MS-E2177 - Seminar on Case Studies in Operations Research

Interim report - Inclus

Robin Hagnäs (Project Manager),
Daniel Aaltonen,
Aurora Kauraala,
Sebastian Hannula

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Changes in project scope and objectives

Our objectives have remained the same, however our scope has narrowed slightly. Previously, we did not focus on any specific methods or frameworks. Now, we have decided to focus on the process proposed by Qazi et al. [1]. In the process, Monte Carlo simulation is used to better capture tail risks in risk prioritization. We chose to focus on this process, since it is similar to what Inclus does on its platform. We will give recommendations on how Inclus could implement the process. Our recommendations will include methods for converting the questionnaire results into distributions, methods for taking cross-dependencies into account, and ways of visualizing the results. We choose to narrow the scope based on the needs of Inclus and as a result of discussions with prof. Ahti Salo.

Project status

In this section we present status of the project by going over the tasks we have done so far, what we are currently doing and what we plan to do later.

Completed tasks

We conducted a literature review about simulation models for the risk assessment of construction projects and found three possible directions where we could take the project. The three possible directions are:

- Project schedule simulations - Where risks related to project schedule overruns specifically are being evaluated with frameworks like Program Evaluation Review Technique (PERT).
- Project cost simulations - Where a distribution of cost overrun is simulated to gain understanding of the probability of cost overruns.
- Risk matrix based simulations - Where Monte Carlo simulation is used to better capture tail risks in risk prioritization.

Upon discussing with Inclus, we decided to go with the Risk matrix based simulation as this best reflects the use cases that Inclus are trying to focus on. The first two frameworks are more focused on project planning, which is a highly competed market that is not of interest to Inclus right now.

One of our original tasks was to figure out the best way to collect the data for the probability distributions that will be used for the simulation. With this narrowed scope, this task is now solved as we will focus on methods using a Likert-style questionnaire for the gathering of the data for risk matrices. This is close to what Inclus is already doing and will ease the implementation for them.

Ongoing tasks

We have made summaries on the relevant articles from our literature review. Currently, we are thinking about how to summarize our findings and how Inclus could use them.

Future tasks

Next, we will begin writing the final report. The final report will consist of a summary of our findings from our literature review and how Inclus could implement our findings, what pros and cons these entail in terms of ease of implementation, and potential impact to Inclus.

Updated risk management plan

Figure 1 shows the updated list of risks associated with the project. The risks have mainly remained the same. Changes are related to the likelihood of risks "misdefined scope" and "suggestions are not suitable for demonstration". The likelihoods have decreased since our scope has specified. Moreover the project has proceeded well so far and the remaining time of the course has decreases thus leaving less time for the risks to happen.

Risk	Likelihood	Impact	Mitigation of likelihood	Mitigation of impact
Misdefined scope / work on objective 1 & 2 get out of hand	Low	A lot of unnecessary work	Continuous discussions with Ahti & Inclus	Redefine scope, focus less on cross-dependencies
Data not suitable for demonstration	Low	Can make the demonstration difficult	Study the subject and communication with Inclus	Ask for help from Inclus
Suggestions are not suitable for implementation	Medium	Recommendations are not useful	Comprehensive literature review /communication with Inclus & Ahti	Communicate with Inclus
Cannot meet the deadlines	Low	Failing the course	Plan work in advance & work consistently on the project	Meet the deadlines
Technical difficulties	Low	More work	-	-
Team member quits the course / free riders	Low	More work for other team members	Everyone has committed to the course	Remaining team members work a bit more
Lack of communication with Inclus	Low	Going wrong direction with the project	Making communication effortless	Keep Inclus updated and ask for help

Figure 1: Updated list of risks associated with the project

References

[1] Abroon Qazi et al. “Prioritizing risks in sustainable construction projects using a risk matrix-based Monte Carlo Simulation approach”. In: *Sustainable Cities and Society* 65 (2021), p. 102576.