



# **Mat-2.177 Project Plan: Case Asperation, Valuation and Pricing of Technology-Based Intellectual Property**

*Project Group:*

Lauri Leino 57727F (PM)

Maija Antila 61104A

Artem Beletski 61261F

Timo Isola 58170N

Henri Janhonen 57687D

# Table of Contents

Table of Contents .....	1
Introduction.....	2
1.1. Background.....	2
1.2. Definitions.....	3
1.3. Objectives .....	4
1.4. Scope.....	4
2. Literature review and methods.....	4
2.1. Literature.....	4
2.2. Methods.....	5
2.3. Scale.....	6
3. Action plan.....	6
3.1. Schedule.....	6
3.2. Milestones.....	7
3.3. Resources .....	8
3.4. Project risks.....	9

# Introduction

This project is done as part of the course Mat-2.177 Operations Research Project Seminar in spring 2005. All the documents concerning this project returned to the Helsinki University of Technology are public. Therefore the details of the project are deemed to be kept a secret due to the high confidentiality of the work. The terminology used in this document is very general and all the figures are tampered with in order to sustain the competitive business advantage of the client company.

## *1.1. Background*

Asperation Oy is a joint venture company founded by Aspocomp Group Oyj and Perlos Corporation Oyj. Asperation Oy creates new, commercially viable integrated components, interconnection and packaging technologies for mobile communication and electronic applications.<sup>1</sup>

This project concerns the valuation and pricing of technology based intellectual property. Asperation has developed a new process technology that allows it to enhance certain product characteristics and features. This innovation includes also a couple of smaller innovations that add value to the new process and product.

This new product manufactured with the innovative process is more applicable than the ones of the same product range already existing in the markets. Therefore this opens up new markets for Asperation or any other company who implements the new process technology and launches the production of the enhanced product.

Some parts of the rights to the enhanced product belong to the founder of Company A (the company name changed to keep confidentiality) and thus the launch of the enhanced product will be done in collaboration with Company A. The Company A also has direct contacts to customers who have already shown some interest to the enhanced product.

The situation involves also Company X that has an IPR (intellectual property right) over some technical solutions related to electronics in the product. Company X has given

---

<sup>1</sup> [www.asperation.com](http://www.asperation.com)

Company A rights to use their solution as part of the system Company A offers its customers.

Asperation has discussed the situation with other stakeholders and three distinct strategies have emerged:

1. New product is manufactured by either one of the parent companies of Asperation
2. The manufacturing is done in collaboration with other stakeholders
3. License to produce the product is sold to a manufacturer

Third option is the one with most direct connection to this valuation and pricing project. It also brings new aspects into consideration, like terms of the license: time, restriction, maturity, application possibilities etc.

## *1.2. Definitions*

Following are the definitions that will be used throughout the project to discuss matters of high confidentiality. The definitions of IP and IPR here are based on the Research Handbook.<sup>2</sup>

**IP (Intellectual Property):** IP may be regarded as 'knowledge and its creative application'. In practical terms all material generated by staff should be regarded as potentially being IP.

**IPR (Intellectual Property Right):** IP that has some kind of protection for plagiarism. Examples of IPR include patents, copyright, performance rights, design rights and trade marks.

**Target industry:** The application area to which Company A sells systems that would greatly benefit from the Asperations IPR.

---

<sup>2</sup> <http://www.leeds.ac.uk/research/hbook/ipr3.htm> , referenced 21 Feb 2005

### *1.3. Objectives*

The primal objective of this project is to assess what is the value of the IPR that Asperation has over the production process innovation and with what price and restrictions the IPR could be sold to another stakeholder in order to maximize the profit of Asperation. This valuation is primarily done to value the particular IPR case described in 1.1, but if possible the valuation model is built to be as generic as possible in order to allow future usage as well.

### *1.4. Scope*

The scope of the valuation and pricing is primarily predefined to cover the example case IPR only. This restriction was introduced, because to be able to evaluate the potential market of the enhanced product and the market evolution, one must understand thoroughly the future possibilities of the market at hand. Therefore the research is delimited to the target industry.

This delimitation is however only the starting point of the study. To make the valuation more accurate the research must also consider other application areas of the product, because this might change the market potential considerably.

## **2. Literature review and methods**

### *2.1. Literature*

A number of articles have been written on valuation. In the review couple of respectable ones were found and will be used to help the analysis. The methods introduced below were suggested in the articles.<sup>3</sup> After the group has done more intense research on the field of the product and industry in order to understand the multiple causalities the valuation conceals it will be able to pick the most relevant methods to use. Probably on week 8 a discussion about the methods with Ahti Salo will be arranged to help screening

---

<sup>3</sup> See Sources

the most applicable ones. Due to the confidentiality issues this meeting could not be arranged earlier.

## 2.2. Methods

Because of the need for better industrial knowledge in choosing valuation method the group has picked a couple of alternatives from the literature. These methods are introduced briefly below. Discussion about possibilities to apply certain method to IPR-valuation in this special case or in more generic situations is also included.

### **Method One: Use of Industry Standards**

This method will be used. Industry standards act as estimates in many cases where there is no historical data available. This can be applied for example to interest rates, aging or *substitution of technology*, market penetration of products and life cycles of products.

### **Method Two: The Rating/Ranking Method**

One possibility is to create a scoring model which uses certain attributes to give product a rating. These attributes could be size, robustness or manufacturing price of the technology. Direct use for rating or ranking methods has not yet been found but it is good to know that there is also such a generic pricing model.

### **Method Three: Rules of Thumb**

It is possible that on some phenomena there is no better data available than rules of thumb which are rough estimates. This method will be likely used due to lack of better estimates.

### **Method Four: Discounted Cash Flow Method**

Discounted cash flow method is used to make cash flows produced at different times comparable with each other. All cash flows are calculated as value at given moment using specified discount rate. This method is certainly going to be used and most likely also applied to other methods.

### **Method Five: Advanced Valuation Methods: Monte Carlo and Real Options**

#### *Monte Carlo simulation*

Monte Carlo simulation can be used to create an estimate for development of the value of a technology. If there are several variables like price reduction of products, substitute

technologies and changes in markets for products, distribution of these phenomena can be used and many simulations run taking all these variables into consideration. As a result, simulation reveals the most likely outcome and what kind of distribution is related to it.

### *Real Options*

One possibility to find out the value of IPR is to apply methods used for options. Two different models for this could be binomial lattice or Black-Scholes which is example of Brownian motion. These methods require stochastic input data. Black-Scholes can not be solved analytically in all cases and there might be uncertainty even in the description of the stochastic data. Binomial lattice can be used to value IPR-technology if the needed input data can be generated. As a valuation method binomial lattice will certainly be well applicable if input data is of high quality.

### **Method Six: Auctions**

Auction is definitely one way to sell different kinds of things. In this case it is not a viable method as with auction, price will be set, but the amount is unknown beforehand and the value of the technology can differ from the sales price.

## *2.3. Scale*

The customer company has made forecasts and statements concerning the product. These figures are at the group's disposal but can not be stated here due to the confidentiality. The analysis will be based on these figures but cautiously as it seems like under evaluation at least in terms of selling prices is present. After thorough review on the industry the group will have more solid base on criticizing and making more reliable evaluations.

The customer company has also forecast the potential number of products sold annually as well as the investments required to produce this product.

## **3. Action plan**

### *3.1. Schedule*

The project is scoped to fit the norms of course Mat-2.177 Operations Research Project Seminar. Additionally reporting to the course personnel must include following steps:

project plan (deadline 22.2.2005), intermediate report (deadline 29.3) and final report (deadline 22.4). All reports are planned to be written and given for evaluation to Asperation personnel a few days before actual deadline.

### 3.2. Milestones

In dividing the project into smaller parts following phases were identified among the research group: Preliminary research, Focus and specified research, Analysis and Final presentation. More precise information about each phase is presented in Figure 1.

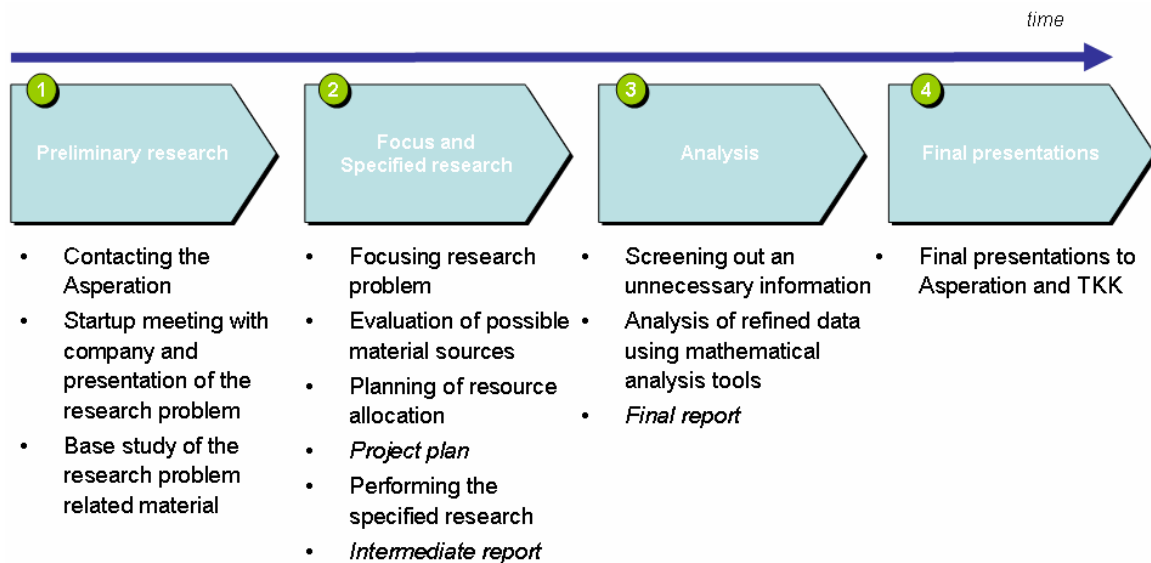


Figure 2 Four phases of the project

To understand the current situation the group performed small study of the research problem with help of information received from Asperation and by studying the literacy concerning pricing of technology. Second phase is more focused research of the problem and gathered information is mainly novel to Asperation. This information is analyzed at third phase and results are presented to Asperation and course personnel at final phase of research.

At the moment the project is at phase 2, resource planning is roughly done and the next stage is to begin the information collection and model creation. Focusing and specifying



the research is the most challenging phase and project group reserved a lot of time to implement it.

### *3.3. Resources*

The group consists of five third year students of Industrial Engineering and Management. All of the members of the group are studying the System and Operation Research as a minor, four of them Production and Logistics and one International Business and Strategy as a major. None of the members have special work experience regarding the case, but all have passed several courses considering strategy, investment theory and valuation methods which can be helpful.

Because there are no particularly experienced members in the group, the divisions of labor have been made by each ones' preferences. Maija and Timo will take care of building the mathematical model for general case and then implementing this for each different scenarios. Artem and Henri will collect parameters for this particular case and then apply the method Maija and Timo found in cooperation with the model builders. Lauri will help wherever the help is needed and control that everything goes as planned. As a project manager he will also has his own managerial tasks thus he handles the most of the communication with Asperation as well as the course personnel.

The second resource is the course personnel who are available for consulting and guidance. The use of this option has so far been little but it should be increased as the project proceeds.

The third resource is the personnel at Asperation. So far the group has met Jukka Ranta (CEO), Janne Mettovaara (Business Development Manager) and Mark Mehtonen (R&D Engineer) all of whom have been keen on sharing information, answering questions and settling things.

And of course Helsinki University of Technology offers an extensive amount of literature, both written and electronic, as well as required infrastructure for the project. If the practical implementation of the model is done in a more sophisticated software environment than Excel, then the project group has to rely on HUT's software licenses, e.g. MatLab.

### *3.4. Project risks*

This project has several risks. Since there is no absolute or clear “right solution”, the final valuation of the success of the project has to be done by reviewing the methods used. To verify found solution in practice one should valuate several new technologies, sell those on market and compare the differences. Obviously this is impossible. Lack of a right solution and the impossibilities to test the found method could lead the group to underestimate some issues and not figure these out later, even at valuation of the final report. To prevent this, the group must take into consideration all kinds of factors that could have effect on price, regardless of how ridiculous the idea sounds at first. The factor shouldn't be declined until the group, the personnel of the course and Asperation are one of mind.

The personnel of Asperation are also something beyond the group's opportunity to control. However, this risk isn't so remarkable since the valuation process is important for them. A more realistic problem with Asperation is possible lack of information. The data needed could be impossible to get or it would require efforts Asperation is not willing to make, so the group just have to accept the situation. So far there have been no signs of that but naturally there are no guaranties that the situation remains the same.

One of the risks is also the group itself. In the beginning it's common to make bigger plans than it's possible to handle. As deadlines close in these mighty plans tend to collapse and the result becomes a hasty scribble. To avoid this, the group has to make a realistic plan and keep to the schedule. Regular conversations between the group and Asperation or the course personnel also help the project to succeed. The group reports its progression and possibly emerged questions to Asperation every second week. The course personnel will be contacted whenever needed and of course in mandatory sessions.

## Sources

- Documents from Asperation Oy
- Valuation and Pricing of Technology-Based Intellectual Property  
Richard Razgaitis, John Wiley & Sons, Inc., 2003
- The Dark Side Of (Technology) Valuation  
Aswath Damodaran, Pearson Partners, 2001