Measuring societal impact with help of publication metrics: possibilities and problems

Ashraf Maleki, PhD

University of Turku, Turku (Finland)

ashraf.maleki@utu.fi

14.02.2024

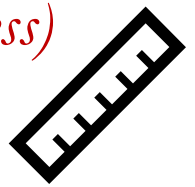
FinnArma's publication metrics network

About me

- (2021-) Senior Researcher, University of Turku (Department of Social Research)

  Project: Applicability of Altmetrics in Research Impact Assessment (AltAssess)

  (Funded by Academy of Finland)



- (2019) PhD (Knowledge and Information Science)
- (2014) Master (Scientometrics)

Publications (a selection)

- Maleki, A., Holmberg, K. (Under review a). Who Are Tweeting About Academic Publications? A Cochrane Systematic Review and Meta-Analysis of Altmetric Studies. *arXiv:2312.06399*
- Maleki, A., Holmberg, K. (Under review b). Tweeting and Retweeting Scientific Articles: Implications for Altmetrics. *Special Issue at Scientometrics for ISSI-2023*.
- Malinen, S., Maleki, A, Holmberg, K. (Submitted). Why do blogs disseminate science? Analysis of blogs posting COVID-19 scientific publications during the pandemic.
- Maleki, A., Holmberg, K. (work in progress). Shifting Thematic Context across Altmetric Platforms for Information Science Research Outputs.
- Maleki, A., Holmberg, K. (2023a). An Investigation of Policy Citations to Nordic Scientific Publication. *Nordic Workshop in Bibliometrics and Research Policy 2023 (NWB2023)*, Gothenburg, Sweden.
- Maleki, A., Holmberg, K. (2023b). Do original tweets and retweets differ in indicating research impact across various subject areas in multidisciplinary papers published in PLoS? *STI2023*. Leiden, The Netherlands.
- Maleki, A., & Holmberg, K. (2022). Comparing coverage of policy citations to scientific publications in Overton and Altmetric.com: Case study of Finnish research organizations in Social Science. *Informaatiotutkimus*, 41(2–3), 92-96.

Who Are Tweeting About Academic Publications? A Cochrane Systematic Review and Meta-Analysis of Altmetric Studies

Ashraf Maleki*, Kim Holmberg**

* ashraf.maleki@utu.fi;** kim.j.holmberg@utu.fi

Economic Sociology, University of Turku, Assistentinkatu 7, Turku, 20014 (Finland)

1 Abstract

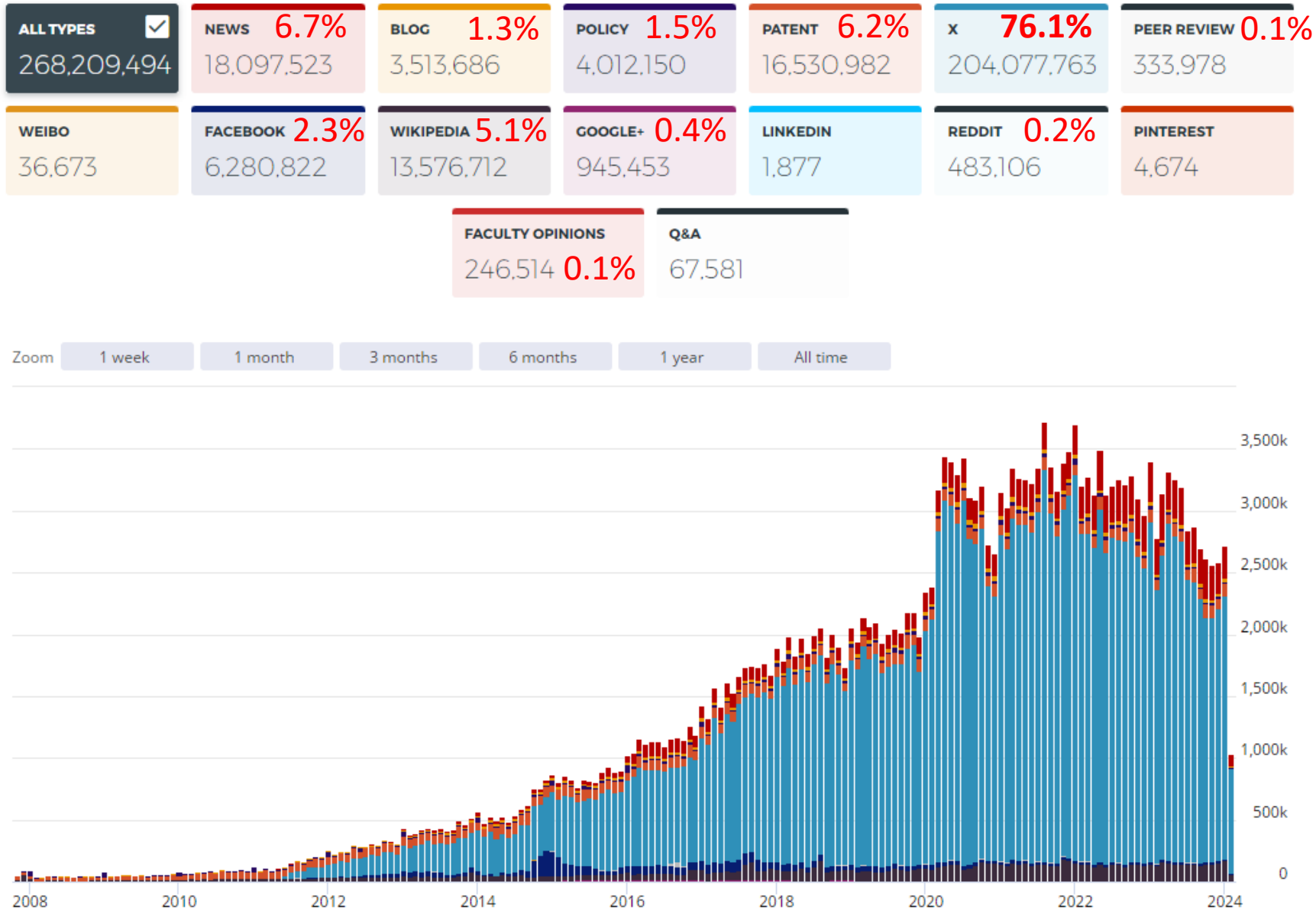
Previous studies have developed different categorizations of Twitter users who interact with scientific publications online, reflecting the difficulty in creating a unified approach. Using Cochrane Review meta-analysis to analyse earlier research (including 79,014 Twitter users, over twenty million tweets, and over five million tweeted publications from 23 studies), we created a consolidated robust categorization consisting of 11 user categories, at different dimensions, covering most of any future needs for user categorizations on Twitter and possibly also other social media platforms. Our findings showed, with moderate certainty, covering all the earlier different approaches employed, that the predominant Twitter group was individual users (66%), responsible for the majority of tweets (55%) and tweeted publications (50%), while organizations (22%, 27%, and 28%, respectively) and science communicators (16%, 13%, and 30%) clearly contributed smaller proportions. The cumulative findings from prior investigations indicated a statistically equal extent of academic individuals (33%) and other individuals (28%). While academic individuals shared more academic publications than other individuals (42% vs. 31%), they posted fewer tweets overall (22% vs. 30%), but these differences do not reach statistical significance. Despite significant heterogeneity arising from variations in categorization methods, the findings consistently indicate the importance of academics in disseminating academic publications.

Keywords: meta-analysis, systematic review, altmetrics, Twitter, X, user engagement, user categorization, scholarly communications

1

Research Impact

Broad range of indicators now capture the interaction of academics and the general public with academic research publications.



Source: Altmetric.com (13.02.2024)

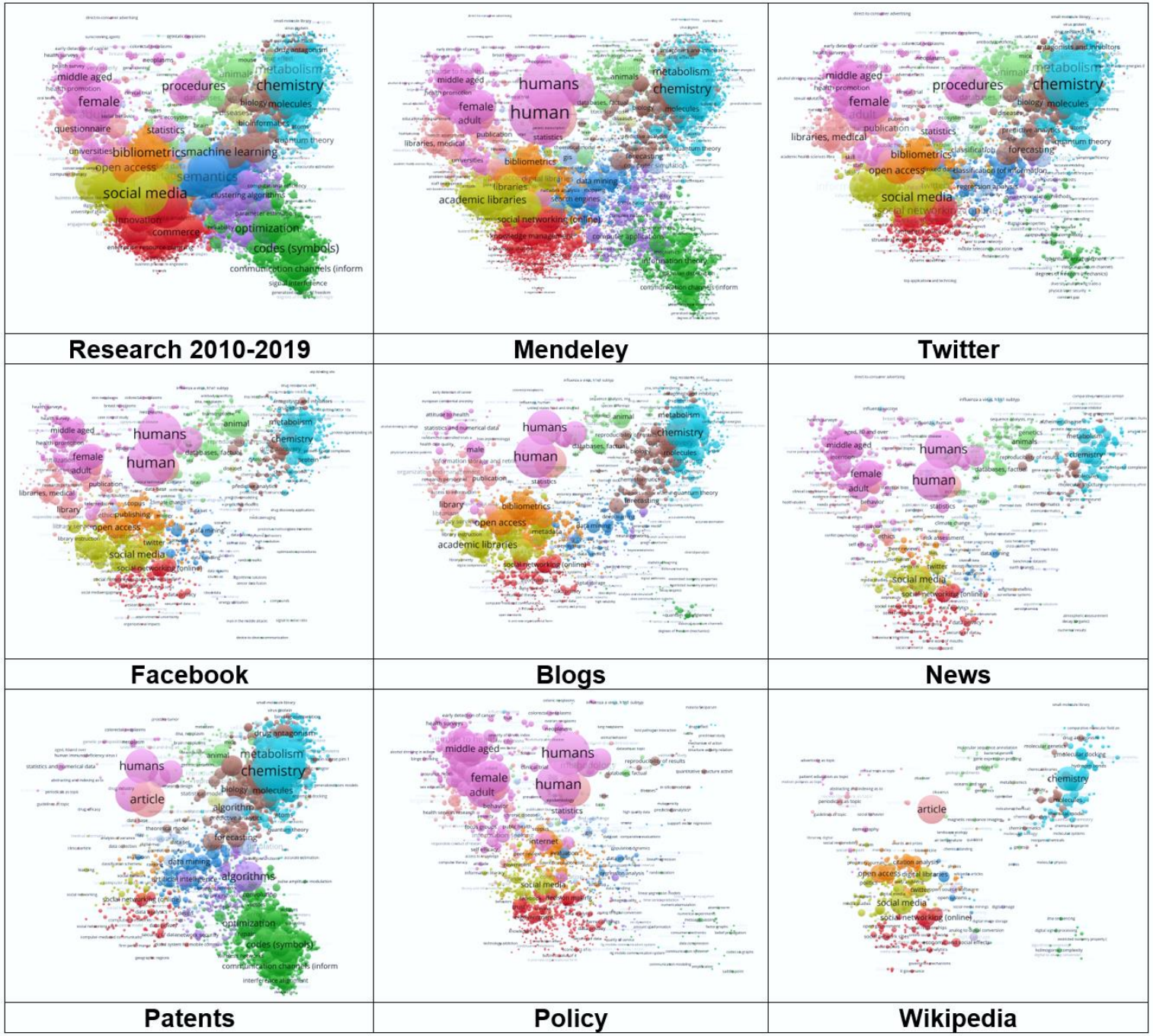
Sources of Bias

- **Impact of Subject Fields**

Different areas follows various norms in:

- Productivity level
- Societal relevance

Thematic shift across altmetric platforms in *Information and Computer Sciences (Maleki and Holmberg, work in progress)*

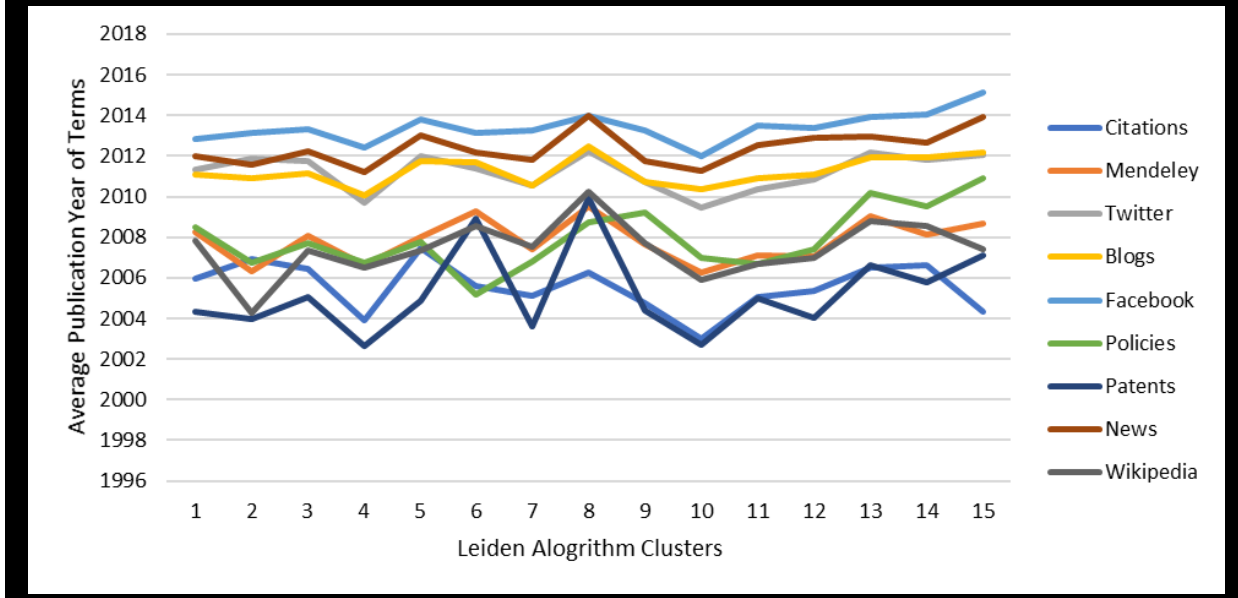


Sources of Bias

- **Impact of Time** (span of time needed for impact accumulation by publications)
- Citation > slower
- X > the fastest

- The average publication year of terms associated with various altmetric mentions
- Facebook represents the most recent topics.
- Patent and Citations represent the oldest topics.
- Facebook>News>Blogs,X>Policy>Mendeley, Wikipedia>Citations,Patents

(Maleki and Holmberg, work in progress)

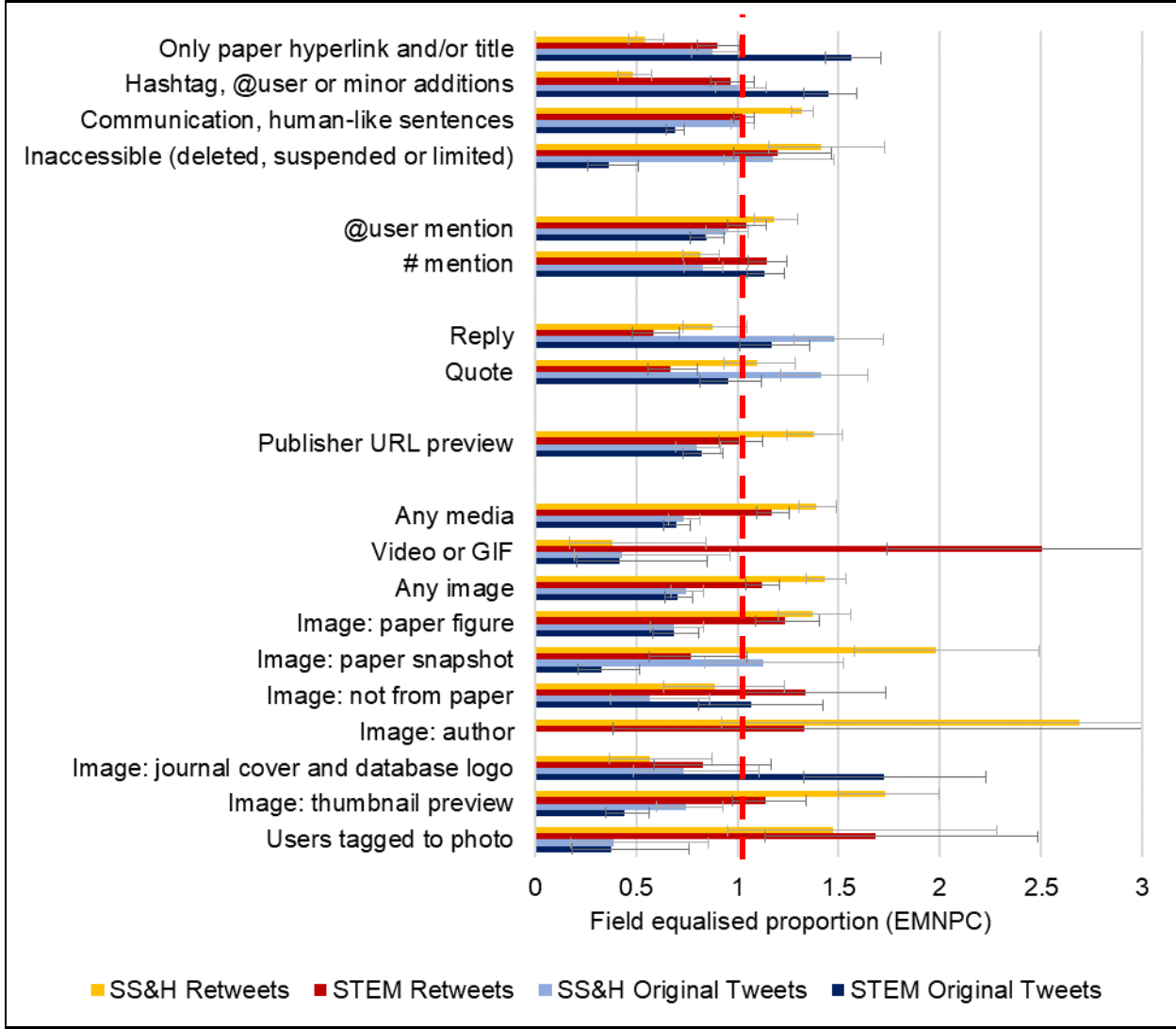


Sources of Bias

- **Inherent factors due to diverse range of activity captured with one indicator**
  - X (original posts/reposts)

(Maleki and Holmberg, Under review b)

Original Tweet / post	Retweet / repost
Authoring a tweet	forwarding an original tweet
User spends effort and has engagement with the topic	A brief user engagement; a simple click on a button
Authenticity	Publicity



Tweets vs. Retweets

Changes over time:

- in media content
- in communication language

(Maleki and Holmberg, Under review b)

Tweets vs. Retweets

Correlations with citations:

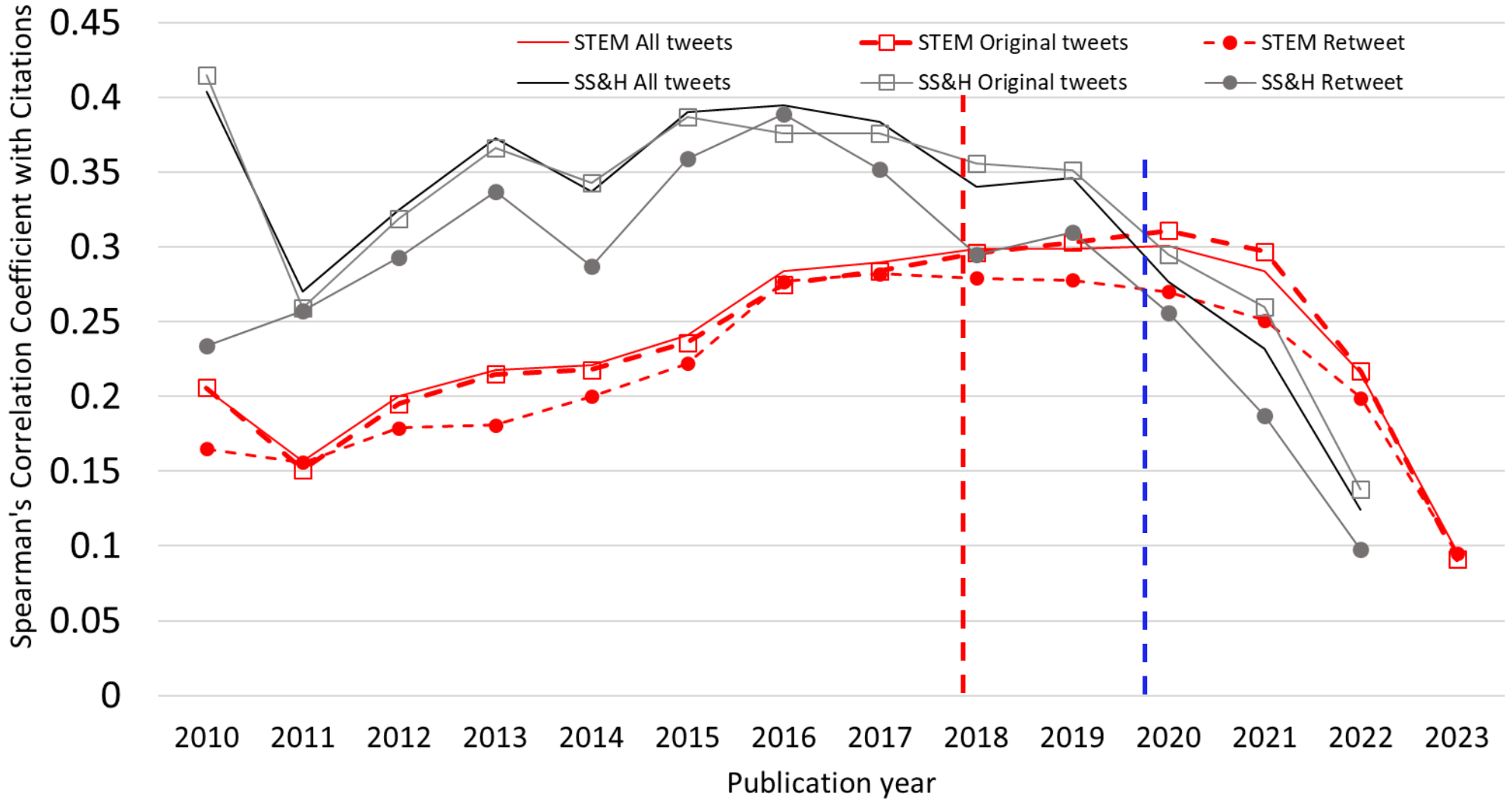
1. Overall higher association with academic impact in SS&H fields

2. Delay in SS&H

3. Early impact of Original tweets > all tweets

4. Retweets are mostly weaker in correlations with citations

(Maleki and Holmberg, 2023b)



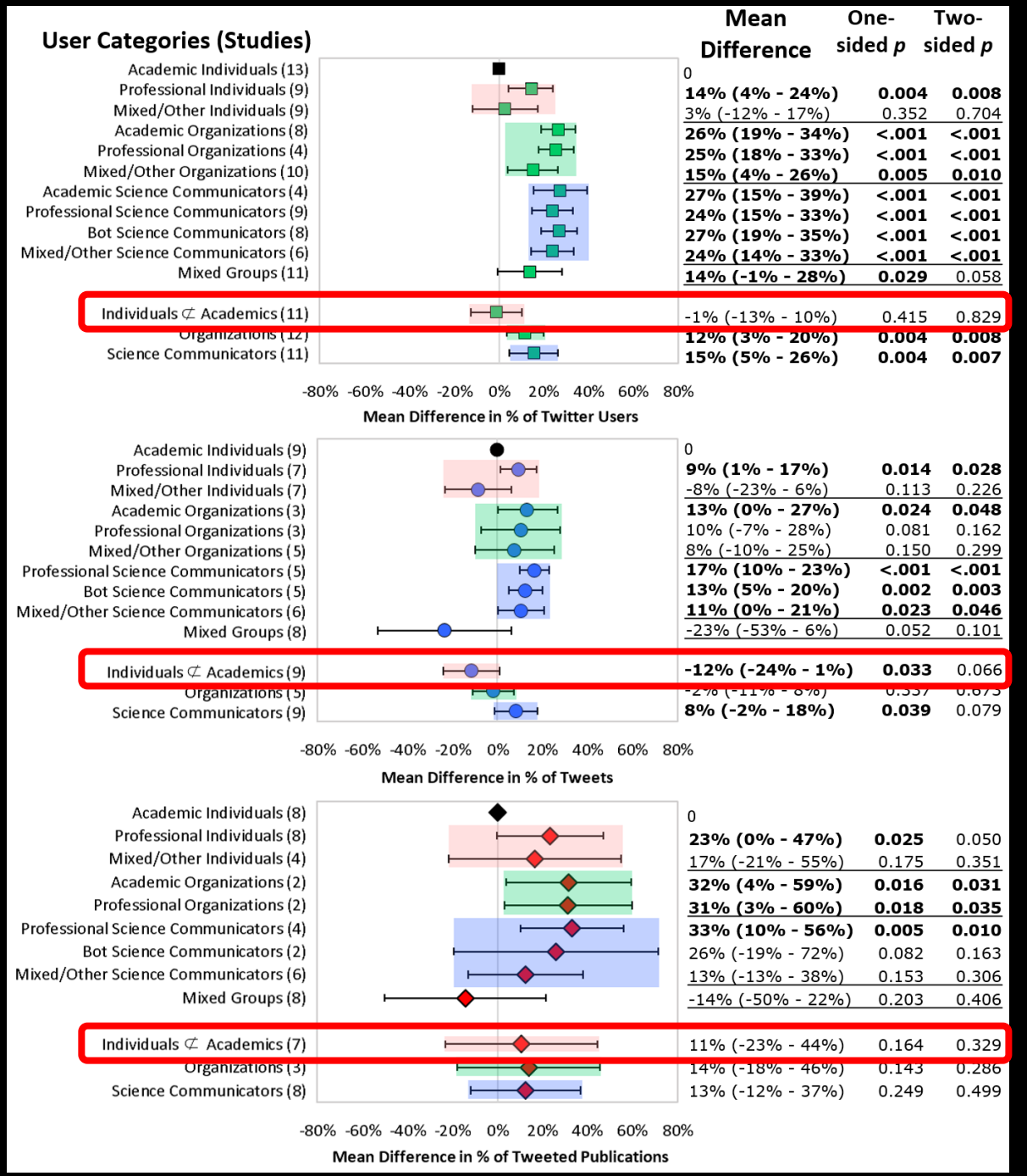
Sources of Bias

- **Inherent factors due to diverse range of activity captured with one indicator**
  - Twitter users (individuals, organizations, academics, professionals, the general public, publishers, science communicators, bots etc.)

Systematic review of altmetric studies shows:

- Parity in extent/activity of academic and non-academic individuals in X

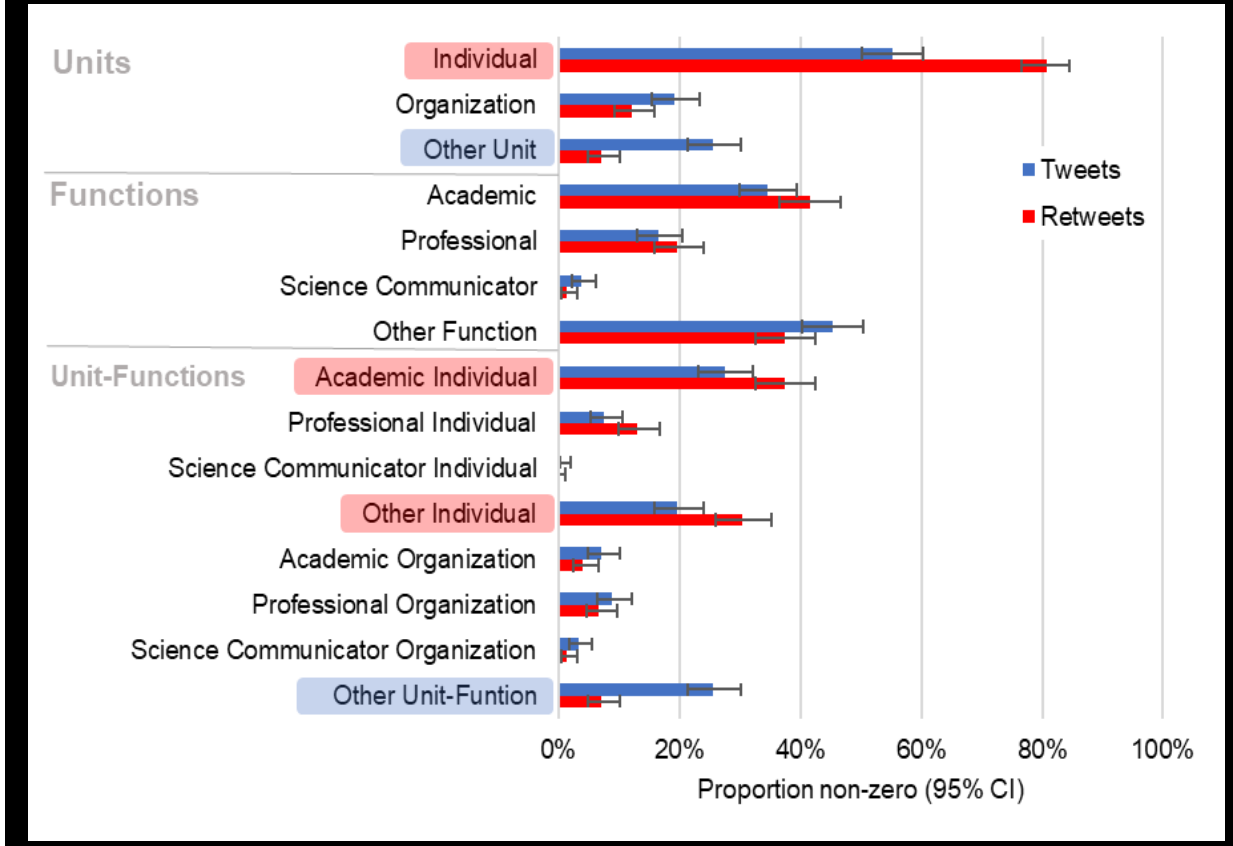
(Maleki and Holmberg, Under review a)



Sources of Bias

- **Inherent factors due to diverse range of activity captured with one indicator**
  - Tweets (original tweets/retweets)
  - Various X/Twitter users

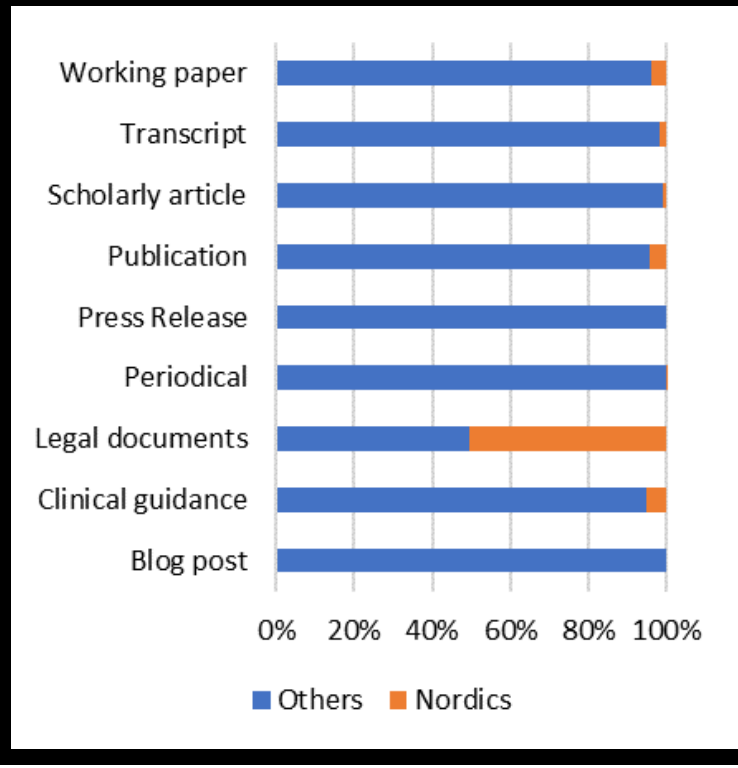
  (Maleki and Holmberg, Under review b)

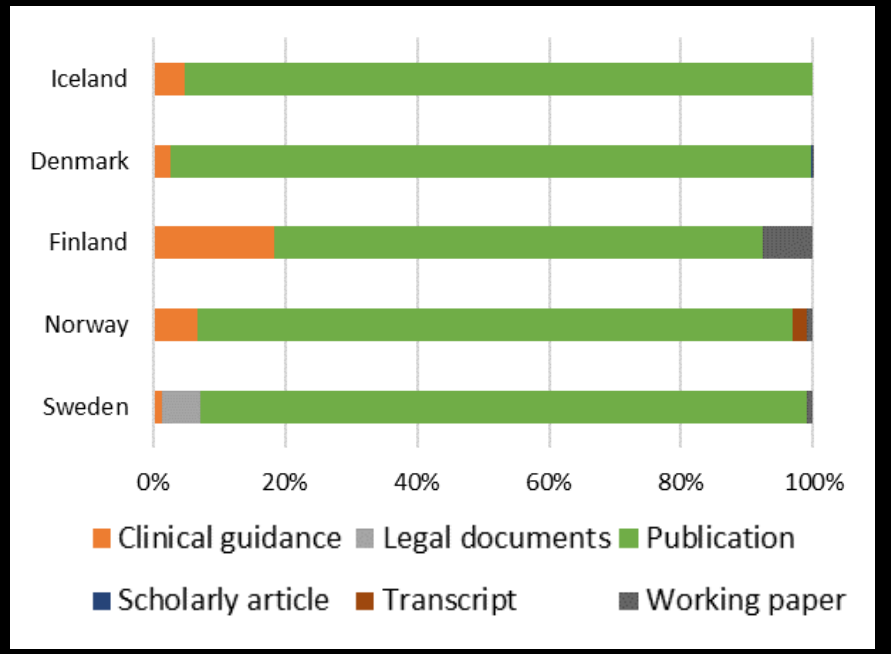


Sources of Bias

- **Underlying data source**
  - Especially concerning Policy document citations in Overton.io and Altmetric.com
  - Unknown datasets:
    - Development in data set size in unknown directions (can cause normalization problems)
    - Uncitable documents

  (Maleki and Holmberg, 2023a)





Sources of Bias

- **Variety in policy context**

Multitude of impact captured by policy citations:

- Medical impact
- Environmental impact
- Agricultural impact
- Societal impact
- Standards and best practices in various areas of science
- Etc.

(Maleki and Holmberg, 2023a)

Gaming Social Impact

- Citation Cartels
- Altmetrics can be easily gamed.
- Automatic blogging of academic paper abstracts
- Misinformation and disinformation patterns, especially during pandemic

(Malinen, Maleki and Holmberg, submitted)

Social Impact Assessment using Metric: Solutions

- Statistical normalization for time and field
- Filtering out irrelevant data from analysis
- Capturing inherent variables
- Open Science (data sharing, ensuring reproducibility)

Thank you!

Questions?

Ashraf Maleki, PhD

University of Turku, Turku (Finland)

ashraf.maleki@utu.fi

14.02.2024

FinnArma's publication metrics network