FINDINGS ON THE EVALUATION OF THE HEALTH OF SOFTWARE ECOSYSTEMS

This briefing reports scientific evidences on findings in initiatives of evaluation the health of software ecosystems.

FINDINGS

- The evaluation of the health of software ecosystems has produced few approaches. The majority of the approaches expect some kind of rigorous and formal evaluation.
- Quite a few studies provide some data validation, other focus only in parts of the ecosystem, and many of them do not present a "formal" evaluation approach.
- The studies propose several health metrics and show data extracted for these metrics. However, they do not show how these metrics can be part of a complete evaluation approach.
- No one study exhibits the health state of the entire ecosystem. The mass of the studies is in early stages of development, explaining the lack of robust assessments.
- Only three studies present complete approaches of evaluation of the health of Software Ecosystems.
- Some evaluations are focused on measuring specific health aspects, or define only a proposal. However, they did not present data evaluation.
- There is a general lack of studies replication. Many studies use concepts proposed by other authors, but they did not perform a replication of the original study.
- Two studies, present a partial application of the original study. However, they also introduced extensions and discussed issues with the primary approach.
- Regarding the studies quality, some topics were not well described. Aspects such as issues of bias, limitation, validity, and reliability were not always addressed. None of them presented and explained data collection.
- Despite of the quality assessment of the studies 78% present more than 80% of quality.

There are research gaps such as the lack of practices, metrics and tools adequate to conduct the process of health evaluation. Let's see:

- There is not a common sense about health definition. It would be useful to have an agreed upon concept on which to build solid evaluation approaches.
- Practically all studies have concentrated their efforts on getting metrics for health evaluation. They discovered several metrics, but there is not a consensus about which metrics are better to evaluate.
- There are some problems to work with metrics such as: difficulty in defining which metrics can be measured, how to work with highly abstract metrics, which is the better way get value for a metric considering different ways of measuring, and so on.
- Other research areas on evaluating of the health of ecosystems are in the initial state, or even nonexistent. The influence of the practices on the health of ecosystems should be more deeply explored.
- This study shows the absence of tools to support the evaluation process. Some approaches developed their own tool to extracted data. Few tools existing in the market were also used. See Table 1.
- Although the evaluations are immature, the review results suggest that the metrics' analysis can identify problems and improve their health. In order to increase the usefulness of the research in the practice, it is necessary to have a sufficient number of high quality studies.

Study	Tools
[S1]	Import.io(https://www.import. io/)
[S3]	Authors developed their own tool based on Ruby
[S6]	Authors developed their own tool
[S8]	Microsoft Software Removal Tool
[S9]	Authors developed their own tool based on Java and PH
[S13]	Authors developed their own tool based on Python and Scrapy(https://scrapy.org/)
[S19]	Project Monitoring Cockpit (ProMonCo)[2]
[S21]	Authors developed their own tool for mining the web-based developers mailing list
[S23]	FLOSSmole and CVSAnalY

Table 1 Tools used in the evaluation process

Who is this briefing for?

Software engineering practitioners who want to make decisions about evaluation of the health of Software Ecosystems based on scientific evidence.

Where the findings come from?

All findings of this briefing were extracted from the Systematic Review conducted by Simone da Silva Amorim et al.

What is included in this briefing?

The main findings of the Systematic Review.

What is not included in this briefing?

Additional information not presented in the original systematic review.
Detailed information about the original studies analyzed on the systematic review.

To access other evidence briefings on software engineering:

http://www.lia.ufc.br/~cbsoft2017/

For additional information about:

http://wiki.dcc.ufba.br/Aside/

ORIGINAL RESEARCH REFERENCE

Simone da Silva Amorim et al. **How Has the Health of Software Ecosystems Been Evaluated? A Systematic Review**. Proceedings of SBES'17, Fortaleza, CE, Brazil, September 20–22, 2017, 10 pages. https://doi.org/10.1145/3131151.3131174