

Jury Member Report – Doctor of Philosophy thesis.

Name of Candidate: Sabah Farshad

PhD Program: Engineering Systems

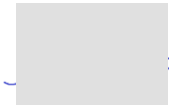
Title of Thesis: Improving collaborative engineering design and learning through feedback systems in the age of digitalization and AI

Supervisor: Professor Clement Fortin

Name of the Reviewer: Andreas Panayi, Professor of the Practice

I confirm the absence of any conflict of interest

(Alternatively, Reviewer can formulate a possible conflict)



Date: 23-01-2024

The purpose of this report is to obtain an independent review from the members of PhD defense Jury before the thesis defense. The members of PhD defense Jury are asked to submit signed copy of the report at least 30 days prior the thesis defense. The Reviewers are asked to bring a copy of the completed report to the thesis defense and to discuss the contents of each report with each other before the thesis defense.

If the reviewers have any queries about the thesis which they wish to raise in advance, please contact the Chair of the Jury.

Reviewer's Report

Reviewers report should contain the following items:

- Brief evaluation of the thesis quality and overall structure of the dissertation.
- The relevance of the topic of dissertation work to its actual content
- The relevance of the methods used in the dissertation
- The scientific significance of the results obtained and their compliance with the international level and current state of the art
- The relevance of the obtained results to applications (if applicable)
- The quality of publications

The summary of issues to be addressed before/during the thesis defense

Brief evaluation of the thesis quality and overall structure of the dissertation:

The dissertation demonstrates a high level of quality, both in terms of research depth and the overall structure. It addresses a very current and important challenge, especially when dealing with the development of big complex systems involving global engineering teams. Sabah has successfully produced a comprehensive work on the improvements of collaborative engineering design, offering a well-organized and logically structured document. He includes extensive relevant literature and frameworks, resulting in a solid foundation for the research.

The relevance of the topic of dissertation work to its actual content:

The chosen topic aligns well with the content of the dissertation. Sabah successfully addresses the aspects of collaborative engineering design, learning, and feedback systems in the era when digitalization and artificial intelligence are at their hype. The research contributes greatly to the field.

The relevance of the methods used in the dissertation:

The methods used in the dissertation are well-suited to address the research questions and lay the initial foundation for further research and developments. The utilization new digital tools and AI techniques in order to improve collaborative engineering design is very good.

The scientific significance of the results obtained and their compliance with the international level and current state of the art:

The results obtained in the dissertation display a high level of scientific significance. The research provides new insights of how digital tools, AI, and feedback systems, can be leveraged to advance the understanding of collaborative engineering design thus improving performance. The findings are presented with clarity, making them accessible for further researche.

The relevance of the obtained results to applications:

The dissertation discusses the obtained results from case study practical applications. Sabah connects theoretical insights to applied case scenarios. In doing so, he illustrates the potential impact of the research on collaborative engineering practices and performance improvement.

Two concerns that should be addressed in a continuation of this work:

- (i) How easy would it be to incorporate these digital tools and AI techniques in a real-world environment where the organization has deadlines to meet?
- (ii) How would the behaviors of teams consisting of mature professionals differ compared to the teams of Masters and PhD students utilized in this work? Would the findings and conclusions still be valid?

This dissertation will be a valuable resource for professionals seeking to integrate digitalization and AI in engineering design processes and also a valuable starting point for researchers to advance it further.

The quality of publications:

The quality of publications associated with the dissertation is very good. Sabah has published the research outcomes in reputable journals and conferences, demonstrating his commitment to academic excellence and fulfilling Skoltech's requirement for dissertation defense.

The summary of issues to be addressed before/during the thesis defense:

Expand AI abbreviation on the dissertation title.

Search for "error" in the document and fix the places where it appears.

The colon ":" in Contents (after Chapter) is blue and underlined. Why?

Some Table references appear in the List of Figures, and are missing from the List of Tables.

"Figure 4.3.3 Sentiment Analysis with Google Cloud Natural Language" is missing the legend

Figure 2.4 and Figure 4.2.1 are the same. Why is the same figure repeated and not referenced? Also in Figure 2.4 there are bold characters in the figure label

In some figure/table labels a bracket appears after the number, eg. Table 4.13.

Figure 4.3.1 is a bit blurry and hard to read. Figure 4.5.1 also. Most of the figures in Section 4.5 are blurry.

Page 148: "In this concluding section, **we** summarize the key findings and their implications," This is your work – "we" should be used in the text. Check for other instances and remove.

In some place there are extra line breaks. Please check and remove.

Provisional Recommendation

I recommend that the candidate should defend the thesis by means of a formal thesis defense

I recommend that the candidate should defend the thesis by means of a formal thesis defense only after appropriate changes would be introduced in candidate's thesis according to the recommendations of the present report

The thesis is not acceptable and I recommend that the candidate be exempt from the formal thesis defense