

Vision Paper: The Sustainability Awareness Framework (SusAF) as a De-Facto Standard?

Birgit Penzenstadler^{1,2}, Norbert Seyff³, Stefanie Betz^{5,2}, Leticia Duboc⁶, Jari Porras², Ruzanna Chitchyan⁷, Ian Brooks⁸, Shola Oyedeji², Karina B. Villela⁹ and Colin C. Venters^{10,11}

¹GU|Chalmers University, Sweden

²Lappeenranta University of Technology

³FHNW, Switzerland

⁴University of Zurich, Switzerland

⁵Furtwangen University, Germany

⁶La Salle - Ramon Llull University, Spain

⁷University of Bristol, UK

⁸University of the West of England, UK

⁹Fraunhofer Institute for Experimental Software Engineering, Germany

¹⁰European Organization for Nuclear Research (CERN), Switzerland

¹¹Centre for Sustainable Computing, University of Huddersfield, UK

Abstract

For many practitioners, considering sustainability during a software development project is a challenge. The Sustainability Awareness Framework (SusAF) is a tool for thinking through short, medium- and long-term impacts of socio-technical systems on its surrounding environment. While SusAF has been used by several companies, is not widely adopted in industry yet. In this Vision Paper, we discuss the options for extending the reach of SusAF and what it would take to evolve SusAF into a (de-facto) standard

Keywords

Vision Paper: Sustainability, Framework, Requirements Engineering, Software Engineering, Sustainable Software

1. Introduction

Sustainability has been a topic at the REFSQ Conference since 2012 with the first workshop on Requirements Engineering for Sustainable Systems (RE4SuSy) [1]. Over the past eight years, members of the Karlskrona Alliance for Sustainability Design (which all authors of

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✉ birgitp@chalmers.se (B. Penzenstadler); norbert.seyff@fhnw.ch (N. Seyff); besi@hs-furtwangen.de (S. Betz); l.duboc@salle.url.edu (L. Duboc); ; (J. Porras); r.chitchyan@bristol.ac.uk; (R. Chitchyan); Ian.Brooks@uwe.ac.uk; (I. Brooks); shola.oyedeji@lut.fi; (S. Oyedeji); karina.villela@iese.fraunhofer.de; (K. B. Villela); c.venters@cern.ch; (C. C. Venters)



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this paper belong to) have developed the Sustainability Awareness Framework, short SusAF. SusAF supports researchers and practitioners in anticipating direct effects, enabling effects, and systemic effects of social-technical systems. Furthermore, the effects consider different dimensions of sustainability (individual, social, environmental, economic, and technical). A moderator guides the stakeholders of the system through a brainstorming and discussion where these effects are elicited through a set of questions on key topics per sustainability dimension.

Why and how does such a framework potentially help with sustainability impacts? Not every practitioner has a background in sustainability. When asked, many practitioners feel not adequately educated to consider sustainability in IT system development [2]. Therefore, we started describing the central concepts¹ that were relevant to relate a socio-technical system to sustainability and to start exploring the effects such a system could have on sustainability. We successfully applied SusAF in different application domains and with varied sets of stakeholders of varying expertise levels. The framework has been used in seven countries at universities and in industry [4]. Case settled, right? Not quite.

Challenge We envision a wider application of the framework and sense that there is still a certain apprehension about championing sustainability and moderating a SusAF workshop when one does not feel “expert enough”.

Objective Our main objective is to have impact with SusAF as it seems to be useful according to the feedback we have received [4]. This raises the question of what will become of SusAF one day?

In this paper, we discuss the options we see and highlight the one we think is best. We look forward to discussing these options further with the community.

2. Towards a De-Facto Standard?

Looking at the options, one could argue that there is a high chance that SusAF gets applied once it becomes a formal standard. Let us discuss this option in more detail.

Formal Standard What would it take for SusAF to become a standard? First, we would have to go through a national standardization body e.g. BSI in the UK, which may require potentially years of lobbying in a committee. If there is a suitable committee already in place, it might be possible to convince them to sponsor the framework in becoming a standard. However, such committees sometimes run for years and then die. Some standardization bodies are mainly made up of industry players that push what they are already using. How to convince a standardization body that SusAF is worthwhile to become a standard?

Alternatively, one might attempt to go directly to IEEE, which would eventually lead to an ISO standard. This alternative could also take years. Moreover, even once SusAF is an

¹A framework is “a structure for a topic area that collects elements of the topic area and relates them to each other. A framework is semi complete and must be supplemented and/or adapted context-specifically for a concrete application.” [3]

official standard, would governmental authorities ever require its usage? Would it mean that the standard is indeed used by industry? Some of the software engineering standards have been around for many years, e.g. the 29148 on Requirements Engineering [5], but several of the official standards in Requirements Engineering (RE) are not widely adopted by industry [6].

That leads us to the question: Is it actually worthwhile to aim at making a standard out of SusAF? We have come to the conclusion that this should not be our primary goal. It is a high risk endeavour where, at the end, we still would not have achieved our goal of making SusAF widely adopted by industry. Furthermore, there is some urgency in our matter. We would like the adoption of SusAF by industry to start right away.

So, what about other options?

De-Facto Standard Looking at study on standards in RE [6], one can see that there are other artefacts than formal standards, such as guidelines, which seem to have significant impact on the work of practitioners. So what about the option to establish SusAF as a de-facto standard that is widely used by industry? Let us first discuss possible disadvantages.

One disadvantage might be that a de-facto standard is easier to change and thus output is less comparable (e.g. for a customer comparing different products or features). Also, industry adopts much easier standards than establishing de-facto standards so the spread might be larger when having a standard. Another disadvantage might be that if politics impose regulations to make software engineering companies accountable for the sustainability impacts of their products, a standard might be easier for companies to implement and to perform assessments than a de-facto standard. Finally, a standard goes through a very rigid evaluation process so the outcome possible has a better quality than a de-facto standard.

However, what would it take to establish SusAF as a so-called de-facto standard? We have discussed this question among the authors of this paper and have derived the following list of actions:

- Spread the word: We would need to actively promote SusAF. Companies need to know that it is out there and that it is available to them.
- Provide evidence that it works: Potential adopters need to know that it works so we need to provide evidence not only by conducting further case studies, but also by inviting successful adopters to share their lessons learned.
- Provide evidence of demand: An increasing number of clients are requiring specific sustainability outcomes from software systems and suppliers. An example is UK Government's policy requirements stated in Greening government: ICT and digital services strategy 2020-2025 [7].
- Link to well-known frameworks: SusAF helps to reflect on the potential sustainability impacts of IT systems. Yet, companies may need to be able to translate it into other frameworks they work with (e.g., how do potential impacts according to SusAF relate to the *Sustainable Development Goals* (SDG) [8] or to their GRI reporting [9]).
- Continuous improvement of SusAF: It is great to have a first version of the framework available but this is not enough. We need to make sure that it is usable in different project settings and development contexts. This includes supporting tailoring and providing

guidance on how to apply the framework in different development process models and for different types of systems.

- Continuous improvement of supporting artefacts: The SusAF Workbook is available for download [10]. What additional guidance would be beneficial for a moderator? We have had successful applications by students and industry partners in companies. Feedback from them could be used to provide the necessary guidance.
- Make SusAF part of education and training: Teaching SusAF and forming alliances with organizations such as IREB [11] can help make the framework known to (future) practitioners.

What do we need to do next? We have set ourselves the goal to foster the following activities:

- Provide guidance on identifying a set of suitable stakeholders for the SusAF workshop. You either need knowledgeable people in the room or a moderator with some background in sustainability.
- Provide guidance on how to tailor SusAF for specific development processes (e.g., agile development frameworks such as Scrum) and specific types of systems (e.g., cyber-physical systems or autonomous systems)
- Provide guidance on how to relate SusAF to other widely adopted frameworks (e.g., SDG, GRI, relevant ISO standards).
- Provide a training course for practitioners on sustainability that specifically addresses the needs of software engineering to offer a more effective alternative to "general purpose" sustainability trainings already available.

Through impact and ultimate adoption, SusAF can become a de-facto standard, and then industry partners can help it go through a committee of a standardization body and become an official standard.

3. Conclusion

We have discussed different options on how to continue our work on SusAF and would like to continue this discussion with different stakeholders. These include experts in the field of standardization, researchers and, last but not least, practitioners. We anticipate that a broad discussion, including the opinions of these different stakeholders on how to proceed, will make it more likely that we can achieve our goal of fostering the adoption of SusAF in industry and creating a framework that can have a lasting impact.

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