MS-E2177 - Seminar on Case Studies in Operations Research

Decision Process Playbook for Consequential Decisions

Project Plan

Team UPM Fibres

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March 13, 2023

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1 Background

Good decision making has always been, and still is, one of the most important aspects of any business. However, the exponentially growing amount of available data has changed the way we approach decision making in general. Choices that were previously based on guesswork can now be done based on data (Davenport et al., 2012). This has created useful opportunities for business corporations but this advance has not come without its own challenges (Agrawal et al., 2011). The big question still remains; how to make good decisions consistently?

UPM — like any large business — makes a lot of decisions of varying scope and impact. These include everything between day to day small decisions to multi-year strategic ones. As UPM is navigating its way in the fast-changing forest industry and focusing on a fossil-free future, it is consequential for them to make the right decisions at every scope and impact level.

Our client, UPM Fibres, is the biggest of the six allocated business areas of UPM. It combines integrated production of pulp and timber resulting in one of the world's biggest pulp manufacturers (UPM, 2022). Yearly, over 3.5 million tons of pulp and 1.4 million cubic meters of timber are produced (UPM, 2022). Employing over 2500 personnel, UPM Fibres has multiple levels of decision making. In this project, we focus on medium-impact decisions of UPM Fibres.

Medium-impact decisions are set between large strategic investments and small simple decisions. In UPM Fibres these are decisions that are consequential time-, money-, and resource-wise and require commitment for at least one period (e.g., should sawmills' production schedules be switched to nights to save electricity?). Even though medium-impact decisions are by definition not the most impactful on their own, their cumulative effect can be significant and these kinds of decisions are essential for profitable business.

To support decision makers (DMs), UPM Fibres has a Decision Support and Analytics team that supports all kinds of decisions, including medium-impact ones, through the use of operations research (OR) and data science tools. While this provides benefits for data-based decision making, it does not remove all the challenges for DMs (Agrawal et al., 2011). Challenges such as: "When to use data and when to trust one's own intuition?" and "What to do when there is little time to analyse the data?" still remain. This leads back to the big question; could there be some guideline — "a playbook" — which could help DMs in making better and more structured medium-impact decisions at UPM Fibres?

2 Objectives

Our main objective is to design a decision making playbook for UPM's medium-impact decisions. The playbook could be used to help the decision making process. The goal is also to build on the academic literature and existing tools to inform UPM's DMs.

Based on case interviews with UPM, we try to find the most useful tools to include in the playbook. Each tool will have a literature overview and a case example which we try to tie as closely as possible to UPM's decision making problems. We hope that this will make the use of the playbook effortless, and thus bring value to the company.

The DMs at UPM are in general managers who make decisions continuously. They may not have the time to dive deep into new tools that could be used to make the existing process better. Also, as outsiders looking in, it may be easier for us to find use cases for the tools. This is where we hope the playbook comes in. It would offer an easily accessible way to find new tools and incorporate them into their process.

3 Tasks

This section lists the tasks and subtasks which, if successfully executed, should allow us to meet given objectives.

3.1 Scoping the Problem

Given that our objective is to produce a useful decision making playbook for UPM's medium-impact decisions, it is crucial to understand current decision making practices and related challenges, as well as the general context of decisions and decision making processes at UPM Fibres. Therefore, we held several knowledge transfer meetings with our client, the OR team at UPM Fibres, and conducted initial interviews with two DMs that are potential end users of our playbook.

3.2 Designing the Product

A thorough review of literature in the field of decision making, with a focus on the challenges identified in our initial discussions with UPM, will serve as the basis for our playbook design. Realistically, we can have two iterations of the playbook design: in the first iteration, we will create a minimum viable product (MVP) that allows us to gather valuable feedback from end users, and in the second iteration, we will form the final product based on the feedback received.

3.3 Validation and Testing

To ensure that the playbook truly meets the needs of its user, we continuously validate our hypotheses with the client. Moreover, after completing our MVP, i.e., a version of the playbook with the minimum amount of features to be usable, we will conduct further interviews with the DMs to validate that the playbook is on a trajectory to become a useful decision making tool. Finally, when the playbook has been fully developed, we will gather a final round of feedback from relevant DMs and client alike.

3.4 Documentation

To better structure our work and fulfill course requirements, we compile three reports about this project: an initial project plan (this document), an interim report that presents advancements on the project and any updates to the initial project plan, as well as a final report displaying and discussing the project's results.

4 Schedule

Figure 1 presents our preliminary schedule for the project, including all tasks discussed in the previous section.

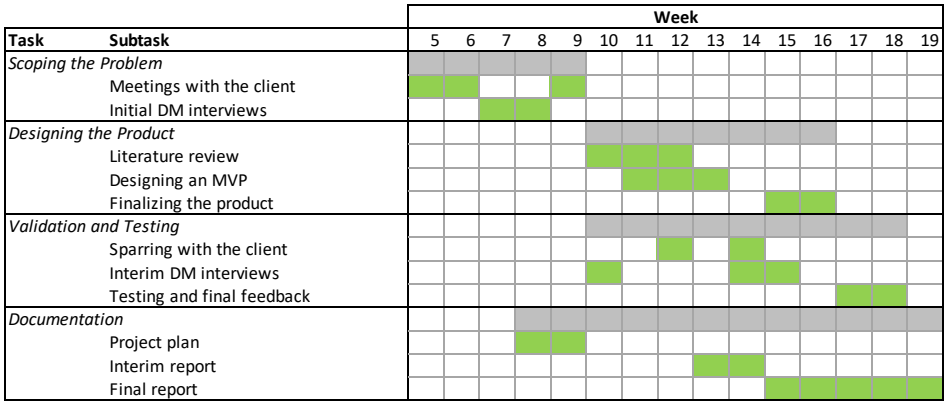

Figure 1: Initial schedule for our UPM decision playbook project

5 Resources

The main resources for the project will be interviews done with UPM employees and literature on decision making. Our project group consists of six Systems and Operations Research graduate students. The workload will be divided equally between the students so that everyone will interview a couple of employees and have an equal amount of literature that they will study.

The interviews will be held between two students and a DM from UPM. Two past decision processes done in the company will each be discussed in detail with 2–3 DMs. Besides the interviewees that will be chosen later, our team has four contact persons from UPM that will help us understand the ways of working in the company: Joona Kaivosoja (Manager, Decision Support and Analytics), Sauli Järvenpää (Senior Manager, Decision Support and Analytics), Cosmo Jenytin (Senior Analyst, Decision Support and Analytics) and Roni Sihvonen (Analyst, Decision Support and Analytics). Our team will meet up regularly with the contact persons to go through the progress of the project and discuss any questions that may have emerged.

The literature will focus on different tools that can be used in a decision making process. The course professor Ahti Salo will assist us in finding suitable literature on the topic. The most suitable tools for the decision processes done at UPM will be chosen based on the knowledge acquired through the interviews.

6 Risks

Our objective is to deliver a well-researched and functional decision playbook to UPM. By listing the risks associated with the project, we can better eliminate them and reach our goal. The main risks, their likelihood and preventive measures are listed in Table 1. The scale of the likelihood estimate is [Low, Medium, High].

We consider insufficient scoping of the problem to be our main challenge. In addition to inaccurately identifying the core issues of the client, we face the risk of having a too broad scope. In that case, the team would have difficulties finishing the project on schedule. We hope that by designing the first draft of the playbook as soon as possible, we mitigate the risks related to scoping.

Table 1: The main risks of the project in order of importance.

Risk	Likelihood	Effect	How to prevent
Insufficient scoping	High	In the worst scenario, the team fails to identify the needs of the DMs and the end product will deliver little to no value.	The team meets actively with the client and interviews several DMs that are the end users. Feedback from the client is collected throughout the development process.
Inactive members	Medium	If some members become inactive, the workload might grow too big for the remaining members, resulting in an inability to follow the schedule or deliver value.	The team meets weekly to keep everyone engaged. Every team member contributes to every phase of the project, if possible.
Unreliable data	Low	Subjective experiences of the DMs might not give a comprehensive view on the core challenges our client faces, resulting in a product with few end users.	The team interviews multiple DMs with different backgrounds and knowledge of OR.

References

Divyakant Agrawal, Philip Bernstein, Elisa Bertino, Susan Davidson, Umeshwas Dayal, Michael Franklin, Johannes Gehrke, Laura Haas, Alon Halevy, and Jiawei Han. Challenges and opportunities with big data 2011-1. *Purdue University Cyber Center Technical Reports*, 2011.

Thomas H Davenport, Paul Barth, and Randy Bean. How 'big data' is different. *MIT Sloan Management Review*, 2012.

UPM. UPM annual report, 2022. URL `https://user-fudicvo.cld.bz/UPM-Annual-Report-2022/242-243/`. accessed on 4.3.2023.