009). <i>The power of the Internet in China: Citizen activism online</i> . Columbia University Press.
howard et al. 2011a	81	Political participation	Howard, P. N., Duffy, A., Freelon, D., Hussain, M. M., Mari, W., & Maziad, M. (2011). Opening closed regimes: What was the role of social media during the Arab Spring? <i>SSRN</i> . <a href="https://doi.org/10.2139/ssrn.2595096">https://doi.org/10.2139/ssrn.2595096</a>
jost et al. 2018	81	Political participation	Jost, J. T., Barberá, P., Bonneau, R., Langer, M., Metzger, M., Nagler, J., ... & Tucker, J. A. (2018). How social media facilitates political protest: Information, motivation, and social networks. <i>Political Psychology</i> , 39(S1), 85–118.
bonilla & rosa 2015	226	Public sphere	Bonilla, Y., & Rosa, J. (2015). #Ferguson: Digital protest, hashtag ethnography, and the racial politics of social media in the United States. <i>American Ethnologist</i> , 42(1), 4–17.
tufekci 2017	196	Public sphere	Tufekci, Z. (2017). <i>Twitter and tear gas: The power and fragility of networked protest</i> . Yale University Press.
fraser 1990	173	Public sphere	Fraser, N. (1990). Rethinking the public sphere: A contribution to the critique of actually existing democracy. <i>Social Text</i> , 25/26, 56–80.
theocharis et al. 2015	169	Public sphere	Theocharis, Y., Lowe, W., Van Deth, J. W., & García-Albacete, G. (2015). Using Twitter to mobilize protest action: Online mobilization patterns and action repertoires in the Occupy Wall Street, Indignados, and Aganaktismenoi movements. <i>Information, Communication &amp; Society</i> , 18(2), 202–220.
habermas 1991	166	Public sphere	Habermas, J. (1991). <i>The structural transformation of the public sphere: An inquiry into a category of bourgeois society</i> . MIT Press.
braun & clarke 2006	141	Public sphere	Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. <i>Qualitative Research in Psychology</i> , 3(2), 77–101.

papacharissi 2016	138	Public sphere	Papacharissi, Z. (2016). Affective publics and structures of storytelling: Sentiment, events and mediality. <i>Information, Communication &amp; Society</i> , 19(3), 307–324.
papacharissi & de fatima oliveira 2012	131	Public sphere	Papacharissi, Z., & de Fatima Oliveira, M. (2012). Affective news and networked publics: The rhythms of news storytelling on #Egypt. <i>Journal of Communication</i> , 62(2), 266–282.
baer 2016	128	Public sphere	Baer, H. (2016). Redoing feminism: Digital activism, body politics, and neoliberalism. <i>Feminist Media Studies</i> , 16(1), 17–34.
yang 2016	125	Public sphere	Yang, G. (2016). Narrative agency in hashtag activism: The case of #BlackLivesMatter. <i>Media and Communication</i> , 4(4), 13–17.
boyd 2010	120	Public sphere	Boyd, D. (2010). Social network sites as networked publics: Affordances, dynamics, and implications. In Z. Papacharissi (Ed.), <i>A networked self</i> (pp. 47–66). Routledge.
clark 2016	120	Public sphere	Clark, R. (2016). “Hope in a hashtag”: The discursive activism of #WhyIStayed. <i>Feminist Media Studies</i> , 16(5), 788–804.
mendes et al. 2018	113	Public sphere	Mendes, K., Ringrose, J., & Keller, J. (2018). #MeToo and the promise and pitfalls of challenging rape culture through digital feminist activism. <i>European Journal of Women's Studies</i> , 25(2), 236–246..
van dijck 2013	112	Public sphere	Van Dijck, J. (2013). <i>The culture of connectivity: A critical history of social media</i> . Oxford University Press.
papacharissi 2015	110	Public sphere	Papacharissi, Z. (2015). <i>Affective publics: Sentiment, technology, and politics</i> . Oxford University Press.
freelon et al. 2016	99	Public sphere	Freelon, D., McIlwain, C. D., & Clark, M. (2016). Beyond the hashtags: #Ferguson, #Blacklivesmatter, and the online struggle for offline justice. Center for Media & Social Impact, American University. Retrieved from <a href="https://ssrn.com/abstract=2747066">https://ssrn.com/abstract=2747066</a> .
jackson et al. 2020	97	Public sphere	Jackson, S. J., Bailey, M., & Welles, B. F. (2020). <i>#HashtagActivism: Networks of race and gender justice</i> . MIT Press.
tremayne 2014	93	Public sphere	Tremayne, M. (2014). Anatomy of protest in the digital era: A network analysis of Twitter and Occupy Wall Street. <i>Social Movement Studies</i> , 13(1), 110–126.
marwick & boyd 2011b	91	Public sphere	Marwick, A. E., & Boyd, D. (2011). I tweet honestly, I tweet passionately: Twitter users, context collapse, and the imagined audience. <i>New Media &amp; Society</i> , 13(1), 114–133.
meraz & papacharissi 2013	87	Public sphere	Meraz, S., & Papacharissi, Z. (2013). Networked gatekeeping and networked framing on #Egypt. <i>The International Journal of Press/Politics</i> , 18(2), 138–166.
blondel et al. 2008	86	Public sphere	Blondel, V. D., Guillaume, J. L., Lambiotte, R., & Lefebvre, E. (2008). Fast unfolding of communities in

			large networks. <i>Journal of Statistical Mechanics: Theory and Experiment</i> , 2008(10), P10008..
blei et al. 2003	85	Public sphere	Blei, D. M., Ng, A. Y., & Jordan, M. I. (2003). Latent Dirichlet allocation. <i>Journal of Machine Learning Research</i> , 3(Jan), 993–1022.
youmans & york 2012	84	Public sphere	Youmans, W. L., & York, J. C. (2012). Social media and the activist toolkit: User agreements, corporate interests, and the information infrastructure of modern social movements. <i>Journal of Communication</i> , 62(2), 315–329.
penney & dadas 2014	83	Public sphere	Penney, J., & Dadas, C. (2014). (Re)Tweeting in the service of protest: Digital composition and circulation in the Occupy Wall Street movement. <i>New Media &amp; Society</i> , 16(1), 74–90.
brock 2012	81	Public sphere	Brock, A. (2012). From the blackhand side: Twitter as a cultural conversation. <i>Journal of Broadcasting &amp; Electronic Media</i> , 56(4), 529–549.
bennett & segerberg 2012	797	Collective action	Bennett, W. L., & Segerberg, A. (2012). The logic of connective action. <i>Information, Communication &amp; Society</i> , 15(5), 739–768.
castells 2015 [2012]	615	Collective action	Castells, M. (2015 [2012]). <i>Networks of outrage and hope: Social movements in the Internet age</i> . John Wiley & Sons.
gerbaudo 2012	380	Collective action	Gerbaudo, P. (2012). <i>Tweets and the streets: Social media and contemporary activism</i> . Pluto Press.
benford & snow 2000	262	Collective action	Benford, R. D., & Snow, D. A. (2000). Framing processes and social movements: An overview and assessment. <i>Annual Review of Sociology</i> , 26(1), 611–639.
juris 2012	214	Collective action	Juris, J. S. (2012). Reflections on #Occupy Everywhere: Social media, public space, and emerging logics of aggregation. <i>American Ethnologist</i> , 39(2), 259–279.
bennett & segerberg 2013	207	Collective action	Bennett, W. L., & Segerberg, A. (2013). <i>The logic of connective action: Digital media and the personalization of contentious politics</i> . Cambridge University Press.
mccarthy & zald 1977	165	Collective action	McCarthy, J. D., & Zald, M. N. (1977). Resource mobilization and social movements: A partial theory. <i>American Journal of Sociology</i> , 82(6), 1212–1241.
bennett 2012	140	Collective action	Bennett, W. L. (2012). The personalization of politics: Political identity, social media, and changing patterns of participation. <i>The Annals of the American Academy of Political and Social Science</i> , 644(1), 20–39.
entman 1993	139	Collective action	Entman, R. M. (1993). Framing: Toward clarification of a fractured paradigm. <i>Journal of Communication</i> , 43(4), 51–58.
melucci 1996	132	Collective action	Melucci, A. (1996). The process of collective identity. In <i>Challenging Codes: Collective Action in the Information Age</i> (pp. 68–86). Cambridge University Press.

gerbaudo & trerž 2015	129	Collective action	Gerbaudo, P., & Treré, E. (2015). In search of the 'we' of social media activism: Introduction to the special issue on social media and protest identities. <i>Information, Communication &amp; Society, 18</i> (8), 865–871.
kavada 2015	128	Collective action	Kavada, A. (2015). Creating the collective: Social media, the Occupy Movement and its constitution as a collective actor. <i>Information, Communication &amp; Society, 18</i> (8), 872–886.
bennett & segerberg 2011	125	Collective action	Bennett, W. L., & Segerberg, A. (2011). Digital media and the personalization of collective action: Social technology and the organization of protests against the global economic crisis. <i>Information, Communication &amp; Society, 14</i> (6), 770–799.
snow et al. 1986	119	Collective action	Snow, D. A., Rochford Jr, E. B., Worden, S. K., & Benford, R. D. (1986). Frame alignment processes, micromobilization, and movement participation. <i>American Sociological Review, 51</i> , 464–481.
tilly 1978	113	Collective action	Tilly, C. (1978). <i>From mobilisation to revolution</i> . Random House.
della porta & diani 2020 [2006]	108	Collective action	della Porta, D., & Diani, M. (2020 [2006]). <i>Social Movements: An Introduction</i> . Blackwell.
goffman 1974	107	Collective action	Goffman, E. (1974). <i>Frame analysis: An essay on the organization of experience</i> . Harvard University Press.
milan 2015	106	Collective action	Milan, S. (2015). From social movements to cloud protesting: The evolution of collective identity. <i>Information, Communication &amp; Society, 18</i> (8), 887–900.
snow & benford 1988	105	Collective action	Snow, D. A., & Benford, R. D. (1988). Ideology, frame resonance, and participant mobilization. <i>International Social Movement Research, 1</i> (1), 197–217.
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## Section E: Co-occurrence Keywords Data

Table E1 shows the 100 most frequent keywords and their occurrences in each period of the periodic maps.

Table E1: Frequent keywords by period.

<b>2010-2014</b>		<b>2015-2019</b>		<b>2020-2023</b>	
social media	265	social media	1234	social media	1573
internet	141	twitter	398	twitter	539
media	79	internet	341	activism	517
twitter	77	social movements	336	protests	428
social movements	76	activism	331	politics	343
activism	63	protests	304	social movements	330
collective action	61	media	293	media	323
arab spring	60	politics	243	facebook	258
social networks	55	facebook	231	internet	248
communication	54	communication	192	communication	222
protests	51	movements	192	movements	211
facebook	50	participation	185	mobilization	196
politics	39	collective action	178	participation	196
participation	38	mobilization	177	collective action	195
networks	37	online	165	online	179
mobilization	33	information	152	identities	178
online	32	networks	130	covid-19	173
movements	29	social networks	127	digital activism	168
information	28	identities	106	information	155
web 2.0	27	news	103	news	137
revolution	26	political participation	103	gender	132
technologies	26	digital activism	99	engagement	131
egypt	24	technologies	86	networks	126
news	24	engagement	84	social networks	111
political participation	23	democracy	76	political participation	110
youtube	22	power	70	impact	105
democracy	21	gender	69	discourses	103
engagement	20	feminism	67	#blacklivesmatter	101
youth	18	arab spring	65	feminism	98
new media	17	civic engagement	65	power	98
digital media	16	digital media	64	youth	90
public sphere	16	organization	63	race	88
communities	15	race	56	instagram	87

models

15	youth	56	models	87
	communities	55	hashtags	86
	political communication	52	emotions	84
	violence	52	violence	83
	youtube	51	democracy	81
	china	50	women	81
	elections	50	china	79
	impact	50	#metoo	77
	public sphere	50	culture	75
	behavior	48	populism	75
	connective action	45	climate change	73
	emotions	45	strategies	73
	models	45	hashtag activism	72
	framing	43	communities	71
	identities	42	digital media	69
	discourses	42	technologies	67
	news coverage	41	political communication	66
	revolution	41	resistance	62
	women	41	civic engagement	60
	online activism	40	behavior	58
	journalism	39	connective action	56
	united states	39	framing	55
	egypt	38	news coverage	55
	knowledge	38	perceptions	55
	big data	37	attitudes	54
	organizations	37	memes	53
	censorship	36	health	52
	dynamics	36	elections	51
	culture	34	online activism	51
	occupy wall street	34	social network analysis	51
	age	33	youtube	50
	campaigns	32	management	49
	content analysis	32	dynamics	48
	space	32	sentiment analysis	47
	civil society	31	intersectionality	46
	perceptions	30	hong kong	44
	resistance	30	justice	44
	social network analysis	30	organizations	44
	citizenship	29	images	42
	education	29	racism	42

hashtags	29	knowledge	41
icts	29	conflict	40
surveillance	29	polarization	39
advocacy	28	public sphere	39
expression	28	campaigns	38
collective identity	27	ensorship	38
policy	27	collective identity	38
populism	27	crisis	38
strategies	27	journalism	38
turkey	27	policy	38
health	26	big data	37
sites	26	content analysis	37
diffusion	25	people	37
hashtag activism	25	affordances	36
new media	25	fake news	36
public opinion	25	framework	36
attitudes	24	machine learning	36
patterns	24	misinformation	36
trust	24	performance	36
exposure	23	public opinion	36
memes	23	sexual violence	35
online communities	23	civil society	34
opinion	23	surveillance	34
political protest	23	trust	34
affect	22	disinformation	33
climate change	22	experiences	33
conflict	22	exposure	33

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## Section F: Computational Historical Analysis of Methods

Table F1 shows the methodological categories, their respective search terms, and the number of results for each category in the dataset. The search terms were adapted from Walter and Ophir (2024), and were applied to the abstract, keywords, and keywords plus fields using analytical code in R that is available in the article’s replication files.

Table F1: Search terms for methods evolution analysis.

<b>Methods category</b>	<b>Search terms</b>	<b>Results in Dataset</b>
Qualitative	"focus group", "interview", "semi-structured", "in-depth interview", "group discussion", "qualitative interview", "qualitative research", "dense description"	811
Surveys	“survey”, “cross-section” (with optional hyphenation), "longitudinal survey", "panel survey", "wave survey", "repeated survey", "time-series survey"	571
Content analysis	"content analysis" (excluding automated/computer-assisted/computerized variations), "text analysis" (excluding automated variations), "manual content analysis", "human-coded"	560
Computational content analysis	"topic modeling", "automated image", "data mining", "automated content/text analysis", "computer-assisted content/text analysis", "computerized content/text analysis", "machine learning", "natural language processing", "nlp", "sentiment analysis", "text mining", "automated coding", "dictionary-based analysis", "computational linguistics", "computer-aided text analysis", "supervised learning", "unsupervised learning", "text as data", "images as data"	381
Ethnography	"ethnograph" (captures ethnography/ethnographic), "participant observation", "participant research", "fieldwork" (excluding quantitative fieldwork), "fieldwork" (hyphenated variation), "digital ethnography"	328
Network analysis	"network analysis", "semantic net", "social network analysis", "citation network", "co-citation", "network visualization", "network metrics", "network centrality", "network structure"	283
Discourse analysis	"discourse analysis" (with optional hyphenation)	215
Mixed methods	"mixed method", "multi method" (also capturing hyphenation and use of plural), "triangulation/triangulated", "qualitative comparative analysis", "QCA", "fsQCA/csQCA/mvQCA" (variants), "process tracing", "sequential explanatory/exploratory design/approach", "convergent parallel/design/approach", "embedded design", "case-based analysis"	200

Comparative	"comparative case/analysis/study/research/method", "cross-national comparison", "cross-cultural comparison", "longitudinal comparison" (excluding survey-based)	78
Systematic reviews	"systematic lit" (also systematic literature), "systematic review", "meta-analysis", "metaanalysis" (unhyphenated variation)	64
Experiments	"experimental condition/group/treatment/manipulation/stimuli/between-subjects/within-subjects", "random assign" (with flexible spacing/hyphenation), "controlled experiment", "between-subjects design", "within-subjects design", "factorial design", "participants/subjects were randomly assigned", "vignette study/experiment/design"	17

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## References for Supplemental Materials

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