#DevResearch: Exploring Development Researchers' Twitter Use for Research Dissemination

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Abstract
Social media is increasingly used by researchers to discuss research and policy. However, little is known about access to social media as well as the nature of its use among development studies researchers. This study combines survey data on the social media use of 131 development researchers with data on 56,512 tweets by development researchers. Development researchers are most active on Twitter and Facebook, and use them to engage with academics and students. Twitter data reveal that only a small fraction of tweets explicitly discuss their country of residence. Implications for understanding the role of social media in the dissemination and use of development research are provided.

Keywords: social media studies, knowledge production, diversity, economics

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Résumé
Les chercheurs ont de plus en plus recours aux médias sociaux pour discuter de recherche et de politiques. Cependant, on en sait peu sur l'accès aux médias sociaux par les chercheurs en études du développement et leur utilisation de ceux-ci. Cet article combine les données provenant d'un sondage fait auprès de 131 chercheurs en développement et les données sur 56 512 Tweets envoyés par des chercheurs en développement. Ces chercheurs sont particulièrement actifs sur Twitter et Facebook, utilisant ces réseaux pour échanger avec des académiques et des étudiants. Cependant, les données sur Twitter révèlent qu'une part infime seulement des Tweets discutent explicitement de leur pays de résidence. Cette étude traite ainsi d'approches pour comprendre le rôle des médias sociaux dans la dissémination et l'utilisation de la recherche en développement.

Mots clés : études des médias sociaux, production du savoir, diversité, sciences économiques

Introduction

Social media has become integrated into personal and professional spheres of life (Boyd & Ellison, 2007). Launched in 2006, the social networking service Twitter has particularly gained extensive credibility among researchers working both within and outside academia. Studies have shown that the dissemination of research via networks such as Twitter is particularly useful in extending its reach in diverse fields (Luc, Archer, Arora, Bender, Blitz, Cooke, Hlci, Kidane, Ouzounian, Varghese, & Antonoff, 2020; Wekerle, Vakili, Stewart, & Black, 2018). Typically, academics use Twitter for consumption, dissemination, communication, and the promotion of knowledge (Sugimoto, Work, Larivière, & Haustein, 2017). Most Twitter studies rely solely on survey data to gather information on social media use by academics, and these studies are also often discipline-specific (e.g., Kimmons & Veletsianos, 2016). However, with increasingly novel ways of gathering data (thanks in part to the use of machine learning algorithms and big data), research can now examine real-time Twitter data, instead of simply asking researchers about their Twitter usage. Moreover, there is little research on researchers' use of Twitter in the field of development studies[1] globally. Disseminating work in development studies is considered a critical step in advancing the state of knowledge in that specific area—to both scholars as well as practitioners of development policy. Second, using social media to enhance the reach of knowledge in development studies could be an important means to appeal to policymakers and better engage with key stakeholders in the development paradigm.

Against this background, a rigorous investigation of the potential of social media (particularly Twitter) in the dissemination of development research is lacking. To bridge this gap, this article provides an overview of Twitter use among development researchers around the world. Text analysis of tweets shared by 31 randomly selected development researchers is supplemented with survey data from a larger pool of development researchers. Part of this research seeks to address any disparities in social media use that may be present within development studies, for example, understanding the location and identity of the researcher who is sharing and disseminating information related to development research.

This study examines development researchers' preference for Twitter when it comes to research dissemination. The policy implications of this study relate to communication strategies associated with development research in general. It fills an important gap in the literature on research dissemination that has only recently begun to gain relevance in the domain of development studies.

Specifically, the research questions (RQs) are:

> RQ1: To what extent do development researchers use Twitter? Do they use it purely for dissemination purposes?
>
> RQ2: What are the broad themes development researchers explore via Twitter use?
>
> RQ3: Does the use of Twitter vary by the location and identity of the researcher?

This study addresses these questions through a combination of survey methods and Twitter content analysis. It presents descriptive findings from surveys conducted

within the global development research community and compares the social media use of development researchers with researchers from other disciplines. Tweets from a random sample of development researchers are analyzed to identify not just the academics who use Twitter, and social media in general, but also the nature of this use. Although there is documentation of how scholars use social media to showcase their work and the work of others during conferences or seminars, this study's innovation lies in explaining the importance of Twitter in spreading policy-relevant research using this mixed-methods approach.

Understanding the role of social media in the dissemination of development research is critical to understanding the channels through which it ultimately affects policy dialogue. In this context, the geographical location of the research could be important (Panin, 2020), where a lack of context could significantly affect how any normative statements are delivered. As Grieve Chelwa (2021) shows, the underrepresentation of African scholars in economics is a contributing factor to the lack of understanding of policy problems relevant to African countries, despite extensive research being conducted in the same context. It is possible that local researchers (and institutions) may have different dissemination channels compared to non-local researchers, particularly when the intention is to influence local policies. This research aims to understand the position of social media (particularly Twitter) in disseminating development research relative to other methods of dissemination, thereby leading to social media policy formulations in development research institutions.

This article begins with an overview of the relevant literature examining social media use among researchers and scientists before detailing the methodology used herein and the data collected and used for analysis. Key findings related to social media use among development researchers are then presented using a Twitter analysis. The article concludes with implications for policy.

Literature review

Social media, Twitter, and academia

Social media has helped overcome physical/geographical distance between academics across the globe, enabling cross-continental collaboration with ease (Holmberg & Thelwall, 2014).[2] With the increasing use of social media, specifically Twitter, for scholarly communication and research dissemination, the implications of an investigative study into the nature of the space that development research occupies online cannot be overlooked. Kim Holmberg and Mike Thelwall (2014) study the disciplinary differences in scholarly exchange on social media, concluding that researchers in digital humanities and cognitive science use Twitter more for conversations, while economics researchers shared the most links.

The increasing popularity of social media in academia has also given rise to alternative sources of information and metrics of citation (otherwise known as Altmetrics). This implies that there are more digital records of research being shared via social media, which are tracked by Altmetrics. This is broadly an impact of technology, but the role of social media in amplifying this spread is significant. For example, José Luis Ortega (2016) suggests that journals with Twitter accounts receive 34 percent more citations

and 46 percent more tweets than those without Twitter accounts. However, as Stefanie Haustein (2019) notes, examining the correlation between tweets and citations only reveals part of the story. She also provides a comprehensive overview of a dataset of 24.3 million tweets linked to Altmetric Twitter data.

The modes of communicating information, academic or otherwise, have grown exponentially. Academicians and researchers who spend time on social media platforms naturally tend to build a following of peers and non-academics. Isabelle M. Côté and Emily S. Darline (2018) investigate the Twitter followers of an evolutionary biologist and ecology faculty members to understand if social media helps communicate their work to varying audiences, finding that half of the followers are fellow scientists. When the number of followers is greater than 1,000, followers become more diverse—including media professionals and non-researchers, among others. The authors suggest that this leads to an exponential increase in the communication of findings because the followers of scientists are, in turn, followed by other people who may not necessarily belong to the same field or profession.

The use of jargon also impacts the reach of dissemination via social media. Stefanie Walter, Ines Lörcher, and Michael Brüggermann (2019) find that while climate scientists interact most with their peers, they adjust their style of communication on Twitter to engage with a wider audience. They tend to use more words expressing negative emotions when communicating with journalists, civil society, and politicians. Timothy Bowman (2015) also highlights the use of strategic communication to reach a wider audience. He finds that academics use affordances and framing while composing tweets to interact professionally.

Development studies and Twitter
In development research in particular, the channels of research dissemination are potentially as important as the research itself, since such effective dissemination is critical for engaging with relevant stakeholders (Schnitlzer, Davies, Ross, & Harris, 2016).

Development researchers provide an essential source of (evidence-based) knowledge in their areas of expertise, typically aiding policy formulation. By creating a new body of knowledge, or adding to an existing one, development researchers are constantly providing contextual information about everyday problems. Typically, development researchers will use research journals and conferences, which often restrict access to subscribers or members, to disseminate research. To this end, social media bridges the gap between researchers and the general public, who might want to interact with them (Biswas & Kirchherr, 2015; Burke-Garcia & Scally, 2014; McPherson, Budge, & Lemon, 2015; Schnitzler et al., 2016).

Why do academics use social media?
The growth of social media platforms has also provided renewed means for researchers seeking to quantify the online presence of academics. In particular, such studies are able to explore how academics are extending the reach of their work to the general public. For example, Judit Bar Ilan, Stefanie Haustein, Isabella Peters, Jason Priem, Hadas Shema, and Jens Terliesner (2012) use data from 57 researchers with an online pres-

ence and find that 84 percent have home pages, 70 percent are on LinkedIn, 23 percent have public Google Scholar profiles, and 16 percent are on Twitter. The authors go on to argue how traditional measures of an author's credibility (e.g., citations) only measure their impact on other academics or researchers, whereas the impact on the public and readers is often completely overlooked (Schiller, Hunsaker, Kane, Wolfe, Dale, Suter, Russell, Pion, Jensen, Konar, Ecology, & Jun, 2001).

Social media serves as a common ground for students and academics to interact; Gemma Nandez and Ángel Borego (2013) analyze 1,263 individuals (mostly academics) affiliated with 11 Catalan universities and their profiles on Academia, a social networking site for academics. They find the three main reasons for using Academia are getting in touch with other researchers (67%), disseminating research output (61%), and following other researchers' activities (59%).

Further, communicating one's work serves multiple purposes, including credibility and proof of work, which could mean higher chances of future funding. Schnitzler et al. (2016) believe in social media's ability to meet several academic research goals; academics use social media to communicate the progress of their study and eventually to report their findings. Moreover, it is also suggested that funders use social media to talk about the programs and studies they are funding.

The target of research varies by dissemination channel. Ehsan Mohammadi, Mike Thelwall, Mary Kwasny, and Kristi L. Holmes (2018) find that PhD students make up a large portion of academic article readers on Mendeley, a reference management library. Medical professionals, professors, and librarians are other readers on Mendeley, in the fields of clinical medicine and social sciences. Thus, it would be wrong to assume that academics and students are the only consumers of research. With this in mind, social media can act as a bridge between technical, tight-knit academic circles and the general public.

It is clear that academics are increasingly using social media to communicate their work, network, find work, and advertise employment opportunities. In development research in particular, themes of access, the nature of use, and voice are likely to mediate social media use, in turn resulting in unequal paradigms of research communication. This could lead to the partial communication of ideas being tested in a particular context and not necessarily translated to others. If policymakers, academics, and the general public seeking information about what works in development use social media to inform their work, it becomes important to understand and explore how researchers are communicating such development research—especially its effectiveness.

Methodology

This study follows a two-pronged approach to examine how development researchers use social media. To answer RQ1, findings are reported from a small-scale survey that canvassed information from development researchers on their social media use (extent of usage, topics, and attitudes toward usage). The study uses Twitter analysis methods that are useful in synthesizing large qualitative datasets to make inferences. Indeed, such methods have become a powerful tool in researchers' toolkits, allowing for qualitative analysis and coding tweets according to themes (Hays & Daker-White, 2015).

SURVEY DATA

In line with similar social media-use surveys in other disciplines, a survey instrument was adapted that measures engagement with various platforms for academic and other purposes (Elsayed, 2016; Jaring & Bäck, 2017). The survey protocol was approved by an institutional review board prior to being deployed. Informed consent was sought from participants, and all data were anonymized prior to being analyzed. The survey (Appendix 1) also covered if researchers undertook research related to a specific country and asked their motivations for doing so. If researchers used Twitter, they were prompted to answer an additional set of questions on the purpose, frequency, and diversity of their Twitter use. Survey invitations were sent to all researchers listed under the DEV (Development) classification of IDEAS RePEc, a repository of economics researchers. Additionally, multiple-site entry was used to recruit respondents, with survey links posted on social media as well as delivered via development agency networks to enhance the representativeness of the sample to development researchers globally. A total of 184 responses were received, of which 131 were valid.
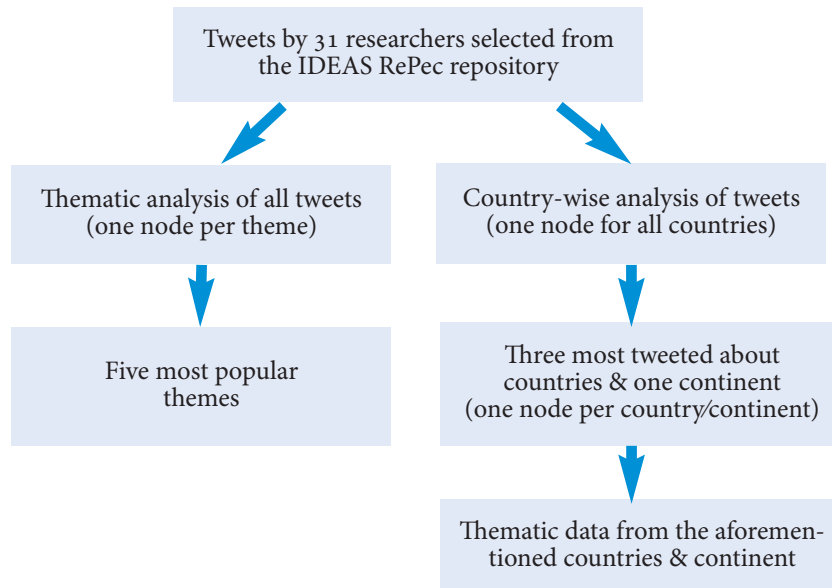
TWITTER DATA

To examine the nature of Twitter usage for communicating development research, web-scraping methods were used to generate a dataset of 56,512 tweets by a randomly sampled set of 31 development researchers. Not all researchers listed under DEV have Twitter profiles or have the details of their Twitter profiles listed in the IDEAS repository. Therefore, the sample of development researchers on Twitter was chosen at random from those who have provided links to their Twitter profiles as part of their IDEAS profile. The sample comprised 31 researchers, including 24 men and seven women. To maintain congruence with survey data, information on the researchers' current location of residence was obtained from their Twitter profiles. Where this information was not provided, the location of the researchers' primary professional affiliation was assumed to be their country of residence.[3] In most cases, information on the researchers' country of origin and education was obtained from their personal and/or professional websites. Henceforth, this is referred to as the country node.

All tweets by the 31 researchers from a six-week period were obtained using NCapture and uploaded on NVivo for further analysis (Bogen, Bleiweiss, & Orchowski, 2019; Palmer, 2013). The tweets in the dataset were posted between January 24, 2020, and February 17, 2020. Naturally, the number of tweets and followers of each researcher varies greatly, depending on their social media activity.[4]

To narrow down aspects of RQ2, this study focuses on whether tweets were discussing research in any particular country, or if they were centred around a theme within development research (or both). NVivo makes it possible to run word searches for multiple words at the same time, yielding tweets (or any qualitative data) that meet these criteria as a dataset. The following steps were used to understand the different countries the researchers were tweeting about: researchers were divided into groups and assigned to a country using a look-up function; these were retained as a separate node to examine country-level differences. Following this, research themes were looked up separately, and results were stored as nodes, with one node per theme. The shortlisted themes within development research were health, climate, education, sanitation, environment,

infrastructure, inequality, poverty, governance, and labour well-being. Since the themes are broad, and looking up the theme alone did not yield all relevant tweets, tweets mentioning similar words were also included in the nodes. Each segregated node was then manually refined to remove tweets that did not meet the required criteria. Thus, each node served as a collection of tweets along the dimensions of country of interest and theme of interest. Figure 1 shows how coding was conducted from raw tweets.

Figure 1: Twitter data capture process

Tweets by 31 researchers selected from the IDEAS RePec repository

Thematic analysis of all tweets
(one node per theme)

Country-wise analysis of tweets
(one node for all countries)

Five most popular
themes

Three most tweeted about
countries & one continent
(one node per country/continent)

Thematic data from the aforementioned countries & continent

To better explore the intersections between country and thematic areas, the most tweeted about themes within a country node (both residential as well as country of education) were sought. It is possible that tweets were double counted if they mention a number of words that have been looked up at different times. For example, if a tweet mentions *health* and *India*, it is counted as one tweet related to India and one separate tweet related to health. The numbers mentioned below are inclusive of retweets, comments, and replies to tweets, with each being treated as a separate tweet in itself, but all solely attributable to the author.

Findings

SOCIAL MEDIA USE AMONG DEVELOPMENT RESEARCHERS

Results from the survey data are presented as descriptive evidence for Twitter use among development researchers (RQ1). This sample had slightly higher male representation (58.87%) and the average age of respondents was 41.65 years. Nearly 75 percent of respondents had completed their doctoral education; the remaining respondents reported having completed a postgraduate degree. This is broadly in congruence with the random sample of researchers on Twitter that make up the Twitter analysis, at least in terms of gender. The average number of years that respondents have had a Twitter account is 5.46 years. Of the respondents that have Twitter accounts, most tweet on a weekly basis. Only about 4.5 percent of respondents have attended Twitter conferences,[5] and 2.3 percent have presented their work at one. In line with the age of the sample, respondents reported having spent 15.84 years on average doing research, with

men reporting significantly more years spent doing research relative to women researchers in development studies: mean years of research for men = 18.39 years, *t*-test statistic (115) = -2.88, *p-value* < 0.01.

Nearly half of the sample reported currently residing either in the U.S. (22.13%) or India (22.95%), followed by Italy and Colombia (approximately 5% each). In contrast, nearly 40 percent of respondents indicated that they had completed their doctoral studies in the U.S., followed by 10 percent in India and the U.K., respectively. Thus, half of the sample of development researchers completed their doctoral studies either in the U.S. or the U.K.

### WHY DO DEVELOPMENT RESEARCHERS USE SOCIAL MEDIA (ESPECIALLY TWITTER)?

Twitter is the most popular social media platform with researchers in the sample (60.77%), followed by Facebook (57%) and then LinkedIn (51.54%). More importantly, 67.16 percent of the respondents reported using social media for sharing academic research work, their own as well as that of others (RQ2). About a third of respondents also reported using it for personal matters (posting photographs of family and friends), whereas 62 percent share information and news via these platforms. These findings are broadly consistent with earlier work by Nandez and Borego (2013), but have an increased share of Twitter users compared to other studies (e.g., Bar-Ilan et al., 2012). Other work reports that Twitter and Facebook are the most popular social media sites among academics and scholars (Al-Daihani, Al-Qallaf, & AlSaheeb, 2018). Figure 2 shows the score of the Twitter activity index, which aggregates the number of distinct activities for which respondents use Twitter. It takes a maximum value of 11 (i.e., that the respondent uses Twitter for 11 distinct activities, sometimes or frequently in a rep-resentative week by the men and women in the sample who use Twitter for dissemi-nating research).

Figure 2: Twitter index by respondent characteristics
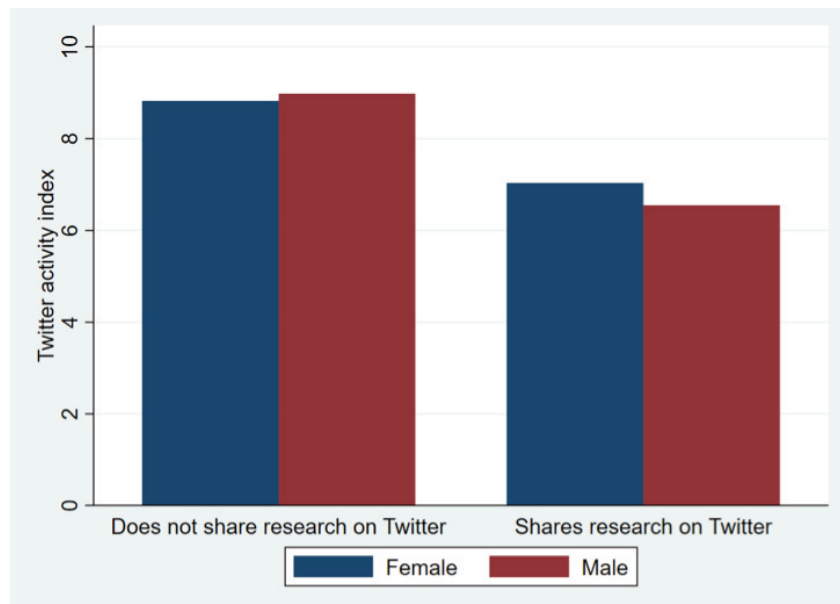
This article will now turn to examining the various forms in which academics share research work on Twitter, both their own and that of other academics. Findings from the survey suggest that the most popular form of sharing research work on social media is through links to manuscripts. Of those who use social media, 60 percent reported engaging in promoting or disseminating one's own work. The most popular social media platform to share research work is Twitter. Respondents also retweet the work of others, seldom giving their opinion on the methodology and approach. Blogger, SSRN, the respondent's respective research institution's website, Medium, and WhatsApp are other platforms used to share research work. Only 29.23 percent of respondents used social media to get help for projects. As Figure 3 shows, there is only a marginal difference between male and female development researchers (by level of education) and the number of accounts on social media that are currently active.

Figure 3: Social media use by development researchers, gender, and highest educational qualification
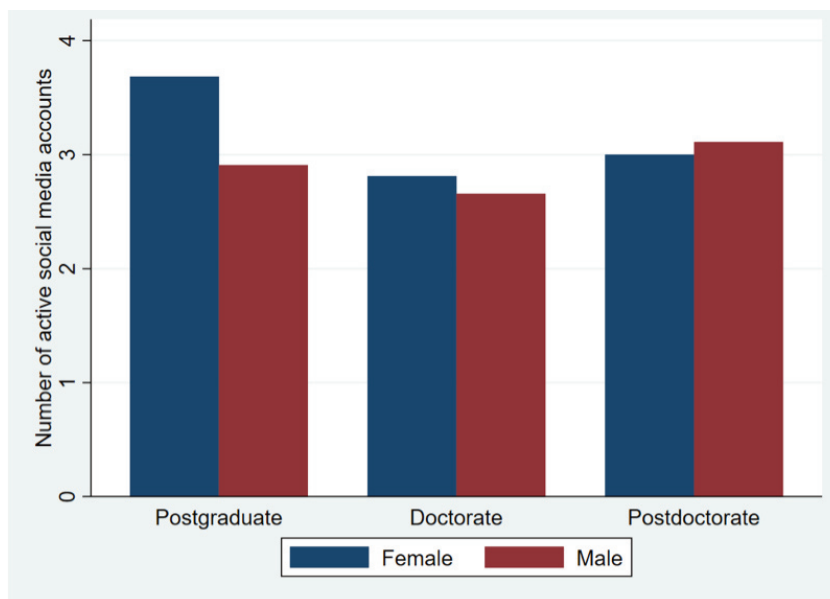
About 25 percent of academics sometimes use Twitter to communicate the results of their study and to communicate about academic events (RQ2). More academics do not use Twitter to communicate with students (41%). Forty-one percent of respondents also reported using Twitter to expand their professional network. The above-mentioned findings seem to fit in with recent literature in this area: Marina Della Giusta, Sylvia Jaworska, and Danica Vukadinović Greetham (2021) find that economists have fewer Twitter conversations with members of the public than scientists, and they are more likely to engage with the same people and stay in their "conversation bubbles." As Figure B.1 in Appendix 2 shows, older and more experienced researchers are likely to be active on Twitter.

Survey evidence on Twitter use and researcher identity

Finally, to better address the nature of Twitter use, especially along dimensions of country-specific research, researchers were asked whether their work is largely focused on a single country and their reasons for doing so (RQ3). On average, 60.5 percent of sample respondents indicated that their research is predominantly focused on a single

country. Neither the average number of years in development research nor the level of Twitter activity (measured by the Twitter activity index) differs according to whether or not researchers focus on a single country. Even within this subsample of country-specific researchers, nearly half of them chose to focus on a country that they were neither educated in nor currently reside in.

Open-ended responses implied that respondents chose to do research on a single country primarily on account of the context that they can bring to their work. Several respondents felt a greater familiarity with a country's context because it overlapped with their country of origin or residence. Thus, as a researcher assessing whether to focus on a particular country for their research, it is possible that context, experience, and accessibility are very important inputs. Very few researchers mentioned that they took up working on a particular country (or a region, such as sub-Saharan Africa) with the intention to fill gaps in knowledge about development in these countries. Figure 4 presents a word cloud arising from a content analysis of these responses.

Figure 4: Word cloud of reasons for conducting country-specific research

THEMES EXPLORED BY DEVELOPMENT RESEARCHERS ON TWITTER
Survey responses provide a broad picture of *who* uses Twitter among development researchers, as well as *how* it is used (RQ1). However, since these are self-reported data, it is likely to have captured only a fraction of the nature of Twitter use among development researchers around the world.

This section reports findings from the thematic content analysis of tweets by development researchers selected at random from the IDEAS repository. This helps to directly address RQ2, which deals with thematic areas of focus by development researchers in the random sample.

On average, researchers in the sample have 7,935.42 followers, which is substantially higher than the average Twitter user. It is possible that this is due to their role in actively disseminating research and the possibility that they will post about employment or funding opportunities. Ashley Carlson and Christopher Lee (2015) find a significant

relationship between hours spent on social media and one's following; therefore, it is also plausible that this specific sample of development researchers invested time and effort in gaining a following on Twitter.[6] As active users of Twitter, it is also more likely that they self-select into having linked profiles on their IDEAS page. As such, they may not be representative of all development researchers active on Twitter and social media. This sampling technique is, however, likely to yield some preliminary insights into how development researchers are using Twitter by focusing on the content and themes of

Table 1: Characteristics of Twitter development researchers sample

| Number of followers (June 2020)/Gender	Number of tweets	Country of residence	Country of origin	Country of education	Number of tweets about country of residence	Number of tweets about country of origin	Number of tweets about country of education
5,033/M	72	U.S.	NA	U.K.	0	—	0
1,196/F	93	U.S.	India	NA	4	2	—
82/M	149	NA	Italy	U.K.	—	4	0
601/F	358	U.K.	Colombia	France	0	1	11
2,258/F	480	U.S.	NA	NA	0	—	—
167/M	486	Canada	NA	NA	38	—	—
196/M	654	France	NA	NA	16	—	—
11,300/M	708	U.S.	India	U.K.	0	121	0
992/F	863	Bolivia	NA	Denmark	86	—	0
1,685/F	909	U.S.	NA	NA	2	—	—
1,706/F	915	U.S.	Philippines	NA	0	11	—
2,942/M	996	U.S.	U.S.	U.S.	4	4	4
1,434/F	1,061	U.S.	NA	France	0	—	2
1,845/M	1,217	U.S.	NA	NA	2	—	—
1,729/M	1,595	Italy	NA	U.K.	23	—	0
119,500/M	1,841	U.K.	NA	Austria	0	—	0
1,146/M	2,092	Germany	NA	NA	0	—	—
4,923/M	2,254	U.S.	NA	Colombia	8	—	165
5,531/M	2,542	Sweden	India	U.K.	16	168	0
1,344/M	2,543	U.K.	NA	Mexico	0	—	119
5,468/M	2,596	Peru	NA	U.K.	165	—	0
10,600/M	3,163	Nigeria	Nigeria	U.S.	381	0	2
541/M	3,173	U.S.	NA	Italy	23	—	46
2,028/M	3,198	France/Germany	NA	Germany	37/41	—	0
1,547/M	3,205	Indonesia	NA	U.K.	104	—	0
4,826/M	3,214	U.S.	U.K.	NA	0	0	—
25,600/M	3,216	U.S.	NA	U.K.	12	—	0
6,268/M	3,221	U.K.	NA	NA	0	—	—
20,800/M	3,224	U.S.	U.S.	U.S.	25	25	25
657/M	3,236	U.K.	India	NA	0	102	—
2,053/M	3,238	Sweden	NA	Sweden	46	—	46

Note: Data on tweets and gender are derived from Twitter data from NCapture and sorted by number of tweets. Where data was not available on Twitter, country of origin, residence, and education were mined from personal websites/CVs. NA denotes "Not applicable," i.e., this was either not different from other country variables or not available.

their tweets. Table 1 contains some characteristics of the sample of Twitter development researchers. A little more than one percent of all tweets were regarding one's own country of residence, with even smaller numbers about their country of education or origin, suggesting that a large majority of tweets are not country-specific.

WHAT COUNTRIES DO RESEARCHERS TWEET ABOUT?

Figure 5 shows the most tweeted about countries and continents. The distribution of tweets is heavily skewed in favour of single countries: while a specific researcher may tweet about one country primarily, they may not tweet at all about the others. In total, there were 17,734 tweets mentioning at least one country. Tweets in the dataset used Africa interchangeably to refer to South Africa (the country) and countries in the African continent overall. The country list contained variations in the use of the word *Africa*, for example, west/south/north/sub-Saharan. To illustrate, an analysis of the content of tweets shows that a number of researchers tweet about the need for development in the continent with respect to food, sanitation, health, and education, among others. In cases where it was possible to procure data on all three countries (origin, education, and residence), researchers tweeted more about countries of education and origin (when the two countries were different). Two researchers tweeted most about their country of residence. Between countries of residence, origin, and education, researchers from the sample tweeted more about countries of origin.

Figure 5: Most tweeted about countries and continents
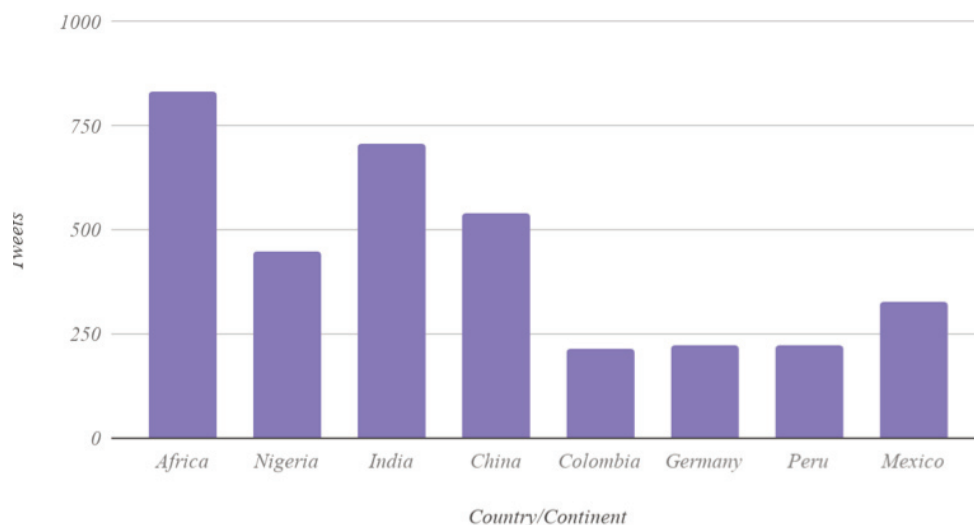
WHAT AREAS DO RESEARCHERS TWEET ABOUT?

Tweets in the sample that were coded for a theme largely discuss relevant experiments and past, ongoing, and potential studies. Exchanges between researchers were also about ideas to increase the accuracy of results. The content of these tweets also focuses on summarizing expert views (via links to interviews or similar). Tweets, thematic and otherwise, also bring out the diversity of development subjects, especially economics. For example, researchers in the sample tweet and retweet about the economic impacts of climate change on health. In such cases, the tweet would show up for a word search under *climate* and *health*, and would be counted as one tweet per theme.[7]

Out of the 11 themes, this study focuses on education, governance, inequality, poverty, health, and climate. Table 2 contains the summary statistics on the distribution of tweets dealing with each theme. These themes cumulatively account for 6.7 percent of all tweets, whereas the other four themes accounted for only 0.66 percent. This does not imply that all researchers in the sample tweet about these issues (it is possible that a single active researcher pushes up the overall fraction of tweets about a particular theme in the sample).

Table 2: Thematic content of tweets by development researchers (by area)

Theme	Total tweets	Mean	Median	Mode	Upper limit	Standard deviation
Education	1,435	46.29	21	9	289	73.48
Governance	971	31.32	17	6	114	35.34
Inequality	542	17.48	10	1	101	21.34
Poverty	525	16.94	12	6	70	16.23
Health	570	18.39	13	18	74	19.25
Climate	293	9.45	6	0	34	9.52

Source: Calculated using NCapture data

The tweets on *health* range from concerns about food and its quality to exchanging papers on the care industry and mental health. Literature suggests that the use of social media in healthcare practices and giving timely help is increasing, more so among the nursing community (Schnitzler et al., 2016). This is more likely in light of the ongoing COVID-19 pandemic, where many development researchers have pivoted work to studying the effects of the pandemic on health-related aspects of access and care.

The tweets on *education* highlight the need for inclusive education policies. Social media is increasingly becoming entwined with the lives of scholars. George Velestsianos and Royce Kimmons (2016) find scholars, students, and authors attending American Educational Research Association conferences tweeting more and differently before, during, and after the conference. In a demographic study of profiles mentioning research papers, Hamid Ekbia, Michael Mattioli, Inna Kouper, Gary Arave, Ali Ghazinejad, et al. (2015) find that researchers are the source of most shared publications and scholarly work on Twitter. Ortega (2016) found that authors in the domain of education registered on Twitter improved the visibility of their papers and, as a consequence, the likelihood of citations.

Similar to the tweets on the other themes, those about *governance* varied greatly—from data protection to the language of communication on official government documents. This could potentially be linked to responding to issues of governance in development studies.

Although the term *inequality* can be argued to encompass various aspects of economic, gender, and categorical inequality, this research is unable to make these distinctions among tweets. Several researchers in the sample tweeted about the escalation in country-specific inequality, often including charts and tabulations.

Extracting tweets on *climate* was meant to examine development researchers' treatment of issues related to environmental economics and climate change on Twitter. Work by

Walter et al. (2019; as cited in Della Giusta, Jaworska, & Vukadinović Greetham, 2021) found climate scientists typically refrain from using jargon on Twitter, so detecting them may be difficult. The tweets on climate address the skewed and dangerous impacts of climate change on different groups of individuals (e.g., farmers).

The two geographical regions that were most discussed in the tweets about *poverty* were India and Africa. Among the tweets, researchers shared their views on the effectiveness of poverty alleviation measures, such as universal basic income, targeted transfers, and foreign aid. The clear link between poverty and inequality, as stated in an Oxfam report, was retweeted widely. Researchers widely tweeted about randomized controlled trials and the 2019 Nobel laureates in economics.

Discussion

This study set out to examine social media usage among development researchers globally—some of whom may be using social media to directly and/or indirectly influence policymakers' opinions or to disseminate research. Understanding aspects of their social media use can provide a closer look at novel ways in which research on development effectiveness is being disseminated to a wider audience (including the general public). To do this, findings from a survey of development researchers on their social media usage are accompanied by a thematic content analysis of tweets from a random sample of development researchers.

The findings indicate that development researchers who use social media are active on an average of three platforms, with the most popular in the sample being Twitter and Facebook, followed by LinkedIn. Furthermore, development researchers who actively shared research on Twitter reported significantly lower overall average activity: 6.78 on the Twitter activity index, $t(128) = 4.22, p < 0.01$. This suggests that researchers use social media (in this case, Twitter) for fewer unique purposes than those who do not share their research on the platform. Researchers who reported using Twitter to share research are typically younger and have less research experience, which is consistent with general demographic analyses of social media users.

A unique element of this analysis is the inclusion of a thematic content analysis of tweets by development researchers to examine the nature of their social media use. Many development researchers tweet about a select group of countries that their research (or their interests) align with. A few researchers tend to tweet the most about their country of origin, followed by their country of residence. Survey responses implied that researchers chose to research a single country primarily on account of the context they can bring to their work (and any resulting policy implications arising from this work). Both types of data used in this study highlight the popularity of Africa and India among development researchers.

This study also provides deeper insight into the potential of social media, specifically Twitter, for the advancement of research. An analysis of the impact of tweets on citations and Altmetrics found that relative to articles that were not tweeted, tweeted articles achieved significantly higher Altmetrics scores when controlling for age and publication/journal (Luc et al., 2020). Analyzing Twitter data to understand the

research dissemination strategies of development researchers is insightful but not without limitations. For example, the database of tweets used in this study only includes tweets by a small random sample of development studies researchers during a specific time period. In light of the growing popularity of online/virtual conferences, accessing research via the internet in the context of the COVID-19 pandemic has been vital in democratizing development studies.

Conclusion

This study provides implications for science and research communication policies around the world, especially related to policy studies and development research. It suggests not only that development researchers prefer Twitter to disseminate ideas and research but also that their tweets often deal with a variety of different themes and countries. Grant-making bodies and funding agencies that include dissemination strategies in their research projects can better evaluate such strategies given the extensive use of social media among development researchers. Furthermore, research institutions, universities, development agencies, and others involved in the production and dissemination of development research could develop specific communication strategies that incorporate social media (especially Twitter) in their work via infographics and other easy-to-understand material. This will better ensure that development researchers' use of social media is not only beneficial to the wider network of researchers in this space but also to the general public.

Notes

1. Development studies refers to the interdisciplinary social sciences, which include a wide array of fields such as economics, demography, communication, international relations, gender, human rights, geography, sociology, and urban studies, to name a few. This broad definition is intentionally adopted to include research across various disciplines dealing with development issues globally.

2. Access to social media platforms is typically free of charge, making them very popular among the general public. Thus, academic work disseminated via social media is likely to present research communication to a very broad audience.

3. This is often different from country/countries of origin and education. Similarly, for some researchers, the country of origin does not differ from the country of education. Several researchers have more than one country of education because they have completed their education in different parts of the world.

4. The mining capacity of NCapture is limited to tweets in a certain date range. Therefore, there may be heterogeneity in the time period of tweets by researchers in this sample.

5. This included tweeting about conference presentations with hashtags, tagging other researchers, and taking part in virtually organized Twitter conferences. The latter is less common in certain disciplines, so it is not possible to make this distinction.

6. Interestingly, Carlson and Lee (2015) also find that individuals who use social media for purposes other than communicating with their families and friends are more likely to have a greater number of followers.

7. Some tweets are, as noted previously, mentions of employment and funding opportunities. Calls for proposals and PhD student invitations are common tweets across all themes and are not included in any specific theme (even though these might be calls in specific areas within development).

Websites

Academia, https://www.academia.edu/

Blogger, https://blogger.com

Ideas, https://ideas.repec.org/

Medium, https://medium.com/

Mendeley, https://www.mendeley.com/

SSRN, https://www.ssrn.com/index.cfm/en/

WhatsApp, https://www.whatsapp.com/?lang=en

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Appendix 1: Survey questionnaire

Q1 Please consider the following information before deciding to participate in this research.

Purpose: This study aims to explore the dissemination of development research via social media.

Who is conducting this study? This study is being conducted by Anirudh Tagat and Anchal Khandelwal, researchers at the Department of Economics at Monk Prayogshala

Has this study been approved? Yes, this study has received ethical approval from the IRB (043-020) at Monk Prayogshala in May 2020. For queries regarding the same, you may contact Sampada Karandikar (ssk@monkprayogshala.in).

What will you do? You will begin by providing some demographic information about your education and geographical location. Following this, you will be asked to fill in one questionnaire about your use of social media for the purpose of research dissemination. Participation will require approximately 10 minutes.

Risks: There are no anticipated risks with participating in this study.

Benefits: No payments or incentives will be provided for answering the survey. However, participants may learn more about their own social media habits as a result of taking the survey. Participants in the survey will have the option of receiving the research paper once analyses are completed in case they are interested.

Confidentiality: Your participation will remain strictly confidential and your responses will not be associated with your identity. The results may be published in a research paper or a popular press article, and you may request to have a copy of the same once it is published. Please note that the researchers cannot provide you with your individual data, since all analyses will be conducted at the group-level.

Participation and withdrawal: Your participation in this study is completely voluntary, and you may withdraw at any time without penalty. If at any time during the study you begin to feel uncomfortable, you may exit the study by closing your browser window. However, once you've submitted your responses, you will have a two-week window, should you choose to withdraw your data. This is because once data analysis begins, it will be difficult to extract individual data from the pool.

Contact: If you have any questions, comments, or feedback regarding this study, you can contact us at at@monkprayogshala.in. By clicking on the continue button, you are stating that you are over 18 years of age and that you understand the provided information and consent to participate in the study being conducted.

    ○ I accept, continue (1)
    ○ I decline, exit (2)

Q2 Which country are you from?

    ▼ Afghanistan (1) … Zimbabwe (1357)

Q3 What is your age?

    _____

Q4 Please state your gender
- ○ Male (1)
- ○ Female (2)
- ○ Non-binary (3)
- ○ Prefer not to say (4)

Q5 Please state your highest educational qualification:
- ○ Undergraduate (1)
- ○ Postgraduate (2)
- ○ Doctorate (3)
- ○ Post-doctorate (4)
- ○ Other professional degree (5)

Q6 In which country did you complete a majority of your education?
- ▼ Afghanistan (1) … Zimbabwe (1357)

Q7 In which country did you complete your PhD/immediately previous degree?
- ▼ Afghanistan (1) … Zimbabwe (1357)

Q8 Which country are you currently based out of?
- ▼ Afghanistan (1) … Zimbabwe (1357)

Q9 What organization are you currently affiliated with?

_____

Q10 What is your position at this organization?
- ○ Postgraduate student (1)
- ○ PhD scholar (2)
- ○ Post-doctoral scholar/research fellow (3)
- ○ Visiting faculty/scientist/researcher (4)
- ○ Faculty/scientist/researcher (5)
- ○ Research administrator (6)
- ○ Other (7) _____

Q11 For how long have you been doing research?
(please only consider research after undergraduate degree)

	0	10	20	30	40	50
Years						

Q12 What is your area of work? *Please select as many as applicable*
- ☐ Health (1)
- ☐ Education (2)
- ☐ Poverty (3)
- ☐ Sanitation (4)
- ☐ Climate change (5)
- ☐ Environment (6)
- ☐ Governance (7)
- ☐ Gender inequality (8)
- ☐ Other (9) _____

Q13 Are you interested in conducting research on any one specific country more than others?
- ○ Yes (1)
- ○ No (2)

Q14 Which country is this?
- ▼ Afghanistan (1) … Zimbabwe (1357)

Q15 Why are you more interested in this country?

_____

Q16 What is your preferred mode of communication with collaborators?
- ☐ Email (1)
- ☐ Phone call (2)
- ☐ Text message/WhatsApp (3)
- ☐ Other (4) _____

Q17 Please select all social media platforms you are active on:
- ☐ Facebook (1)
- ☐ Twitter (2)
- ☐ Instagram (3)
- ☐ LinkedIn (4)
- ☐ YouTube (5)
- ☐ ResearchGate (6)
- ☐ Other (7) _____
- ☐ None of the above (8)

Q18 Please select the kind of content you post/share on social media
- ☐ Pictures of friends and family (1)
- ☐ Information/news (2)
- ☐ Academic research work (3)
- ☐ Other (4) _____

Q19 What form do you share your research in?
- ☐ Link to manuscript (1)
- ☐ Short article (2)
- ☐ Notes (3)
- ☐ Summary (4)
- ☐ Link to presentation slides (5)
- ☐ Videos (6)
- ☐ Link to data source (7)
- ☐ Link to related news articles   (8)
- ☐ Related infographic(s) (9)
- ☐ Other (10) _____

Q20 Please select the social media platform(s) that you use to share your research.
- ☐ Facebook (1)
- ☐ Twitter (2)
- ☐ Instagram (3)
- ☐ LinkedIn (4)
- ☐ YouTube (5)
- ☐ ResearchGate (6)
- ☐ Other (7) _____
- ☐ None of the above (8)

Q21 Do you share research by other academics on social media?
- ○ Yes (1)
- ○ No (2)

Q22 What form do you share others' research in?
- ☐ Link to manuscript (1)
- ☐ Short article (2)
- ☐ Notes (3)
- ☐ Summary (4)
- ☐ Link to presentation slides (5)
- ☐ Videos (6)
- ☐ Link to data source (7)
- ☐ Link to related news articles (8)
- ☐ Related infographic(s) (9)
- ☐ Other (10) _____

Q23 Please select the social media platform(s) that you use to share others' research.
- ☐ Facebook (1)
- ☐ Twitter (2)
- ☐ Instagram (3)
- ☐ LinkedIn (4)
- ☐ YouTube (5)
- ☐ ResearchGate (6)
- ☐ Other (7) _____
- ☐ None of the above (8)

Q24 Have you ever used social media to get help/collaboration for a project?
- ○ Yes (1)
- ○ No (2)

Q25 Do you follow seminars and talks on social media if you can't make it for them in person?
- ○ Yes (1)
- ○ Sometimes (2)
- ○ No (3)

Q26 Do you know what Altmetrics are?
- ○ Extremely familiar (1)
- ○ Very familiar (2)
- ○ Moderately familiar (3)
- ○ Slightly familiar (4)
- ○ Not familiar at all (5)

Q27 For how long have you had a Twitter account?

	0	10	20	30	40	50
Years						

Q28 How often do you tweet?
- ▼ Rarely (1) … Don't tweet, only read (9)

Q29 Do you know about Twitter conferences?
- ○ Extremely familiar (1)
- ○ Very familiar (2)
- ○ Moderately familiar (3)

○ Slightly familiar (4)

○ Not familiar at all (5)

Q30 Have you ever attended a Twitter conference?

○ Yes (1)

○ No (2)

Q31 Have you ever presented your work at a Twitter conference?

○ Yes (1)

○ No (2)

Q32 Do you use Twitter for any of the following:

	Frequently (1)	Sometimes (2)	Rarely (3)	Never (4)
Obtaining real-time information (1)	○	○	○	○
Sharing real-time information (2)	○	○	○	○
Communicate results to peers (3)	○	○	○	○
Communicate results to public (4)	○	○	○	○
Communicate about academic events (5)	○	○	○	○
Communicate with students (6)	○	○	○	○
As a tool to supplement teaching (7)	○	○	○	○
To expand professional network (8)	○	○	○	○
To promote an organization (9)	○	○	○	○
Seek help on a project (10)	○	○	○	○
Help a fellow researcher (11)	○	○	○	○

Q33 Do you think academia has benefited from social media?

○ Yes (1)

○ Somewhat (2)

○ No (3)

Q34 I was directed to this survey from the following source:

○ Colleagues (77)

○ Email (78)

○ Twitter (79)

○ Facebook (80)

○ PEP network email (81)

○ Other (82)

Appendix 2: Supplementary figure

Figure 2.1: Average years in research by educational qualification and Twitter use for research