Helsinki University of Technology

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Assessing and prioritizing major projects

Project Plan 23.2.2007

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1 Introduction

1.1 Principal

Established in 1910, KONE is one of the world's leading elevator and escalator companies. It provides its customers with industry-leading elevators and escalators and innovative solutions for their maintenance and modernization. KONE also provides maintenance of automatic building doors. KONE provides safe and easy access for hundreds of millions of people daily in all parts of the world. The company guarantees local service for builders, developers, building owners, designers and architects in 800 locations in over 40 countries.

KONE has annual net sales of above three billion euros and about 27,000 employees. Its Class B shares have been listed on the Helsinki Exchanges since 1967.[1]

KONE has a separate unit for major projects, which are related to big constructions and developments around the globe, such as airports, skyscrapers, etc. This unit plans how many elevators should be in the building and what kind of elevators there should be. KONE Major projects unit takes care of projects that are very valuable, have a long duration or are technologically demanding.

1.2 Background for this research

KONE Major projects receives a lot of offers for new projects. They evaluate the project and then start to work with the project. As the market grows, the number of projects increases accordingly. This means that the current resources are not sufficient to assess all incoming projects. In order to manage these projects, KONE must prioritize the projects and thus focus on the most important projects.

Evaluating the projects and ranking them is challenging task, since the aim of the KONE is naturally to serve all clients and participate in as many projects as possible before the tendering process. Taking care of key customers is especially important for KONE since they can bring in a lot of new projects. All these factors and several others have to be taken into account in a manner that in the end maximizes the total profit.

1.3 Description of elevator and escalator buying process

In general the elevator buying process works as follows. There might be some adjustments to this, but the main guidelines are similar from project to project.

Long before the construction starts the elevating systems are designed by the architect, constructor and consultant. In technologically advanced cases the elevator manufacturer is also consulted, but usually only one elevator manufacturer participates in the planning

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[1] KONE Corporation Fact Sheet, http://www.euroland.com/factsheet/sf-kon/factsheethtml.asp?lang=finnish 23.2.2007 (PDF)

phase. After the designing has been completed, the constructor usually puts the actual implementation (installing the elevators) out to tender. Then the best offer takes the contract. Doing cooperation with the constructors helps winning the tendering process but losing the competition would mean losing valuable resources in terms of sunk costs, not to mention lost sales.

2 Research questions

The main research question of this project is:

How should the process of prioritizing projects be organized and conducted?

The main question can further be divided to four sub questions:

- On which criteria should the projects be prioritized and what are the criteria's weights?
- What kind of project monitoring- and evaluation process is at the moment and what it should be like?
- What kind of data there should be available for the evaluation?
- How the functionality of the model can be evaluated at present and in the future?

3 Course of actions

3.1 Literature review

Initially our project will begin with a literature-review that describes the theoretical background of the project process from the seller's perspective. This provides the project team with the latest background information of project selling process beginning from the creation of customer relationship which is finally leading to the won project. This step will be realized by assessing books related to marketing management as well as project-based businesses. The aim is to assess the resources and efforts required in the different phases of bidding-process. This information is required when ranking the projects under scarce resources.

3.2 Assessing the present situation and identifying improvements

We will approach the topic from two perspectives. On the one hand we will assess the present concept that is used to evaluate and rank large projects. A process chart will be constructed to describe the prevailing sequence of actions that is then used to find and identify possible improvements. On the other hand one aim of this study is to construct a standardized procedure for assessing and prioritizing large projects.

For this purpose we need to:

a) Identify the relevant information and data that is required to rank a project

b) Assess the importance of each factor and possibly estimate weights for different variables

c) Construct a model that takes into consideration the possibility of incomplete information

d) Account also for the qualitative aspects that can not be modelled quantitatively

e) Create a monitoring system to evaluate the reliability of the procedure as well as input data

This approach is considered most suitable for the situation as similar situations are likely to occur also in the future. Thus solely ranking the current projects will not provide the principal with long-term advantage, but a standardized process for evaluation is needed.

Identifying the relevant information and data is one of the most crucial tasks. Obviously a part of the data will be based on a subjective estimate of the situation and can thus be biased. As a result a monitoring system is required to be able to give feedback to providers of subjective information.

On the other hand the estimation of parameters is the most challenging task during this project. Probably there will not be single correct estimates for parameters, but they are highly dependent on circumstances. All variables may not be additive and sensitivity analysis and various scenarios are therefore required to model different assumptions. At this point the RPM-software will be used to identify the most promising portfolios under different weights and assumptions.

3.3 Prioritizing present projects

We have been provided with data of present ongoing projects that contains information about features that are currently used to rank them. This data is the main source of information that will be used to estimate the weights for parameters. In practice a feasible project has few target features that are considered important, and thus should be included in chosen projects. Statistical analysis will be used to estimate the dependence between different variables and feasible features. As a result we are able to assess the importance of each factor and identify also missing factors.

The RPM software will be used to rank the current projects. The project group has already familiarized itself with the software. However as we have no license for this program, all calculations must be executed in the Systems Analysis Laboratory which may disturb the application of this tool. In addition, background analysis has to be performed before applying the RPM as the number of non-dominated portfolios may otherwise become too large. Finally the RPM will be used as a reference to which the results of our model are compared.

3.4 The outcome

The outcome of the project is intended to be a standardized procedure for prioritizing processes. This should include a process chart describing the evaluation phases of a

project and required information. Procedure may also contain excel-model to which the information is entered and which then ranks the projects. The model should also be able to give feedback about the quality of information and calculate descriptive statistics such as hit ratio for the preferred projects.

4 Research methods

This project will include both quantitative and qualitative analysis. Quantitative methods include statistical analysis such as regression and estimation of correlation coefficients. The RPM software is also used to rank the current ongoing projects and provide sensitivity analysis and a broad perspective for the evaluation. In addition MS Excel and Visual basic may be required when building the standardized model that is used to rank future projects.

On a qualitative basis, a set of interviews is required to get a picture about the current project evaluating process. On the other hand we have to assess the reliability of information that is available for ranking. In addition some of the variables that are used to rank projects may not be quantifiable and thus have to be taken into account qualitatively.

5 Resources

The project team consists of five undergraduate students from Department of Industrial Management and Engineering:

- **Jaakko Kiukkonen** (project manager): major Strategy and International Business, minor System and Operations Research
- **Ilmari Ollila**: major Strategy and International Business, minor System and Operations Research
- **Tuomo Vepsäläinen**: major Strategy and International Business, minor System and Operations Research
- **Elina Happonen**: major Strategy and International Business, minor System and Operations Research
- **Petri Valkama**: major Strategy and International Business, minor System and Operations Research

Responsibilities of each team member are presented in table 1. Jaakko is the team leader and responsible for contacts with KONE. It is very important to verify that all members have a good understanding of the main methods and software used in the project. That is why all team members take part in literature research. Because creating operating instructions needs brainstorming, a lot of thinking and discussion, all team members participate in that too. All other responsibilities are divided for team members.

Table 1 Responsibilities

Activity	Responsible
Project leadership	
Contacts with KONE	Jaakko
Literature research	
RPM	All
Tendering process	All
Mathematical research	
Methods	Elina
Modelling	Tuomo, Petri
Testing	Ilmari
Operating instructions	
Creating operating priciples	All
Documenting instructions	All
Reporting	
Literature	Tuomo
Backround	Ilmari
Methods	Elina
Test results	Petri
Operating instructions	Petri
Final reporting	Jaakko

6 Project schedule

The planned schedule presented in the activity chart (Table 2) is a guideline for the project team. It helps team members to see how the planned tasks and activities are progressing. Same colours in activity chart indicate certain phase of the project. Previously scheduled task doesn't need to be completed before later scheduled task can start.

- Phase 1: Planning
- Phase 2: Research
- Phase 3: Problem solving
- Phase 4: Reporting

Milestones of the project have been identified in order to assess the progress of this study. This enables the team to identify any future delay and take appropriate corrective measures to meet the deadlines. Milestones are presented in the activity chart (Table 2), and deadlines are presented in Table 3.

Table 2 Activity chart

Phase	Task	Week	6	7	8	9	10	11	12	13	14	15	16	17	18
1	Familiarization to the subject														
	Define the problem														
	Set goals														
	Make project plan														
2	Literature research														
	Interviews														
	Process design														
3	Tool construction														
	Testing the tool / sensitivity analysis														
	Report the results														
4	Midterm reporting														
	Final Reporting														
	MilesStones		*Meeting with the client*			*Project Plan DL*				*Midterm Report DL*				*Final Report DL*	

Planning
Research
Problem solving

Table 3 Deadlines

Deliverable	***Deadline***
Project plans submission	28.2.2007
Project plan presentation	2.3.2007
Midterm report submission	28.3.2007
Midterm report presentation	30.3.2007
Final report submission	23.4.2007
Final report presentation	27.4.2007

There are three credits available for the course. That means that all members will invest 120 hours in the project. In addition, the project manager budgets 40 extra hours for managing the project. As a whole the project requires 640 man-hours.

7 Risks

The most likely risks of the project and their effects are assessed in table 4.

Table 4 Risk matrix for the project

Risk	Effect	Probability	Preventive actions
The outcome of the project is not satisfying and the model can not be applied	Large	Very small	Continuous communication with Kone, and the users of the model. Careful defining of the objectives of this study
The mathematical model could not be found	Large	Very small	Extensive literary research and getting acquainted with optimization techniques and RPM software
Schedule-related problems	Moderate	Moderate	Preparing a precise schedule and continuous monitoring of the state of the project
Problems related with the scope of the project	Small	Moderate	Careful defining and demarcating of the objectives