# Metrics in Large-Scale Agile Software Development: A Multivocal Literature Review - Methodology

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## 1. Research Topic

As large-scale projects increasingly adopt agile practices, the need for metrics arises to coordinate teams, promote continuous improvements, and monitor progress. In this study, I aim to understand and provide a comprehensive overview of metrics in agile development within scalable environments, offering valuable insights to the community.

## 2. Research Questions

**(RQ1)** What metrics are used in large-scale agile software development?
**(RQ2)** What are the reasons and outcomes of using metrics in large-scale agile development?

## 3. Multivocal Review Inclusion and Exclusion Criteria

We included: (i) literature that explicitly discusses the use of metrics related to large-scale agile projects, solutions, or adaptations of metrics in this scenario; (ii) conference papers, journals and official pages about metrics of the related frameworks; (iii) literature published after 2001; (iv) first 10 pages of the Google search. We excluded: (i) inaccessible literature; (ii) results that Google search considers similar to other results; (iii) Google ads; (iv) articles and pages in a language other than English.

## 4. Academic Literature Search String

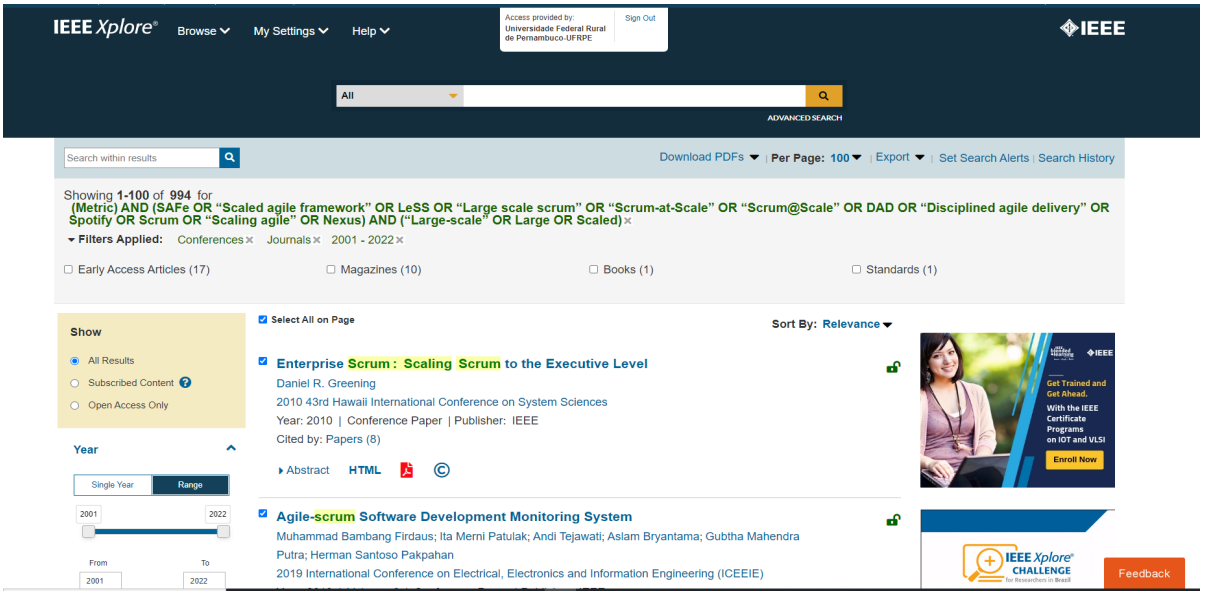
**(Metric) AND (SAFe OR “Scaled agile framework” OR LeSS OR “Large scale scrum” OR “Scrum-at-Scale” OR “Scrum@Scale” OR DA OR “Disciplined agile” OR Spotify OR Scrum OR “Scaling agile” OR Nexus) AND (“Large-scale” OR Large OR Scaled)**

**Filters:**
January 2001 to December 2022; Journals and Conferences; English, Computer Science and Software Engineering Articles, Exclusion of Secondary Studies from Search.

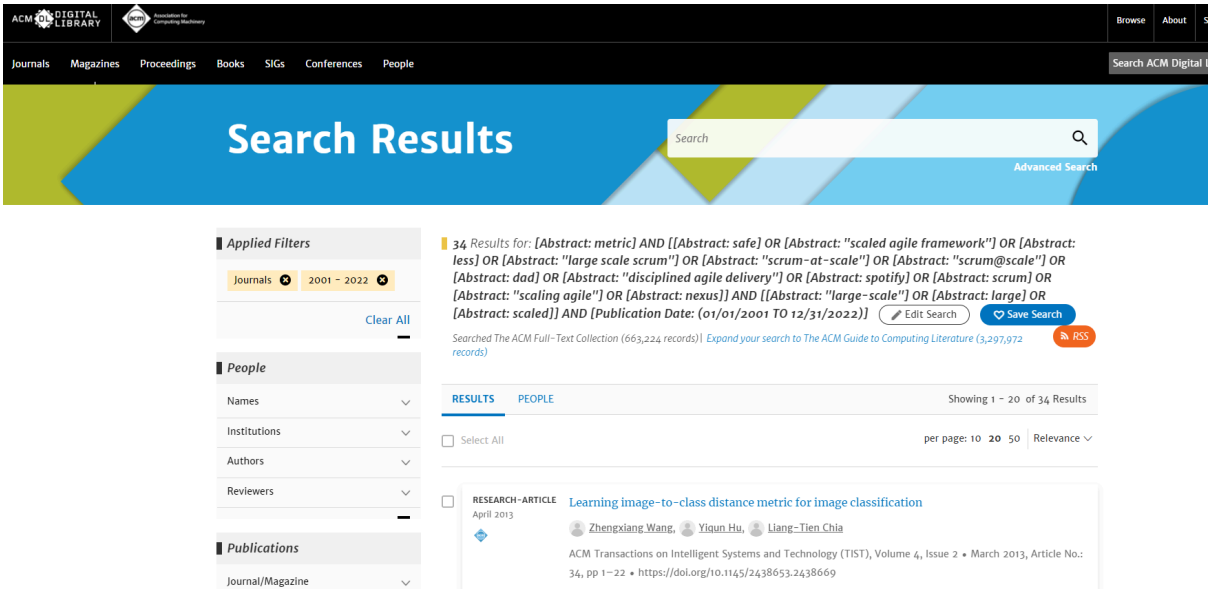
**Databases:** IEEE, ACM, ScienceDirect, SpringerLink, Scopus

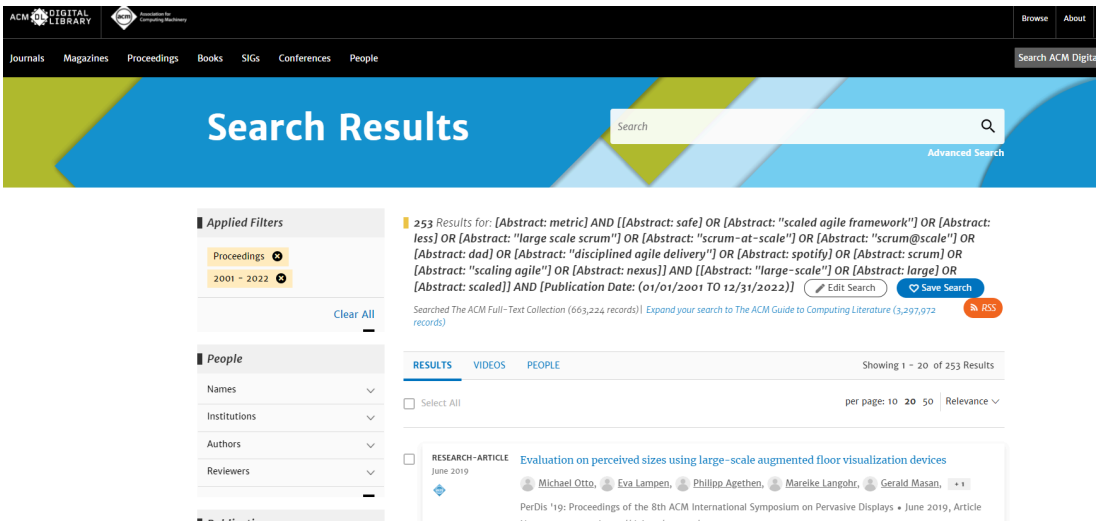
## 5. Evidence of the results found in each database

## IEEE:



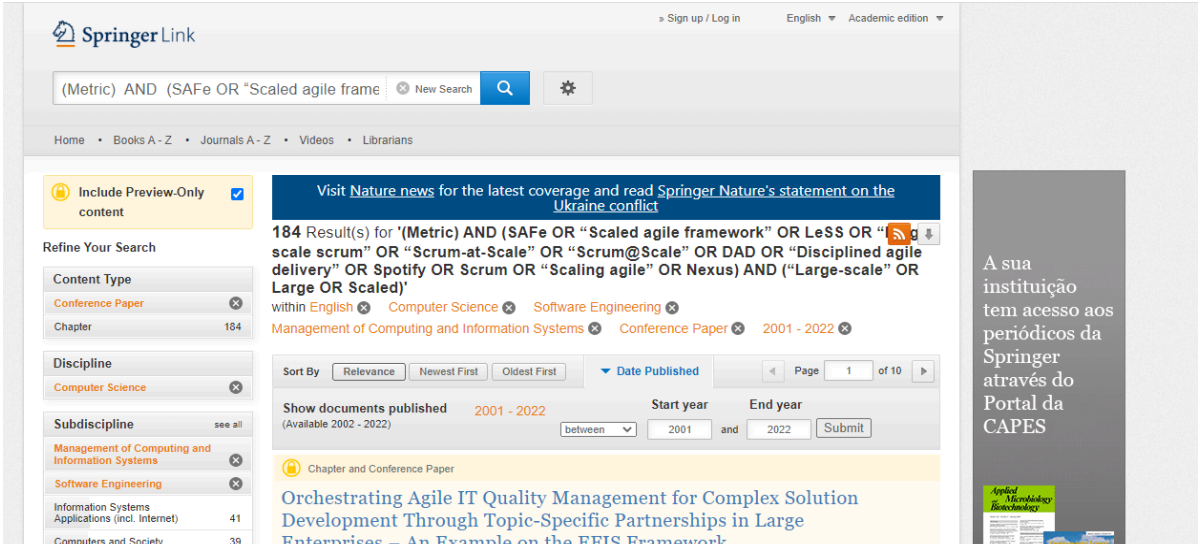

## ACM:



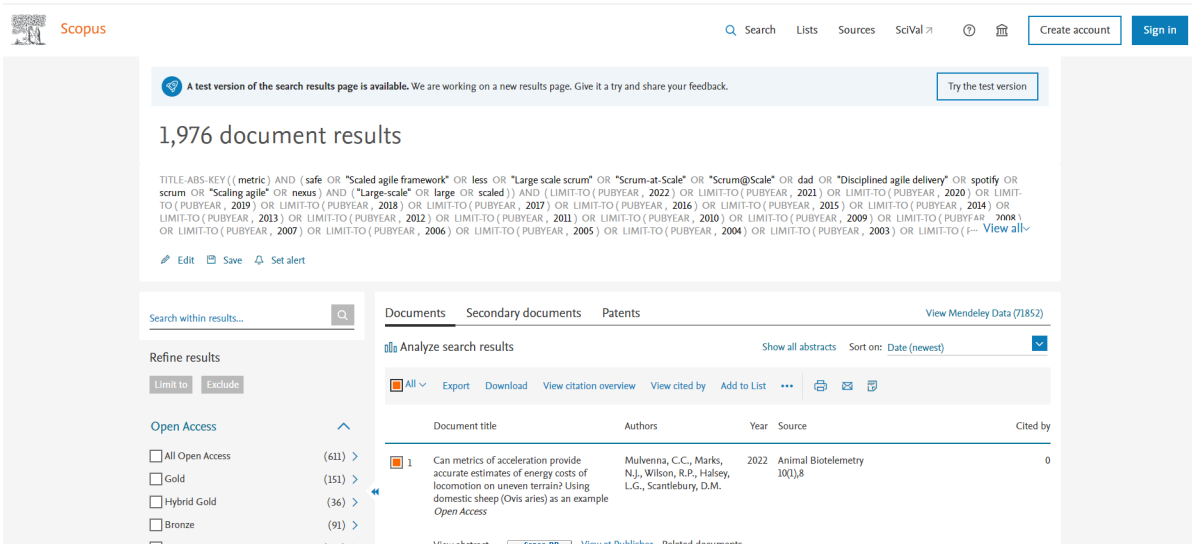



## ScienceDirect:

## SpringerLink:



**Scopus:**




## 6. Selection of Academic Literature

The 'Start' software was used as a tool in this article selection stage. 3479 articles were returned from the automatic search. After removing 393 duplicate articles, there are 3086 articles remaining to be classified, and no articles were left from the ScienceDirect database as they were all duplicates.

| | IEEE | ACM | ScienceDirect | SpringerLink | Scopus | Total |
|---|---|---|---|---|---|---|
| Automatic Search | 995 | 306 | 18 | 184 | 1976 | 3479 |
| After removing duplicates | 974 | 285 | 0 | 184 | 1643 | 3086 |

- 1st selection stage: reading the title and abstract of the 3086 articles.

| | IEEE | ACM | ScienceDirect | SpringerLink | Scopus | Total |
|---|---|---|---|---|---|---|
| Accepted after the 1st selection stage | 13 | 1 | 0 | 25 | 20 | 59 |

- 2nd selection stage: reading the introduction and conclusion of the 59 articles.

| | IEEE | ACM | ScienceDirect | SpringerLink | Scopus | Total |
|---|---|---|---|---|---|---|
| Accepted after the 2nd selection stage | 5 | 1 | 0 | 14 | 5 | 25 |

- Complete reading of the 25 articles

| | IEEE | ACM | ScienceDirect | SpringerLink | Scopus | Total |
|---|---|---|---|---|---|---|
| • Analysis and evaluation | 3 | 0 | 0 | 7 | 4 | 14 |

**7. Grey Literature Search String**

**(Metric) AND (SAFe OR "Scaled agile framework" OR LeSS OR "Large scale scrum" OR "Scrum-at-Scale" OR "Scrum@Scale" OR DA OR "Disciplined agile" OR Spotify OR Scrum OR "Scaling agile" OR Nexus) AND ("Large-scale" OR Large OR Scaled)**

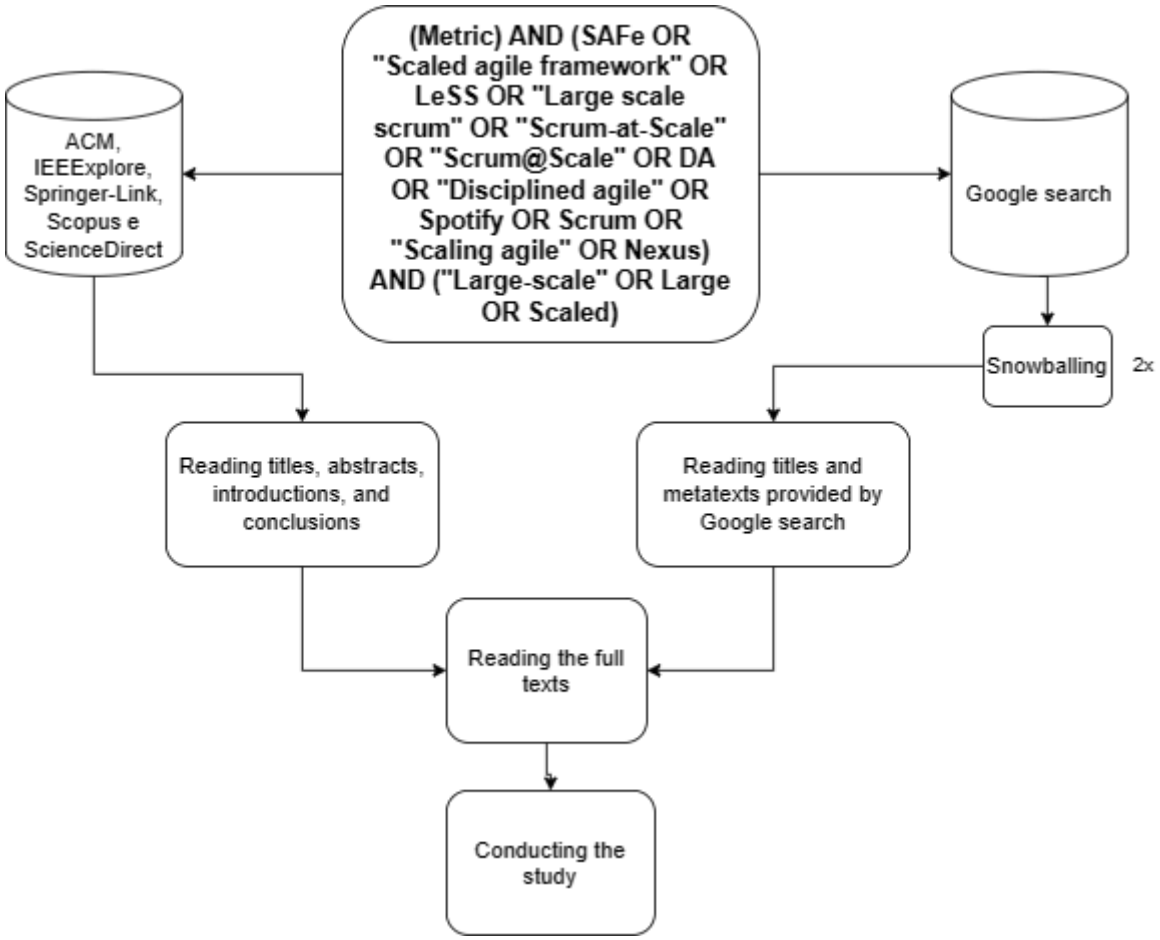
**Database:** Google search. **Date of the search:** January 2023

**8. Selection Strategy to Grey Literature**

The official websites of metrics from all frameworks in the string were separated from the search results to ensure inclusion in the selection. In addition to these sites, the first 10 links returned from the search with the string were considered. Google ads were ignored from the search results. From all these (official sites + 10 first links), 2 cycles of forward snowballing were performed in the selection process of findings.

| Search mechanism | Initial results | Reading titles and metatexts | Reading full texts |
|---|---|---|---|
| Google | 13 | 13 | 5 |

**9. Overview of the Multivocal Literature Review Methodology**


(Metric) AND (SAFe OR "Scaled agile framework" OR LeSS OR "Large scale scrum" OR "Scrum-at-Scale" OR "Scrum@Scale" OR DA OR "Disciplined agile" OR Spotify OR Scrum OR "Scaling agile" OR Nexus) AND ("Large-scale" OR Large OR Scaled)
ACM, IEEExplore, Springer-Link, Scopus e ScienceDirect
Google search
Snowballing
2x
Reading titles, abstracts, introductions, and conclusions
Reading titles and metatexts provided by Google search
Reading the full texts
Conducting the study