



Master Thesis in Business Economics

15 ECTS Credits

Business Logistics, FE 3054, Spring 2008

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Abstract

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Title: Cost considerations when purchasing from China

Background: To be competitive on the global market companies see a chance to achieve success by using suppliers that can offer them the lowest prices. Because of low wages China is one of those countries that can offer very competitive prices for purchasers in our part of the world. But is global sourcing for everyone? Global sourcing can be proven to be more costly than anticipated if the total cost of ownership is not considered.

Research questions:

- Which costs do the investigated manufacturing companies consider in their estimation of costs when purchasing from China, and how do these estimations match up with the actual costing?*
- What is the explanation of potential differences between the estimation of costs and the actual costing?*
- How do the companies' characteristics in terms of experience, size and product characteristic affect the formulation of the costing?*

Purpose: This thesis will investigate what kind of costs companies take into consideration when doing their estimation of costs before initiating trade with China. Further the thesis will study how these estimations match up with the actual costing that can be seen afterwards and investigate what the explanation of potential variations could depend on. The thesis will also answer how the characteristics of the companies and the products affect the costing development.

Method: The empirical data and the conclusions made from it are based on qualitative case studies carried out in four different manufacturing companies that all purchase components from Chinese suppliers. This thesis is written from a positivistic perspective with a deductive approach.

Conclusions: The companies are mainly focusing on purchase price and costs for transportation in their estimation of costs and the match between the estimation of costs and the actual costing are good in terms of purchase price and costs for transportation. Other costs are mismatched or overlooked probably because of their complexity to estimate. Product characteristics are probably the main factor that affects the complexity and amount of time and effort companies spend on costing.

Preface

Working with this thesis have involved a lot of hard work but it has also been interesting and given us valuable knowledge and insights into the subject of purchasing in China and the benefits as well as cost that it can mean.

First of all we would like to thank all the companies and their employees that have participated in our investigations, without their contributions this thesis would not have been possible:

SEIAB Maria Ström -Purchasing manager

Andritz Olaf Büttner -Purchasing manager
Stefan Gustavsson -Sales manager

RH-Chairs Tobias Wärn -Senior purchaser

Invacare Bengt Örning -Purchasing manager
Mikael Skåre -Purchaser

Secondly we would like to thank our tutor, Petra Andersson, as well as our examiner, Helena Forslund that both have guided us through the entire process.

Last but not least we would like to thank our classmates and in particular our opposition-group for valuable inputs that helped to improve this thesis.

Växjö May 26 2008

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Glossary

- **Costing/Cost accounting**¹ - Calculations as a basis for economical decisions²
- **Estimation of costs**³ - A calculation made before production or purchase.⁴
- **Actual costing** - Calculations made after production or purchase to determine real costs.⁵
- **TCO** - Total Cost of Ownership⁶
- **Incremental costs** - Costs that can be directly connected to a specific object.⁷
- **Joint costs** - Costs that are shared by many products or objects and are not affected by which alternative that are chosen.⁸

¹ FAR, (2004), p.109

² Carlsson, P., Sundin, A., (2007), p.153

³ Business dictionary, (1999), p.250

⁴ Mattsson, S-A., (2004), p.55

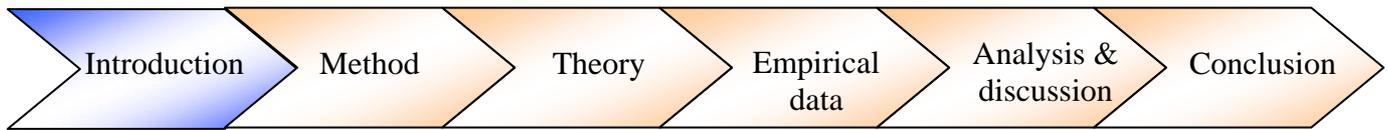
⁵ Mattsson, S-A., (2004), p.41

⁶ Mattsson, S-A., (2004), p.183

⁷ Mattsson, S-A., (2004), p.176

⁸ Carlsson, P., Sundin, A., (2007), p.270

1. Introduction



In this chapter the reader is given some background knowledge about how the globalisation has opened up new possibilities for companies to purchase in a global market. Afterwards some problems that are connected to global sourcing are brought up and the importance of cost considerations when sourcing from low cost countries is discussed. This will lead to the research question and purpose of this thesis. In the end of this chapter some objectives and limitations are concluded among with a disposition of the upcoming chapters in this thesis.

1.1 Background

The world seems to spin faster and faster. Changes happen rapidly and it is very important for companies to try to adapt to the new trends, tools, and possibilities.⁹ The global market has grown a lot the last decades and it has opened a huge market with many new actors.¹⁰ Newly industrialised countries like China, Taiwan, and South Korea have developed new advanced technologies at the same time as they have a low cost structure compared to the western industrialised world. Due to lower wages in these newly industrialized countries in eastern Asia, many companies from the west are turning their faces to the east in their attempt to obtain products to a lower cost.¹¹

The possibilities to communicate in an efficient way has been developed a lot the last couple of years and this has opened up for countries in different parts of the world to do business with each other.¹² More and more companies discover the possibility to do global business. This is shown in the trends of increased outsourcing and global purchasing that exist in companies' sourcing strategies today.¹³ Global sourcing is defined as “searching and

⁹ Tryggestad, K., et al, (2000), p.34

¹⁰ Samli, A.C, et al., (1998), p.177

¹¹ Van Weele, A., (2005), p.101

¹² Mattsson, S-A., (2002), pp.293

¹³ Kotabe, M, Murray, J.Y., (2004), pp.7

establishing supplier relations all over the world, on principal no matter of geographical distance”¹⁴. Many products and components are for example produced in low cost countries and then shipped to western countries to be assembled and consumed.¹⁵

The types of products that are purchased globally have changed over time. In the 1980’s raw material was the main product that companies sourced globally. After a while companies started to source electronic components and nowadays they are sourcing finished products from global suppliers as well.¹⁶

Many companies spend more than half of their turnover on purchasing. Sourcing is probably the main important function that has evolved most in companies during the last couple of years.¹⁷ Recent studies have shown that over 50% of North American firms and nearly 40% of European firms plan to increase sourcing from countries like for example China between 2005 and 2008.¹⁸ Purchasing is traditionally seen as both a primary activity and a support activity to the company, but is now more and more seen as a function that can contribute to a competitive advantage and is therefore one of the most important primary activities.¹⁹

Due to the constantly changing world and the globalisation where international trade of products and services are rapidly growing, the purchasing function is getting more and more important and it is vital for the companies to focus on their purchasing strategy to be competitive.²⁰ The companies have to purchase good enough quality to the lowest possible price no matter where the supplier is located to make sure that they stay competitive.²¹

Global sourcing can be an excellent tool to improve efficiency and to cut costs, but it should not be undertaken without thorough investigations and analysis. The role of global sourcing should first of all be considered in context of the company’s overall strategic plan. In addition to extensive preparations before committing to a purchasing agreement it is required to

¹⁴ Jonsson, P., Mattsson, S-A., (2005), pp.212

¹⁵ Ibid

¹⁶ Cho, J., Kang, J., (2000), p.543

¹⁷ Van Weele, A., (2005), pp.7

¹⁸ Carter, J., et al, (2008), p.228

¹⁹ Van Weele, A., (2005), pp.7

²⁰ Gadde, L-E., Håkansson, H., (1998), pp.7

²¹ Cho, J., Kang, J., (2000), p.542

constantly re-evaluate many of the parameters of the sourcing activity throughout the life cycle of the products in question.²²

To be competitive on a global market companies have to widen their approach and see the global market not only as their new customer, but also as their new supplier.²³ Because of this, many companies have seen the possibility to purchase goods to a lower price. But that won't necessarily be a successful experience for everyone. Some companies have felt that they should be a part of the new global world as well and that they also should source globally, which in some cases have led to premature decisions and greater costs as a result. To purchase from a global market, the companies need knowledge and a long term strategy.²⁴ To be successful in global business the companies need to have an international perspective, understand different cultures, and fluency in foreign language.²⁵ Some theories points out that international business are a natural part of company growth, which evolves from knowledge and an increased commitment to resources to foreign markets. Global sourcing is not for everyone, but it should be considered by every company that are facing high demands on performance improvements.²⁶

The change of sourcing location from local, which implies flexibility and close collaboration possibilities, to global can cause problems. Longer distance can most likely lead to longer lead times, lower flexibilities, and communication problems. Global sourcing can also lead to a greater need for safety stocks due to the longer transportations.²⁷ Global sourcing can be costly if the total cost of ownership is not considered. By adopting a total cost of ownership analysis the purchasing company can gain a better understanding of the costs associated with global purchasing. A number of total cost models have been developed with quite similar content and they all cover costs like transportation and handling, administration, inventory and holding, supplier relations and negotiations.²⁸

²² Industry Week / IW (2008), pp.28

²³ Das, A., Handfield, R., (1997), p.244

²⁴ Kotabe, M, Murray, J.Y., (2004), pp.10

²⁵ Ahlawat, S., Ahlawat, S., (2006), p.105

²⁶ Handfield, R., (1994), p.40

²⁷ Jonsson, P., Mattsson, S-A., (2005), pp.212

²⁸ Song, N., et al., (2007) pp.858

1.2 Problem discussion

The possibility to purchase from developing countries attracts many companies to source globally. But sourcing globally can imply extra costs and problems in the long run.²⁹ It is important that the purchasing companies don't focus entirely on the purchase price, but also consider other costs that can be affected like transportation costs, inventory, shortage costs, and sourcing costs.³⁰ Determining the incremental costs associated with, for example, different suppliers are of interest since these costs are the ones that are connected with the specific alternative.³¹

The procurement process affects all departments in a company. If the purchaser decides to choose a global supplier with lower purchase price, he has to think about all aspects of the procurement process. If the purchase price is lower, is that going to affect the quality so that the production department can't make products with as good quality as before?³² That is one of the main issues in global sourcing and perhaps specifically so when purchasing from China. Quality problems is making companies question whether they should be practising global sourcing at all. Although the Chinese government is trying to improve their brand image by developing quality standards, there is an ongoing reconsideration of sourcing decisions due to this issue.³³ Other questions that can appear with global sourcing are if the warehouse needs a bigger safety stock because of the longer lead time? When can the warehouse expect their next delivery?³⁴

When conducting global sourcing there is always a risk of changes in other aspects as well, like the geopolitical environment. Conflicts between countries could lead to political decision like trade sanctions, anti dumping- or other duties. Events like strikes, congestion or natural disasters could also affect the smoothness of the trade and raise costs. Furthermore court and legislation processes might be in process that could change the terms for doing business with the country in question.³⁵ The sourcing decision affects all parts of a company and they all have to be considered when choosing a sourcing strategy. The motive for starting a global sourcing process has to be in line with the overall business strategy and their characteristics.

²⁹ Cho, J., Kang, J., (2000), pp.544

³⁰ Gadde, L-E., Håkansson, H., (1998), pp.55

³¹ Norelid, C., Eliasson, B., (2005) pp.133

³² Gadde, L-E., Håkansson, H., (1998), pp.55

³³ Industry Week / IW (2008), pp.28

³⁴ Gadde, L-E., Håkansson, H., (1998), pp.55

³⁵ Industry Week / IW (2008), pp.28

One way to measure company and product characteristics is to use Kraljic's matrix which divide them into different groups and make it easier to analyze.³⁶

The purchasing strategy can have a great impact on a company's result. Presumed that all other things are kept constant, one dollar saved on purchasing is one dollar earned profit. This is often misunderstood by companies, which believes that one dollar saved on purchase price, by for example change of supplier, is also one dollar earned. That is not the case. By mainly focusing and lowering the purchase price and not considering the total cost of purchasing, many companies ends up with greater costs than they had calculated with from the beginning.³⁷ The indirect costs like quality, shortage and administration have to be considered in the total cost as well. Total cost of ownership is not a new phenomenon but some of the costs that is associated with global purchasing and total cost of ownership analysis can be difficult to estimate and measure in real numbers and have to be estimated in terms of, for example time spent.³⁸

Due to difficulties in cost estimations it is important to make follow ups in terms of actual costing, to make sure that further purchases will get better estimation of costs. Costing models are simplified models of the reality and can be difficult and costly to develop; it is important that the model won't cost more effort to develop than it will gain.³⁹ Depending on, for example the product's value, more effort will probably be spent on products with high value and vice versa. Larger companies' purchasing departments often encourages innovation in their purchasing activities⁴⁰, which should make them more interested in investigating different costs. Since experience can imply continuous cost reductions⁴¹, knowledge about the costing procedure should increase over time. This thesis aims to give a better understanding of the cost considerations that companies base their purchasing decisions on when purchasing from China.

³⁶ Van Weele, A., (2005), pp.134

³⁷ Gadde, L-E., Håkansson, H., (1998), p.10

³⁸ Song, N., et al., (2007) pp.872

³⁹ Norelid, C., Eliasson, B., (2005) pp.14

⁴⁰ Ellegaard, C., (2006), pp.273

⁴¹ Sinclair, G., (1999), p.48

1.3 Research questions

- Which costs do the investigated manufacturing companies consider in their estimation of costs when purchasing from China, and how do these estimations match up with the actual costing?
- What is the explanation of potential differences between the estimation of costs and the actual costing?
- How do the companies' characteristics in terms of experience, size and product characteristic affect the formulation of the costing?

Figure 1.1 shows a summary of this thesis' research areas.

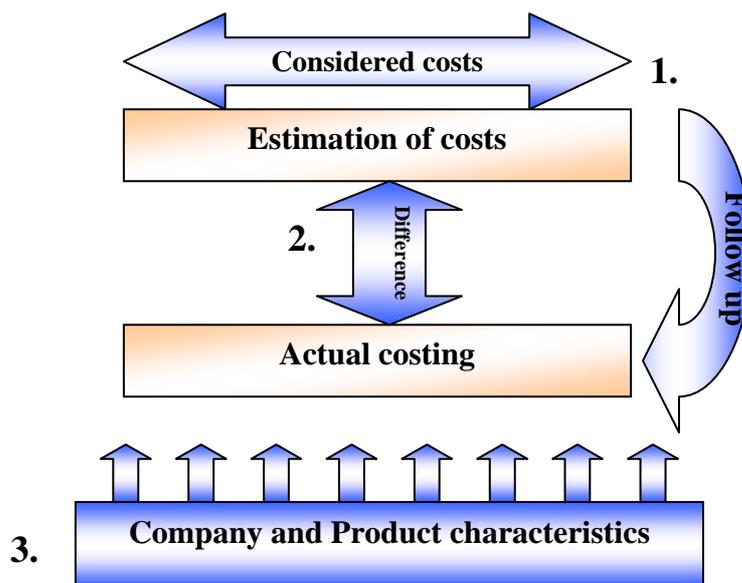


Figure 1.1 Research areas

1.4 Purpose

The purpose of this thesis is to investigate what kind of costs companies take into consideration when doing their estimation of costs before initiating trade with China. Further the thesis will study in an analytical way how these estimations match up with the actual costing that can be seen afterwards and investigate what the explanation to potential variations

could depend on. At last this thesis will study how the characteristics of the companies and the products affect the costing development.

1.5 Limitations

This thesis will not consider the differences in environmental costs, like for example pollution, that change when companies switch to a global purchasing strategy.

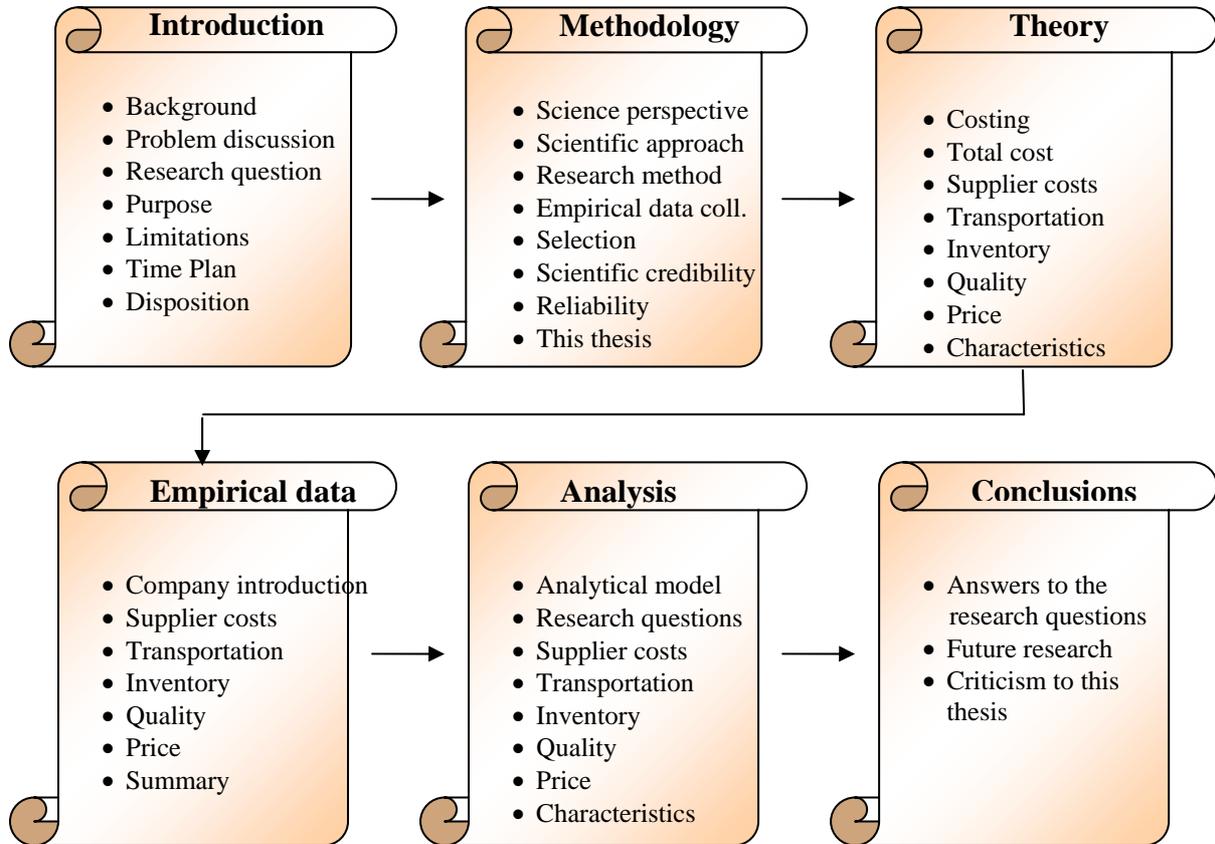
1.6 Time Plan

Figure 1.2 presents the time plan of this thesis.

	14	15	16	17	18	19	20	21	22
		9/4 PM 1		22/4 PM 2		6/5 PM 3			27/5 Deadline
Selection of topic									
Introduction chapter									
Method chapter									
Theory chapter									
Empirical chapter									
Analysis chapter									
Conclusion									

Figure 1.2 Time plan

1.7 Disposition



2. Methodology



This chapter describes the scientific approaches of the thesis. As an introduction some different scientific perspectives are introduced to the reader. After that scientific approach, research method, empirical data collection, selection, credibility, and reliability are presented as well. After each section a motivation and definition is made of our approach. The chapter ends with a summarizing figure of this thesis scientific approaches.

2.1 Scientific perspective

2.1.1 Positivism

Positivism is strongly connected and related with nature-science and focuses on knowledge through experiment. According to positivism, humans only have two ways of assimilate knowledge; things that can be concluded through logic, for example mathematical models, and things that can be observed with human senses, for example observations and experiment.⁴² Positivism implies that the researcher has an objective standpoint, and the main idea is that the result will be the same regardless of by whom the research is done.⁴³

2.1.2 Hermeneutics

Hermeneutics intend to understand human beings opinion of the world through knowledge and understanding.⁴⁴ Adopting positivism on the human knowledge can create inadequate results. To investigate something without investigating how it will be understood will not create a good enough understanding.⁴⁵ According to hermeneutic, the ideas and opinion of

⁴² Thurén, T., (2006), pp.16

⁴³ Patel, R., Davidsson, B., (2003) p.28

⁴⁴ Ibid

⁴⁵ Thurén, T., (2006), pp.94

human beings are not measurable and should therefore be interpreted subjectively by the researcher to be able to create an understanding of their opinion of the world.⁴⁶

2.1.3 Our scientific perspective

This thesis has a positivistic perspective and studies things that can be observed with human senses. This study first gathered known theoretical information about costs related to global purchasing, which then was concluded in a model. This model was then tested on the research objects and from these interviews conclusions were made.

2.2 Scientific approach

According to theory of science two different approaches exist which explain ways to obtain general knowledge and to draw conclusions.⁴⁷ In figure 2.1 the relationship between theory and reality will be viewed from the two different approaches.

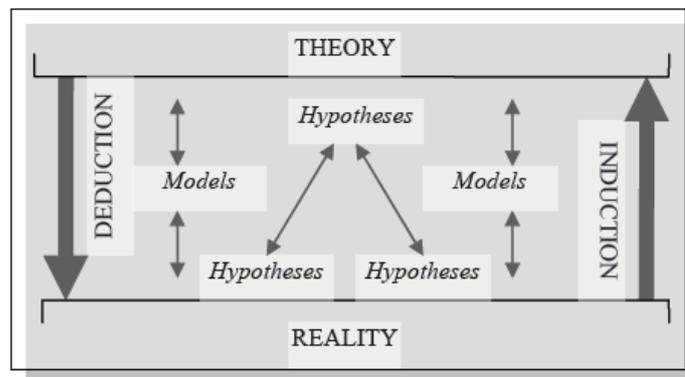


Figure 2.1 Different approaches⁴⁸

2.2.1 Deduction

Deduction implies that the researcher constructs a theoretical framework from where empirical data then will be tested.⁴⁹ The theoretical framework is constructed from simplified models from where hypotheses are developed and tested on empirical data.⁵⁰ Deduction implies that the researcher is trying to draw logical conclusions.⁵¹

⁴⁶ Hartman, J., (2004), p.107

⁴⁷ Andersen, I., (1998), p.28

⁴⁸ Patel, R., Davidsson, B., (1994) pp.22

⁴⁹ Ibid

⁵⁰ Hartman, J., (2004), p.107

⁵¹ Thurén, T., (2006), p.28

2.2.2 Induction

When using induction as an approach no clear theoretical frameworks exist. Instead empirical data is collected by the researcher and theories are then developed and formulated, from which conclusions can be drawn.⁵² Induction is often used in explorative case studies, for example when investigating people's opinion on their work situation.⁵³ Another example is a market survey where conclusions are made about a whole population on behalf of a group of people.⁵⁴

2.2.3 Our scientific approach

Since the empirical data in this thesis is collected from interviews with companies where the questions are based on presented theory, our approach will be deductive. The theory will describe the TCO concept (Total Cost of Ownership), different costs that are included in TCO, and Kraljic's matrix. This theory is used to analyze and discuss the result of the interviews in a way that helps us answer our research questions.

2.3 Research method

2.3.1 Quantitative method

Using a quantitative research method means that the object that is researched is quantifiable. The investigated object is supposed to be measurable and presented in numbers. Examples on measures can be length, weight, and volume. Therefore the quantitative research method is often used in the area of natural science because it is mostly in that area it is easy to make characteristics measurable. For a research to be called quantitative there has to be an order of priority. In a quantitative research the scientist has a great amount of control since this method uses one-way communication where the research is entirely made on the scientists' conditions.⁵⁵

⁵² Patel, R., Davidsson, B., (1994) pp.20

⁵³ Andersen, I., (1998), p.28

⁵⁴ Wallén, G., (1996), p.48

⁵⁵ Andersen, H., (1994), p.70

2.3.2 Qualitative method

The qualitative method can be viewed as a criticism to the quantitative method since it argues that everything is not measurable.⁵⁶ This method is focused on words instead of numbers.⁵⁷ Intercessors for this method are mainly found in the social science area and they argue that there is a fundamental difference in what the two different methods are studying, and therefore both methods can't be used in the same research. The qualitative method is not as structured and formalized as the quantitative method, but the qualitative method are considered to create a more comprehensive view of the situation and it has a two-way communication in contrast to the quantitative method.⁵⁸

2.3.3 Our research method

We have in this thesis used a qualitative research method where we look deeper into a few chosen companies and ask them over bridged questions. We used this method because we want the companies to tell us about the things that we wish to investigate instead of just giving them some pre-determined options to choose between. This because we wanted to capture different variables that can affect decisions, and create an understanding of how the companies operate.

2.4 Case study

In a case study a real life experience is studied and analyzed. The main advantage of this kind of study is that the study is made under real life circumstances and is not fictional, which makes it very easy to gain knowledge about the progress that is made. By doing a case study, the researcher can be really sure that a certain situation actually exists, a certain activity is made, and that processes are working. On the other hand the researcher doesn't know if the phenomenon is common among other companies or not.⁵⁹ A case study can examine a certain individual, a group, an event, a process, a geographical area, etc. A case study is usually done to formulate hypothesis, develop theories, test theories, or illustrating theories. It is common to use case studies when trying to get an understanding on a deep level and in the context that the event really is happening.⁶⁰

⁵⁶ Andersen, H., (1994), pp.70

⁵⁷ Denscombe, M., (2000), p.204

⁵⁸ Andersen, H., (1994), pp.70

⁵⁹ Wallén, G., (1996), pp.115

⁶⁰ Lundahl, P-H., (1999), pp.187

This thesis used a descriptive and comparative case study where four companies were interviewed and analyzed about their experiences from purchasing from China. The advantage of using this case study format was that the thesis could illustrate a real life experience and compare it with how the other contributors experienced a similar situation. But since this thesis was studying four different companies which purchase four different kinds of products from China, the result can not be guaranteed to be correct for other companies that purchase from China.

2.5 Selection

When a certain topic or problem is to be investigated it is often necessary to do a selection of objects to study, since it in many cases is not possible to study all the objects that have the desired characteristics.⁶¹ If certain objects are chosen for the study, these can be categorised as a probability selection or a non-probability selection. The probability selection is defined as a selection of objects that can be said to represent the entire population. A prerequisite for the probability selection is that all the objects in the population have an equal chance of being selected. In the non-probability selection, on the other hand, the preferences of the researcher play a part in the selection of the objects that are going to be studied.⁶² The non-probability selection can be justified to use when doing a qualitative study and choosing people to interview that has the right knowledge about the subject.⁶³

2.5.1 Our selection

In this thesis it was necessary to do a selection of a group of companies to interview that have purchasing activities in China. The method of this study can be categorised as a non-probability selection since the companies interviewed were selected on a basis of accessibility rather than on a notion of them being representative of the average manufacturing company purchasing products or components from China. The four companies that we have interviewed are manufacturing companies that purchase products or components to their production from China.

⁶¹ Andersen, H., (1998), pp.122

⁶² Halvorsen, K., (1992), pp.98

⁶³ Christensen, L., et al, (2001), p.129

2.6 Empirical data collection

The data that is used in a report or thesis can be collected in many different ways, like for example observations, personal interviews, books, or surveys. The empirical part of a thesis is very important and therefore the chosen method of collecting data is crucial.⁶⁴ Data can either be primary or secondary. Primary data means that the author itself has collected the data while secondary data means that someone else has collected the data and is then used by an author in a report.⁶⁵ Primary data is often collected by doing personal interviews and these interviews can be structured in different ways. An interview can be very structured where all the questions are pre-determined and brought up in a certain order. An interview can also be semi-structured which means that the over all subjects are pre-determined but the exact question and when it is supposed to be brought up is not. A third alternative is that the interview has no structure at all. The interview is then more like a conversation and the questions are simply brought up when it is appropriate.⁶⁶ An interview where the alternatives are very limited is usually a quantitative interview where the author wants to collect data from a big number of people. An interview where the alternatives are open and can lead to follow up questions is most likely a qualitative interview that is only done with a few people.⁶⁷ It is usually easier to get good and usable data from a qualitative interview.⁶⁸ Secondary data has usually been collected by another scientist or organization, and the data has probably been used before in another investigation. Therefore, secondary data has already been processed.⁶⁹

2.6.1 Our empirical data collection

We have in this thesis used primary data collected from interviews at manufacturing companies which purchase products or components to their production from China. The interviews were mainly semi-structured so the respondents were able to answer without limitations which gave us the opportunity to get a broad explanation about the topic. The questions are focused on the companies purchasing related costs (see appendix A) and the interviews have been conducted face to face during the weeks indicated on the time plan. The primary data has been collected from interviews and e-mails with the companies indicated in figure 2.2. Personal visits, production tours and presentations have also been made. We have in this thesis also used secondary data in our theory chapter collected from text books and

⁶⁴ Björklund, M., Paulsson, U., (2003), p.66

⁶⁵ Christensen, L., et al, (2001), p.69

⁶⁶ Björklund, M., Paulsson, U., (2003), p.68

⁶⁷ Hartman, J., (2004) p.232

⁶⁸ Wallén, G., (1996), p.76

⁶⁹ Andersen, H., (1998), p.150

scientific articles which we use to support our analysis and conclusion. Secondary data has also been used in form of costing collected from the companies.

Company	Contact persons	Position	Location	Interview date
SEIAB	Maria Ström	Purchasing manager	Växjö	2008-04-21
Andritz	Olaf Büttner	Purchasing manager	Växjö	2008-04-24
	Stefan Gustavsson	Sales manager		
RH-Chairs	Tobias Wärn	Senior purchaser	Nässjö	2008-04-25
Invacare	Bengt Örning	Purchasing manager	Diö	2008-04-29
	Mikael Skåre	Purchaser		

Table 2.2: People and companies that have been interviewed for this thesis.

2.7 Scientific credibility

2.7.1 Validity

High validity means that the study being conducted is relevant to whatever it is that the researcher is trying to prove or measure.⁷⁰ Validity does in general mean that a theory or model gives a true description of reality.⁷¹ Three different kinds of validity should be considered in a thesis. The first one is construct validity, which is important in a thesis to make sure that an objective judgement is made when collecting data. In a case study it can be hard to be objective, but to ensure the best possible objective judgement multiple sources should be used when collecting data and the study should also be reviewed by people with key positions at the company where the case study has been carried out.⁷²

A second validity is internal validity which is needed to make sure that one thing is really causing another, a cause and effect relationship. To be able to establish internal validity many observations should be done to make sure that the final conclusion isn't made up of assumptions.⁷³ The third validity is the external validity which deals with what level of

⁷⁰ Thurén, T., (1991), p.22

⁷¹ Gummesson, E., (2000), p.93

⁷² Yin, R.K. (2003) pp.34

⁷³ Ibid

generalization that can be made from this particular thesis. The validity is considered as high if the results can be used and implied at other cases with similar circumstances.⁷⁴

2.7.2 Validity in this thesis

The validity can be considered as high since we are objective in our interviews with no personal bias to the companies. The validity could be even better if we would have been able to interview many different people at each company but some conclusions can be drawn that most likely are the same in all companies with similar characteristics.

2.7.3 Reliability

A study with a high reliability is conducted in a correct and credible way. This means that for example calculations and selections are done in the right way.⁷⁵ The reliability is dependent on the number of random errors or mistakes that can arise in the collection of empirical data. If a study has a high reliability another researcher should be able to do it again and get the same or a similar outcome.⁷⁶ Reliability is necessary in order to achieve validity. When conducting interviews it is a good idea to record these so that they can be reviewed at a later point in order to confirm that no misinterpretations have been made.⁷⁷

2.7.4 Reliability in this thesis

To secure high reliability in our thesis we had to put a lot of effort into designing the interview questions in a clear way in order to avoid misunderstandings. The questions were based on the findings in the theory chapter to ensure relevance. The interview companies were notified about the type of costs that were going to be covered in the questions prior to the interview in order to give them a chance to prepare and give correct information. The questions were the same in all the interviews, which gave us reliable answers and simplified comparison and analysis of the companies' answers. All interviews were recorded which enable us to go back and review them in order to check all the facts.

⁷⁴ Yin, R.K. (2003) p.37

⁷⁵ Thurén, T., (1991), p.22

⁷⁶ Gummesson, E.,(2000), p.91

⁷⁷ Lundahl, U., Skärvad, P-H., (1999), p.152

2.8 This master thesis' scientific approaches

Figure 2.3 presents a summary of this thesis scientific approaches.

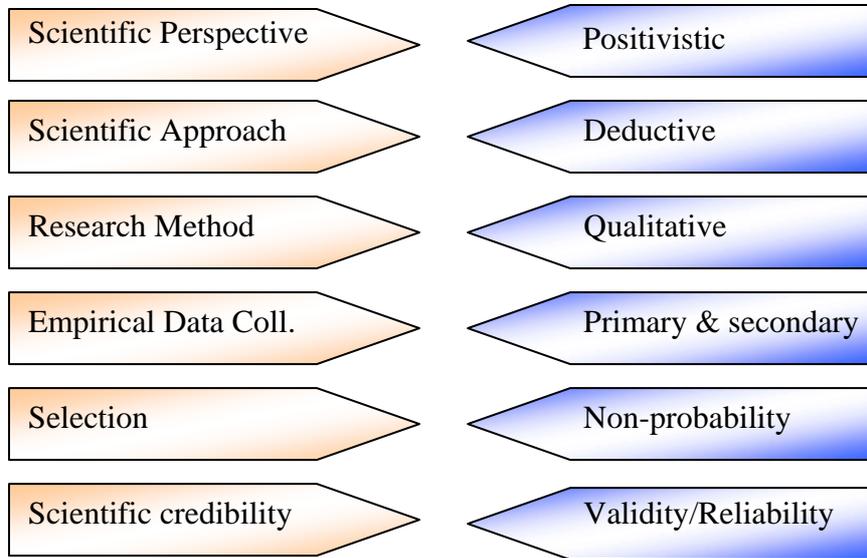
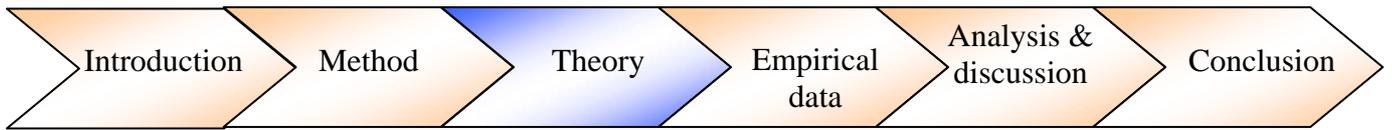


Figure 2.3: Scientific approaches

3. Theory



In this chapter the theory behind our analysis is described. First the term costing is explained followed by three different Total Cost models. From these three models a concluded model is developed and the costs included are described more in detail. Finally the Kraljic portfolio matrix is described to give a better understanding about how the analysis is made.

Figure 3.1 presents the theoretical framework covered in the following chapter. It also points out how the theory is going to be used in order to answer this thesis' research questions.

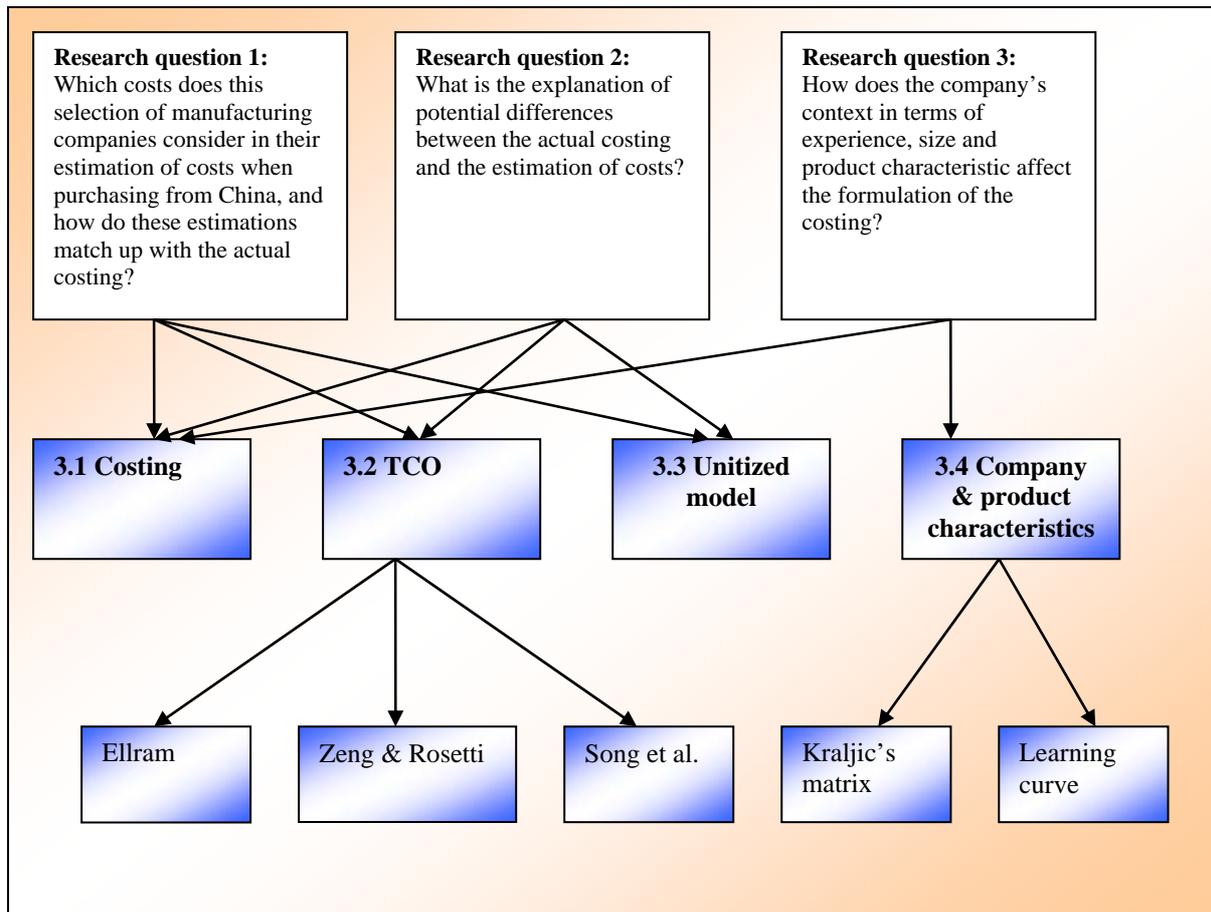


Figure 3.1 Theory framework

3.1 Costing

Cost accounting is a tool for economical analysis to give a better base to stand on in an important decision. Cost accounting can be made in all kinds of situations, like for example future investments, product development, and buy/manufacture situations. Three different kinds of cost accountings can be described:

- Project calculations / estimation of costs: This is focused on the possible future profitability according to the presumptions and assumptions that are made today.
- Project budget: Is established as a compilation of expected costs and revenues. The budget is used as a direction during the implementation of the project.
- Actual costing: Are the calculations that are done after the project is finished to see if the budget was correct and to make adjustments for future projects.⁷⁸

In cost accounting on products mainly two methods are used; the contribution costing method and the absorption costing method. The absorption costing method is the most advanced one where both direct and indirect costs are strictly calculated and accounted. The general idea is that every single project should carry the costs that it is bringing. Direct labor, direct material, material overhead, production overhead, sales overhead, etc. are all accounted separately in the absorption costing method. The contribution costing method is based on incremental costs and joint costs. This means that only the costs that are affected by a certain decision are brought up in the calculations. The rest of the costs, the joint costs, are not specified.⁷⁹

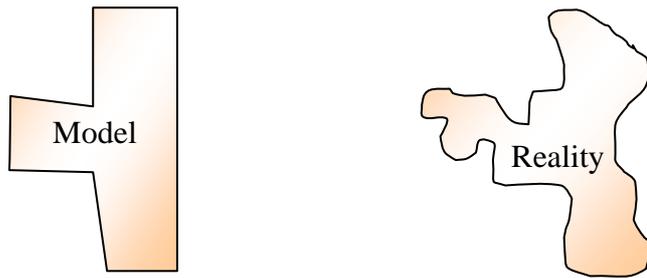
Costing are simplified models of the reality and the model must have a balance between what is desirable to measure and what is possible to measure. On one hand it is desirable to have a model that gives an as exact picture of the reality as possible and on the other hand the model should be easy to use. An illustration of this is shown in figure 3.2.⁸⁰ When designing the costing it is important that the person that is responsible for the costing development has good knowledge about the procedure, in terms of finding the exact costs and estimations.⁸¹

⁷⁸ Norelind, C., Eliasson, B., (2005), p.13

⁷⁹ Norelind, C., Eliasson, B., (2005), pp.164

⁸⁰ Andersson, G., (2001) pp.41

⁸¹ Norelind, C., Eliasson, B., (2005), p.34

Figure 3.2: Illustration of costing model.⁸²

3.2 Total cost of ownership

3.2.1 Total cost principles

The economical consequences' that must be considered in sourcing activities can be illustrated like an ice-berg, shown in figure 3.3. The direct costs are visible while the indirect costs are hidden beneath the surface.⁸³

Figure 3.3: The ice-berg⁸⁴

3.2.2 Ellram's Total Cost of Ownership

Total cost of ownership is a tool aimed at understanding the true cost of buying a good from a particular supplier. This approach requires that a company determines the costs it considers significant in the acquisition, possession and use of a certain purchased good. A TCO analysis may for example include costs related to:⁸⁵

- Research and qualification of suppliers
- Order placement

⁸² Andersson, G., (2001) p.41

⁸³ Jonsson, P., Mattson, S-A., (2005), p.438

⁸⁴ Ibid

⁸⁵ Ellram, L., (1995) p.4

- Transportation
- Receiving
- Inspection
- Rejection
- Replacement

One of the strengths of the TCO approach in calculating costs of purchasing is that it unlike many other approaches doesn't disregard internal costs. Traditional approaches to supplier selection and evaluation are often based on price and or qualitative performance alone.⁸⁶

To ensure that all costs of purchasing are covered the principles of activity based costing (ABC) could be combined with the concept of total cost of ownership. The first step will be to analyse the activities in the value chain that relate to the purchasing policy. Once the activities are defined the resources available to perform these activities should be examined and the resource drivers identified. With costs of performing the activities made clear and the activity drivers that determine the total cost of the purchasing policy calculated information about the supplier performance on these drivers can be measured.⁸⁷

3.2.3 Zeng and Rossetti's Logistical Costs in Global Sourcing

Total costs of ownership approach for evaluation of logistics cost in global sourcing can also be divided into the following five steps:⁸⁸

Step 1: Identify the objective (identification of logistics costs associated with global sourcing).

Step 2: Identify different modes available for transporting raw materials and finished goods to and from the global manufacturer.

Step 3: Develop the minimum number of input parameters necessary to ascertain the costs associated with the six logistics cost categories: transportation, inventory holding, administration, customs charges, risk and damage, and handling and packaging.

⁸⁶ Ellram, L., (1995) p.5

⁸⁷ Degraeve Z., et al., (2005) p.17

⁸⁸ Zeng, A., Rossetti, C., (2003) pp.792

Step 4: In this step the cost elements should be re-classified into three groups based on: weight, value and shipment frequency.

Step 5: Calculate the annual total logistics cost for moving materials between your company and the supplier for each particular transportation mode and construct a cost matrix containing the logistics costs of moving materials in both directions. The most economic transportation mode can then be identified in the cost matrix.

Examples given of input parameters from step three are:⁸⁹

Transportation: freight charge, consolidation, transfer fee and pickup and delivery.

Inventory holding: pipeline holding and safety stock.

Administration: order processing, communication and overhead.

Customs: customs clearance, brokerage fee and allocation fee.

Risk and damage: damage/loss delay, insurance

Handling and packaging: terminal handling, material handling, in/out handling, disposal charge and packaging/supplies materials storage.

3.2.4 Song et al's Total Cost of Global Acquisition

Another approach to the total cost of ownership perspective is a developed framework for calculating the total acquisition costs of a given sourcing activity. The framework is divided into the following key components:⁹⁰

- *Information collection, supplier selection and negotiation:* Costs related to finding information and selecting suppliers are gathered and calculated. This category includes travelling and negotiation costs as well cost for adapting IT-systems once the relationship evolves.
- *Price:* Prices with consideration to discounts, taxes and duties as well as currency fluctuations.
- *Administration:* Administration costs include the ordering and payment/billing process.
- *Logistics and inventory:* Encompasses all types of logistics costs, for example: transportation, expediting, holding costs, receiving, inspection, capital charge of

⁸⁹ Zeng, A., Rossetti, C., (2003) p.793

⁹⁰ Song, N., et al., (2007) pp. 862

keeping inventory as well as the cost of running the warehouse. Indirect costs such as lost sales owing to late deliveries should also be considered.

- *Quality issue*: This category deals with costs caused by quality problems such as: rejection and return, rework, scrap, repackaging and customer complaint handling.
- *Supplier management*: Costs of managing the supplier relations such as supplier training and support, forecasting, performance review, renegotiations and communication costs.
- *Other costs*: This category gathers costs like personnel recruiting and training, costs of dealing with the local governments and cultural and language issues.

According to the discussion regarding total cost model from above, the costs mentioned in the different models can be related and categorized into one of the following categories; *Engaging and handling the supplier, transportation and handling, inventory and holding, quality, price and payment* shown in figure 3.4.

TCO-Summary	TCO- Ellram	TCO-Zeng & Rossetti	TCO- Song et al.
Engaging & Handling the supplier	Order placement Research and qualification of suppliers	Administration	Information collection, supplier selection, negotiation, Administration Supplier management
Transportation & handling	Transportation,	Transportation, Handling and packing, Customs	Logistics and inventory
Inventory & holding	Receiving	Inventory holding	
Quality	Inspection, Rejection, Replacement	Risk and damage	Quality issues
Price & Payment		Price	Other costs

Figure 3.4: Summary of TCO models.

3.3 Unitized model of total cost of ownership summary

3.3.1 Engaging and handling the supplier

Administrative and transaction costs

Administrative costs consider all the costs that are associated with planning and controlling the flow of material. Order administration, planning, inventory filing, etc. are some examples. Cost for computer- and communication systems is another big administrative cost.⁹¹ Administrative costs can also include promoting, advertising, and legal expenses. These kind of costs are very difficult to justify for the supplier in the product price.⁹² Purchasing transactions are procedures related to the activities of finding, evaluating and handling the negotiation with the suppliers.⁹³ The transaction costs can be affected by the company's way of procurement as well as their supplier approach. Due to technology like ERP –systems and the Internet, the possibilities of finding and communicating with suppliers can decrease the transaction and ordering costs drastically.⁹⁴

Supplier management

It is of importance to find suppliers that can provide the requested quality.⁹⁵ By building a long term mutual relationship with the supplier transaction costs can be reduced in the long run.⁹⁶ More possible costs for managing the suppliers are related to the costs that arise from for example, telephone calls, fax, travel expenses from sending personnel overseas, supplier training, investments in IT-system and dealing with poor infrastructure.⁹⁷

Both tooling and engineering costs might be relatively large amounts. The purchaser wants to know what it should cost a supplier to own the tools, for how long the tools are going to last, and if the tools can be used in the production process of products other than the one that they aim for right now. The purchaser need this information to make sure that the supplier don't charge them for all the tooling cost, even if the supplier can use the same tools for many different customers. It is the same thing with engineering. The purchaser does only want to

⁹¹ Jonsson, P., Mattsson, S-A., (2005), p.137

⁹² Leender, M., et al, (2002), p.372

⁹³ Baily, P et al., (1998) p.8

⁹⁴ Van Weele, A., (2005), pp.175

⁹⁵ Song, N et al., (2007) p.862

⁹⁶ Baily, P et al., (1998) p.8

⁹⁷ Song, N et al., (2007) pp.860

pay for its share of the necessary engineering hours and not for all of the other customers engineering costs as well.⁹⁸

3.3.2 Transportation and handling

Transportation cost

Transportation and handling costs are those that appears when a product is moved from one place to another either internal in a factory or external between a company and its customer or supplier. The main activities that are connected to transportation between external sources are loading, moving, and unloading of goods. During transportation the goods tie up capital which also has to be brought up in the calculations of total transportation costs.⁹⁹ When looking at transportation costs, the companies usually make a distinction between real cost and remaining costs. The real costs are the ones that are connected to the main activities mentioned before; moving, loading, reloading, and unloading. The remaining costs are costs that affect the calculations but can not be related direct to the actual transportation, such as packing made for this specific transport, temporary storage, damages, insurances, interest, toll, and administration.¹⁰⁰ Another thing that has to be considered when purchasing globally is what kind of terms of delivery that the supplier and the purchaser agrees on. To make this easier the International Chamber of Commerce have a number of official definitions that cover agreements on who is responsible for a good that is being purchased. Some examples of these agreements are:¹⁰¹

- Free on Board (FOB)

FOB can be used when goods are being shipped. The seller has fulfilled its duties once the goods enter the ship. The seller pays for the loading costs. Insurance for the shipping has to be paid by the buyer.

- Free Carrier (FCA)

The seller has fulfilled its duties once the goods have been declared for export and they have been delivered to the transporter that the buyer has contracted. The buyer is responsible for the rest of the costs and activities that follows.

⁹⁸ Leender, M., et al, (2002), p.372

⁹⁹ Jonsson, P., Mattsson, S-A., (2005), pp.130

¹⁰⁰ Lumsden, K., (2006), pp.665

¹⁰¹ ICC, <http://www.icc.se/publ/incoterms/incotermsswe.htm>, 2008-05-15

Customs and duty costs

Import and export from countries that are not members in some trade union will imply careful administration to avoid unnecessary costs. To avoid the goods from spending longer time than necessary in customs, it is of importance that information on documents, for example invoices, way bills and import licenses are correct.¹⁰² By contracting custom brokers with knowledge about the procedure of customs clearance the process can be facilitated.¹⁰³ Taxes and duties are fees that can be charged by the government when importing from certain countries.¹⁰⁴ These fees are aimed to protect domestic industry from foreign competitors.¹⁰⁵

Insurance and packing costs

Costs for packing are connected to activities like packing and wrapping goods, packing material and marking of goods. In some cases costs for return transports will occur.¹⁰⁶ Insurance are costs for economical cover and protection against losses and damages during the transportation.¹⁰⁷

3.3.3 Inventory and holding cost

Tied up capital

Tied up capital is the capital that is tied up in different machines, material, and buildings so that it gets unavailable to other investments. A very common place to put capital is in the inventory.¹⁰⁸ Companies need inventories for a number of reasons. One reason is that they have to safeguard themselves from shortages and disruptions in deliveries.¹⁰⁹ The tied up capital in inventories has to be balanced so that the company keeps enough products in stock to prevent shortages, but at the same time as small inventory as possible since it costs interest money to have a lot of tied up capital.¹¹⁰ The objective for all companies are to keep the level of tied up capital as low as possible and they can do that by for example have as high inventory turnover as possible.¹¹¹

¹⁰² Baily, P et al., (1998) pp.248

¹⁰³ Heinritz, S et al, (1991) p.201

¹⁰⁴ Leenders, M, R., et al., (2002) p.554

¹⁰⁵ Parkin, M., (2003), p.441

¹⁰⁶ Jonsson, P., Mattsson, S-A., (2005) p.131

¹⁰⁷ Abrahamsson, H., Sandahl, F., (1996) p.111

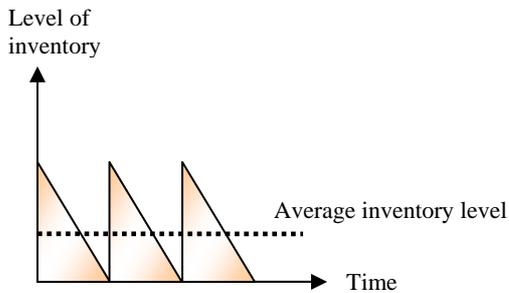
¹⁰⁸ Lumsden, K., (2006), p.284

¹⁰⁹ Lumsden, K., (2006), p.304

¹¹⁰ Jonsson, P., Mattsson, S-A., (2005), p.142

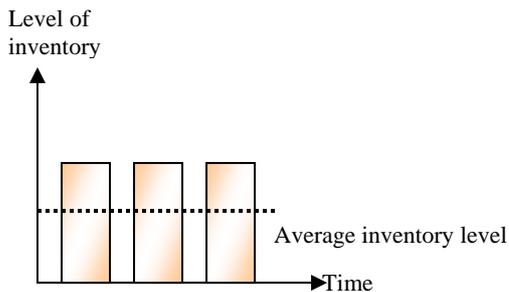
¹¹¹ Storhagen, N., (1995), p.70

There are three different kinds of inventories that can be calculated; the turn-over inventory, the transport inventory, and the finished goods inventory. By multiplying the average inventory level with the value of one single product you get the average tied up capital in an inventory. How to calculate the average inventory level is done a little different in each kind of inventory, as shown in figure 3.5-3.7. ¹¹²



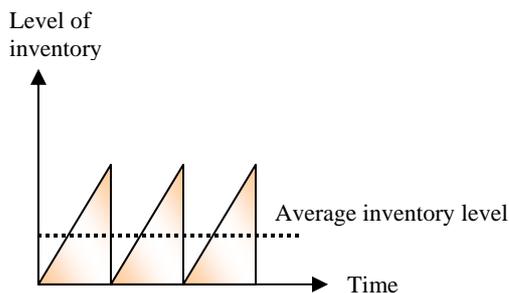
Tied up capital in turn-over inventory =
Average turnover X value of product

Figure 3.5: turn-over inventory¹¹³



Tied up capital in transportation inventory =
Average turnover X value of product

Figure 3.6 Transportation inventory¹¹⁴



Tied up capital in finished goods
inventory =
Average turnover X value of product

Figure 3.7: Finished goods inventory¹¹⁵

¹¹² Jonsson, P., Mattsson, S-A., (2005), pp.143

¹¹³ Ibid

¹¹⁴ Ibid

¹¹⁵ Ibid

Shortage cost

Shortage costs appear when a delivery can't be made to the customer's satisfaction. In worst case scenario the customer gets so unhappy with the delivery that he cancel the order and won't order from the company again. Those costs are very hard to estimate since one doesn't know how much the customer potentially was going to order in the future. A milder scenario would be if the customer cancels this particular order but keep ordering from the company in the future. And the best scenario if shortage appears is if the customer is satisfied with a displacement product. This way the transaction is still made and the supplier don't loose any sell.¹¹⁶

Extra shortage costs can also appear when a supplier has to ship products with express delivery instead of ordinary shipment. This can happen if the supplier has got some kind of problem that makes them run late in their schedule. And if the time is running out the supplier probably has to pay some workers to work overtime, and that is also considered as a shortage cost.¹¹⁷

Holding cost

The holding cost is dependent on the quantity that is kept in stock, and can be divided into; a financial part, a physical part and uncertainty. The financial part is related to the company's required rate of return on the goods kept in stock. The physical part is connected to maintenance of the inventory, while the uncertainty has to do with the risk of, for example obsolesce of the goods.¹¹⁸

3.3.4 Quality

Cost of quality

Quality can be defined as: "*the degree in which customer requirements are met. We speak of a quality product or quality service when both supplier and customer agree on requirements and these are met*"¹¹⁹. Costs for poor quality can be divided into two categories, direct and indirect quality costs. Direct costs are costs that are monitored and perceived within the

¹¹⁶ Jonsson, P., Mattsson, S-A., (2005), pp.139

¹¹⁷ Lumsden, K., (2006), pp.350

¹¹⁸ Jonsson, P., Matsson, S-A., (2005) p.131

¹¹⁹ Van Weele, A., (2005) p.192

boundaries of the company and indirect costs are those costs that are perceived by the customer, and can later on result in lost market shares.¹²⁰ Cost of quality can be categorized into:

Prevention costs, which are costs related to avoiding failure in the first place. These costs are related to, for example; investigations to uncover the causes of errors and education, training and motivation of personnel on quality management.

Assessment costs are costs concerning checking and inspection and timely recognition of errors, for example; inspection or acceptance of purchased goods.

Correction costs are from rectifying mistakes arising from internal and external errors as for example; costs of return shipment for customers, losses due to downtime or standstill of the production, cost of processing complaints and lost goodwill¹²¹

In figure 3.8 a model of quality cost is shown.

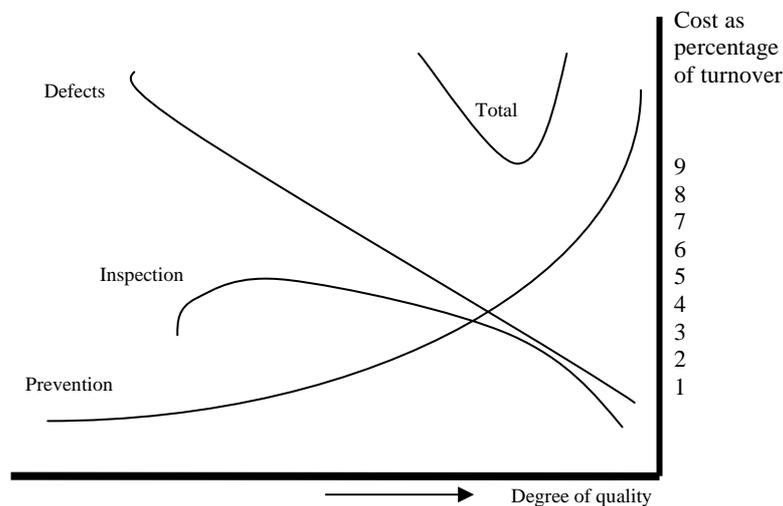


Figure 3.8: Quality cost model¹²²

3.3.5 Price and payment

Purchase price

The purchase price is the direct cost of the product or service that is bought. Since this cost is quite simple to measure it has gained a great focus when evaluating suppliers.¹²³ Another thing that is to consider is when the goods have to be paid to avoid penalties or to get discount.¹²⁴

¹²⁰ Moen, R., (1998), pp.335

¹²¹ Van Weele, A., (2005), pp.193

¹²² Ibid

¹²³ Cavinato, J., (1992) p.293

¹²⁴ Leenders, M., et al, (2002), pp.364

Currency fluctuation

With global purchases come a lot of extra aspects that have to be considered. One of them is currency fluctuation which is increasing and creating problems for buyers that operates internationally. Sudden currency changes might require immediate action from purchasers and they might have to change their sourcing location very fast.¹²⁵ The exchange rate affects all companies that have a global purchasing strategy. Some companies try to build up a network of different supplier in different countries to protect themselves from sudden currency raises. If one country's exchange rate suddenly increases a lot, the purchasing company simply shift to another factory in another country and let them produce some more articles.¹²⁶

Another big problem with currency fluctuation for companies that source globally is the time difference from the day that they order something, until the day that they are about to pay for the products. During that time the currency might change a lot and the price that they have to pay might be very different from the price that they agreed on. If the bill is going to be paid in the suppliers' currency, then a currency change is going to affect the purchaser. And if the bill is going to be paid in the purchasers' currency, the supplier is the one that gets affected from a change in the exchange rate.¹²⁷ The companies can work proactive against this, though. Together with the supplier they can create contracts that limit the amount of currency fluctuation that affects the price. They usually set a percentage figure to which the exchange rate maximum is allowed to change during the time between ordering day and payment day. If the currency changes during this time, the contract will tell the purchaser or the supplier of with how much they can adjust their price up or down.¹²⁸

3.4 Company and product characteristics

3.4.1 The Kraljic Portfolio Matrix

The Kraljic portfolio matrix was introduced in 1983. According to the Kraljic model a company's supply strategy depends on the two factors: profit impact and supply risk. With the help of these two factors or dimensions a matrix can be created. The matrix consists of four

¹²⁵ Van Weele, A., (2005), p.101

¹²⁶ Dornier, P-P., (1998), p.225

¹²⁷ Dornier, P-P., (1998), p.325

¹²⁸ Das, A., Handfield, R., (1997), p.248

possible quadrants, figure 3.9, in which the products being purchased can be categorized into.¹²⁹

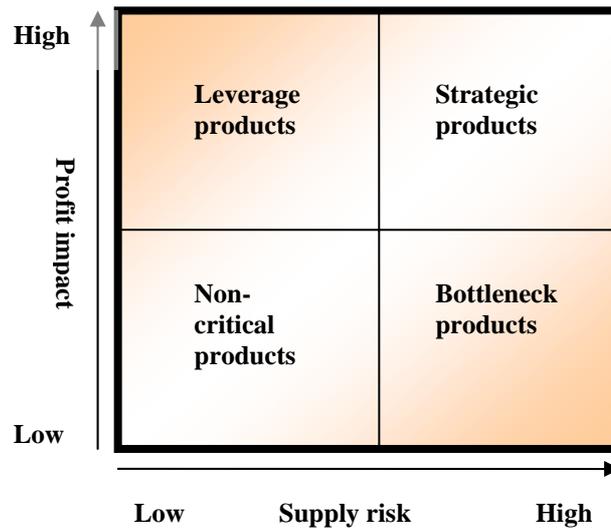


Figure 3.9: Kraljic's matrix¹³⁰

Bottleneck products

Bottleneck products do not have a big impact on a company's financial results. These products are vulnerable in regards to their supply. Suppliers of bottleneck products have a dominant power position. Even if it will incur extra costs it is always necessary to secure the supply of these products in order to assure that the company's production is maintained. One strategy of dealing with bottleneck products is to keep extra stock of these units.¹³¹

Leverage products

Leverage products can generally be obtained from a number of different suppliers. These types of products represent a large share of a finished product's costs. The supply risk for products categorized as leverage products is to be considered as low, which makes this segment buyer dominated. Since the costs of the leverage products are considerable it will be positive for the buyer to negotiate over prices even if it only means cutting a few percentages of the purchase price. The risks of aggressive pricing negotiations are small since the suppliers and products are interchangeable.¹³² The costs of changing supplier are usually low

¹²⁹ Gelderman C., Semeijn J. (2006) p.211

¹³⁰ Ibid

¹³¹ Caniels, M., Gelderman C., (2007) p.222

¹³² Ibid

for leverage products. The only threat for the purchasing company of these kinds of products would be if the suppliers tried to form a cartel to try to shift the power in their favor.¹³³

Non-critical products

Non-critical products usually have a low value per unit. There are many alternative suppliers for these types of products. These products cause few technical or commercial problems for the purchaser. Since the non-critical products have a low value of total costs and are strategically unimportant it is wise to create a purchasing strategy that is aimed towards reducing the logistic and administrative complexity related to purchasing of these products. Systems contracting could be a way of dealing with the suppliers of routine products.¹³⁴

Strategic products

Strategic products are as the name suggest very important for the purchasing function at any given company. The strategic products have a large impact on the company's overall profit since their costs are of a considerable value. At the same time they are expensive their supply also constitute a considerable risk.¹³⁵ Many strategic products are so specialized that they have been developed together with the supplier. Because of these conditions it would be very expensive to switch suppliers in the short term. The conditions on the market for these products lead to close relationship and single sourcing agreements where supplier and customer ideally work together for constant improvements.¹³⁶

3.4.2 Company characteristics

The limited resources of smaller companies make them more loyal to their existing suppliers, research have found that that it is not unusual that they stick with already established relations rather than look for new partners even though the competing suppliers can offer better deals.

In larger companies the purchasing department generally encourages approaches that involve traits of risk taking, flexibility, innovation and creativity in their purchasing activities.

Smaller companies are generally less interested in supplier development than larger companies. They also often have a focus on specific purchasing that threatens to stifle

¹³³ Van Weele, A., (2005) p.151

¹³⁴ Caniels, M., Gelderman C., (2007) p.222

¹³⁵ Caniels, M., Gelderman C., (2007) p.221

¹³⁶ Van Weele, A., (2005) pp.149

innovation.¹³⁷ Another thing that can affect companies purchasing behavior is how experienced they are. Their level of experience can be illustrated by a learning curve.¹³⁸

Learning curves, showed in figure 3.10, are often used to explain how production grows more efficient as the cumulative number of units produced rises. Learning curves can be presented in different ways using different variables but they all show that efficiency improvements and cost reductions can be accomplished over time.¹³⁹

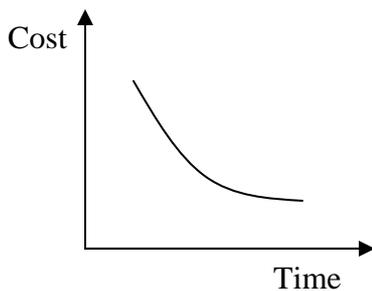


Figure 3.10. Learning Curve¹⁴⁰

Studies show that the learning curve also can be applied in the area of purchasing, these practices can thus be improved over time. A possible effect of experience with a certain purchasing activity is continuous cost reductions. Efforts made by the purchasing department to cut costs could include applying leverage on the supplier by combining different kind of units into one single contract and using alternate suppliers to increase competition.¹⁴¹

¹³⁷ Ellegaard, C., (2006) pp.273

¹³⁸ Sinclair, G., (1999) p.48

¹³⁹ Chase, R., et al., (2006) pp.135

¹⁴⁰ Ibid

¹⁴¹ Sinclair, G., (1999) p.48

3.5 Analytical model

In figure 3.11 the model that will be used to analyze and discuss the empirical material is presented.

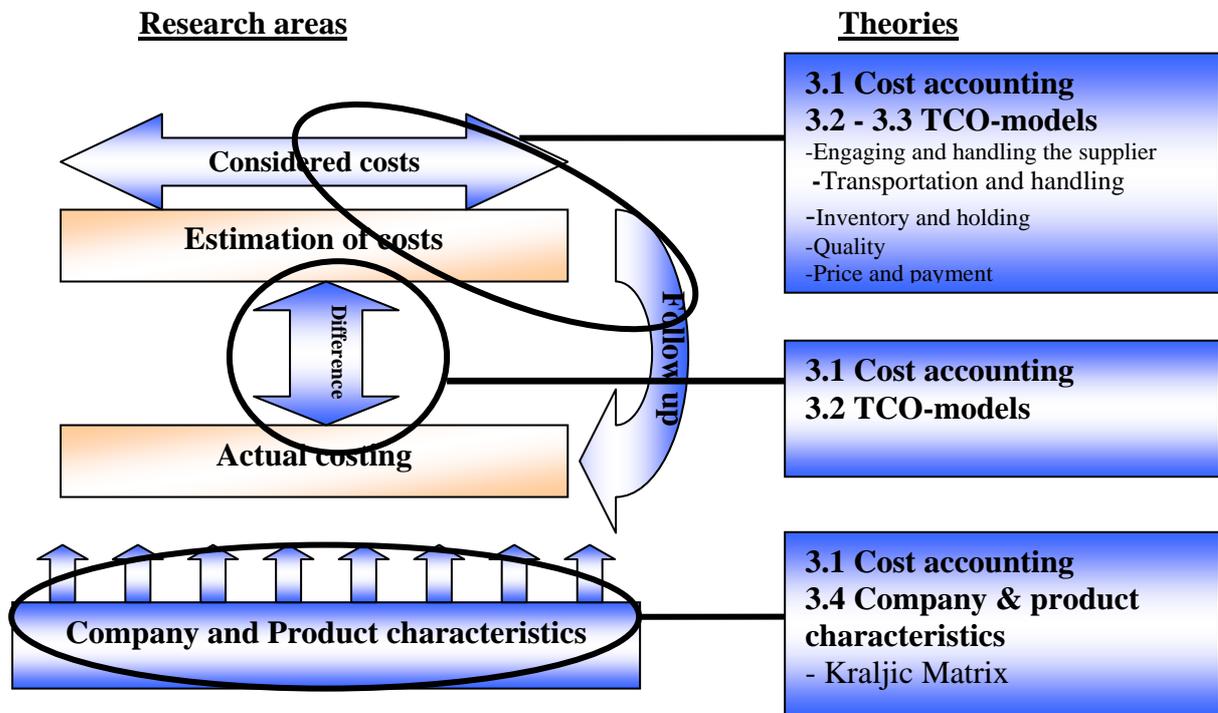


Figure 3.11. Analytical model.

4. Empirical data



In this chapter the collected empirical data will be presented. First a short introduction is made to the four interviewed companies. Further the empirical material will be presented starting with engaging and handling the supplier, transportation and handling, inventory and holding, quality, and price and payment. Finally the chapter ends with two summarizing models of the collected data.

4.1 Company introduction

4.1.1 SEIAB

SEIAB is short for Smålands Elektronik Industri AB. The company manufactures electronic components and has about 50 employees. During 2005 they had a turnover of 55 million SEK and they have their facilities in Växjö. SEIAB purchases electronic cables from China which is a product that is very labor intensive. They only order once every year and purchase 16000-17000 components at each time and has done so for a couple of years. They have several international suppliers but only one in China. SEIAB do not make any detailed follow ups in terms of actual costing on how well their estimation of costs corresponds to the actual costs. SEIAB has a FCA (Free Carrier) agreement with their supplier. They have terms of payments on 45 days and are doing business in USD.

4.1.2 Andritz

Andritz supplies custom made drying systems and services for the paper industry. Andritz in Sweden has 120 employees with facilities in six different places in Sweden. It is a part of Andritz Group that operates globally and has over 10 000 employees and a turn over on about 2000 million euro per year. Andritz in Växjö purchases steel constructions from China with a value of about 50-200 million each. 20% of their need for steel constructions is purchased

from China and this contract has been going on for 5 years now. The project team does follow-ups on the costs relating to the sourcing of steel constructions from China. It is their opinion that these costs mach up quite well with the previous estimations. Andritz has a FCA agreement with their supplier. They have terms of payments on 60 days and are doing business in USD.

4.1.3 RH-Chairs

RH-Chairs was founded in 1977 and they supply customers with ergonomic office furniture. RH-Chairs has about 65 employees in Sweden, the total number of employees including the international sales offices is about 130 people, they are operating in England, France, the Netherlands, and in all the Scandinavian countries. During 2007 RH-Chairs had a turnover of 387 million SEK. They purchase casted details of plastic and aluminum because these components are very labor intensive and they have done so for a couple of years. They import about 50000 back poles from China every year. RH-Chairs do follow ups once every year to make sure that their estimation of costs corresponds to the actual costs. The estimation of costs is then renewed with the latest updates. RH-Chairs has a FOB (Free On Board) agreement with their supplier. They have terms of payments on 60 days and are doing business in USD.

4.1.4 Invacare

Invacare in Diö manufactures wheelchairs that are supposed to make the everyday life easier for people with special needs. Invacare in Sweden has about 60 employees but in the whole world there are more than 5400 employees represented in 80 countries. Invacare in Sweden started sourcing from China in the 80's and have done so since then. One component that they source from China right now is special brakes for their wheelchairs. They import about 80000-90000 brakes from China every year. Invacare follow up the costs related to the purchase price and transportation to make sure that the estimation of costs corresponds to the actual costs. Invacare has a FOB agreement with their supplier. They have terms of payments on 45 days and are doing business in USD.

Table 4.1 shows a summary of the investigated companies' number of employees, purchased item, annual volume, total annual purchase price, number of years they have purchased from China, transportation frequency, terms of delivery, and terms of payment.

				
Employees (Sweden)	50	120	65	60
Purchased Item	Electronic Cables	Steel Constructions	Back poles	Wheelchair brakes
Annual Volume (units)	16 000-17 000	2 500 000 Kilos	50 000	80 000-90 000
Approximate tot. annual purchase price	80 kkr	50 000 kkr	2 000 kkr	2 000 kkr
Experience in China	<5 years	5 years	<5 years	>20 years
Annual Transp.Freq.	Once	Varies	10-15 FCL*. Weekly LCL:s	9 times
Terms of delivery	FCA	FCA	FOB	FOB
Terms of payment	45 days, USD	60 days, USD	60 days, USD	60 days, USD

Table 4.1. Company summary

*FCL = Full Container Load

LCL = Less Container Load

4.2 Engaging and handling the supplier



These costs are, for example, costs for finding and evaluating the supplier, negotiation, and supplier management.

4.2.1 SEIAB

SEIAB contracted their Chinese supplier, Java, after contacts made at a trade fair. The supplier was convincing and they could offer the products SEIAB needed at a low price. SEIAB was not working specifically at finding new Chinese suppliers at the time and they had thus not made any calculations on what it would cost them to look for and assess foreign suppliers. The reason for attending the trade fair was a curiosity on what the Asian suppliers had to offer. The reason for choosing Java was the fact that they already had other Swedish contacts and that they had an image of seriousness. Although no calculations have been made the experience at SEIAB is that the process of finding, assessing and negotiating with the supplier has been more demanding and time consuming than what was initially expected. The process of entering an agreement with the supplier has not made any travelling necessary. All contacts have been made from a distance and no employees at SEIAB have been in China for the negotiations. Technical specifications have been sent to China and the supplier has answered with quotes for the specific demands. The hours spent on preparations before the order has exceeded what was first expected. About 50 emails and 10 free of charge samples were sent before production could begin. The time from the first contact until every detail of the product was acceptable was longer than SEIAB would have thought it would be, but once the supplier had gotten everything right additional orders hardly take any time at all to communicate. Since the product is uncomplicated SEIAB has not been forced to make any investments at the supplier's production site.

4.2.2 Andritz

Once Andritz had made the decision to use Chinese suppliers they paid for the services of the Swedish Trade Council to get help in the process of finding good candidates. The Swedish Trade Council found about 20 companies in China that they saw as possible suppliers to

Andritz. In the second stage of this process Andritz sent members of its Swedish staff to China to work with the selection. Andritz made some calculations for what this process would cost, but since they were not used to that kind of work the calculations were only seen as rough estimations. In retrospect these costing did not cover all the costs that the company later would experience. Even though costs for finding the right suppliers were higher than expected Andritz sees these costs as necessary since they had to find competent suppliers with good prices to stay competitive. Thanks to the low prices in China it is still profitable to do business there even though costs were initially higher than expected. During the first months Andritz assigned four people to work fulltime with the Chinese sourcing project. No investments in hardware has been made on Andritz account, but because of a flatter learning curve than anticipated more money has gone into training of personnel at the manufacturing facility than what they had expected.

4.2.3 RH-Chairs

RH makes quite extensive calculations on all the costs of their sourcing activities in China, costs associated with finding and negotiating with the suppliers are not included in these calculations. In RH:s experience it is not easy to identify the outstanding suppliers in their area. RH used the Swedish Trade Council to hire a Chinese employee that works in Guangzhou to find new Chinese suppliers for RH. The employee uses a number of criteria given by RH in order to assess the suppliers, when this person have found a number of possible suppliers he informs RH, that in turn choose two or three of them for further interviews carried out by RH staff that are sent to China. The Chinese sourcing activities have not meant any investment costs for RH in the form of for example business systems but RH has been forced to invest in tools for casting and jet moulding as well as education for the suppliers employees in how Swedish companies work. The administrative costs of entering the co-operations with the Chinese suppliers have definitely been higher than RH first expected. One big cost of doing business in China is all the travelling. The trips have been quite frequent and several employees, across business functions, go there at the same time. No cost accounting has been made for these trips but it was certainly expected from the beginning that the relationship building would mean a lot of travelling.

4.2.4 Invacare

Since Invacare’s American owners are determined to increase the purchasing activities in China Invacare have an office in Hong Kong from through where much of the contacts with the Chinese suppliers are managed. The factory in Diö has direct contact with its Chinese suppliers when it comes to matters concerning forecasts, ordering, faulty products and billing. The costs of the Hong Kong office are shared by the units within the Invacare organisation that use its services. The fact that the organisation has an office in China means that Invacare in Diö have no travelling expenses since they do not need to send their people to the country on matters concerning purchasing from their suppliers.

Invacare did not do any extensive calculating of the costs for finding, evaluating and negotiating with the suppliers prior to the decision to use Chinese suppliers. The decision to source from China has mainly been made with the support of cost calculations covering salary and material costs. The price of the purchased product should also include a certain percentage to cover the overhead costs of the company. Since the prices are much lower in China than for example in Sweden there is a good margin to cover all the costs related to finding and closing deals with the foreign suppliers. The project of using Chinese suppliers has generally taken more time to start than the involved people at Invacare first planned. The cause of this unexpected problem is that they underestimated the issue of technology transfer. It takes a lot of time to transfer knowledge about the products, knowledge that the previous suppliers had. Many companies in China do also have difficulties to adapt to the demands that are put upon the European suppliers. There have not been any investments in production capabilities that Invacare directly has paid for. Invacare are very specific about the process they expect the supplier to carry out. To be on the safe side, suppliers are also asked to describe the process when they present their offer, this in order to make sure that the supplier knows all the costs it will have to carry.

4.3 Transportation and handling costs



For example costs for shipping, insurance, toll, special wrapping, and returns.

4.3.1 SEIAB

SEIAB transport their goods from China mainly by boat which takes about 32 days. Occasionally they use air freight to make sure that they have enough components in stock until the next delivery. Air freight is of course more expensive, but since SEIAB only source once a year from China they don't find this extra cost as a disturbance. They have no estimation of how much more expensive it gets for them to bring these few components home by air freight instead of by boat but it is obviously more expensive and it is an extra cost that they didn't think they would have from the beginning.

Costs for toll and insurances were all in the estimation of costs and the components do not need any special wrapping so there were no surprises there. Costs for returning bad goods do not exist either because the components are of such a low value so it is not economical to send it back. Complaints have been made to the manufacturer in China and they have then sent extra components in the next delivery instead of dealing with returns. SEIAB also pays for the transportation cost that exists in China from the manufacturer to the harbor.

4.3.2 Andritz

Andritz ship their steel constructions from their supplier in China to wherever the customer is in the world. The cost of shipping one container to one of their projects in South America was for example about 30 000 SEK. The shipping cost was not difficult for them to estimate before the sourcing began so there were no surprises there. They are cooperating with a company in China that deals with all tolls and insurances and they have not been very different from the estimations either. The insurance and toll cost is equal to about 1-2% of the value of the goods being shipped. No returns are of question but lack of quality can be compensated from the manufacturer.

4.3.3 RH-Chairs

RH-Chairs had very good estimations of transportation costs before they started to source from China. They have good control of how much all the transportation should cost and the only thing that is not in the estimation of costs is the constantly increasing price of boat freight. This because of a constant increasing demand and because of the increasing fuel costs. One cost that they hadn't foreseen was the extra wrapping cost. It doesn't cost RH-

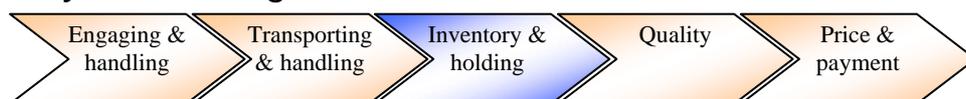
Chairs any extra to get the wrapping that they get, but it takes a lot of time and effort for them to un-wrap the components when they arrive in Sweden. And that is one time- and cost estimation that were not brought up in the estimation of costs.

4.3.4 Invacare

Invacare calculates their shipping costs on the basis of forecasted sell. This means that as long as the forecasts are correct then the estimations of shipping costs are also correct. It has happened that Invacare suddenly got a big order of 600 wheelchairs that were not in the forecast, and this means that the shipping cost increased and some components had to be transported by aircraft to make it in time. The shipping costs then gets more than they were expected but since they had a big extra order that was not calculated with in the forecasts, there were also more components to share the shipping costs between. But overall the extra airfreight might have given them some extra shipping costs that were not in the estimation of costs.

Costs for toll and insurances are brought up in the estimations so there are no unforeseen costs there. No returns have been made either. It has so far been cheaper for the manufacturer to send new components if there is something wrong.

4.4 Inventory and holding cost



Inventory and holding costs are for example costs for tied up capital.

4.4.1 SEIAB

SEIAB is determined to keep the transportation costs low, because of this they order one years supply of components from China at once so that they will not have to pay for several deliveries during the year. The order quantity per time is about 16000-17000 units. Because of the large quantities being delivered at once SEIAB has got a large stock some periods over the year. The large stock at hand doesn't worry them since the product has a low value. The cost of capital tied up in the inventory was not considered in the cost estimations, nor has it been calculated at a later time. The inventory is spent evenly throughout the year.

4.4.2 Andritz

The products are shipped directly to where they are needed, they arrive about a week before they are going to be used. Since these products are not being stored they basically have no costs related to keeping stock, the only cost is for the capital that is being tied up during the transportation process. The cost of the capital being tied up while the project is running and the machine is being built is shared by Andritz and its suppliers and customer through the use of gradual payments both ways in the supply chain. This cost is not directly specified in the costing.

4.4.3 RH Chairs

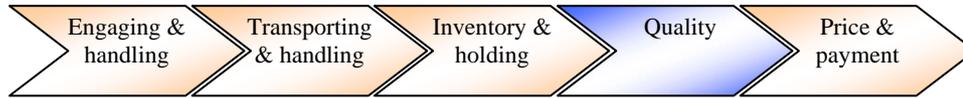
RH Chairs keep a safety stock on the purchased components from China equivalent to the usage during the 30 day long shipping time. The company did not make any detailed cost estimations for costs related to keeping stock prior to when they started the purchasing activities in China. Since they knew that the price of the modules were so much lower they knew that they would have a good margin to cover all the costs with. Today RH Chairs have developed extensive cost accountings for the stock keeping costs of the Chinese products. These cost accountings include costs for the buildings, handling and staff at the warehouse. The cost of capital for the resources tied up in inventory is calculated with an interest rate of 8%. Tied up capital during the 30 days of transportation from China to Sweden is not considered though.

4.4.4 Invacare

Invacare imports 80 000- 90 000 brakes of eight different kinds annually. They get deliveries every sixth week. It is necessary for them to keep safety stock of all products they buy from Asia. The size of the safety stock is calculated depending on variables like the supplier's delivery performance and fluctuations in Invacare's own production and there always has to be an extra margin for unforeseen events. Calculations on the cost of capital tied up in inventory are something that Invacare has failed to prioritise. Since the price of the brakes purchased in China is so much lower than what they paid their European suppliers they

believe that they have less capital tied up in inventory even though they have to keep larger quantities of safety stock.

4.5 Quality costs



Quality costs can be costs for, for example, prevent quality problems, inspections to avoid problems and costs for corrections due to quality problems.

4.5.1 SEIAB

The quality aspect was not included in the estimation of costs before the trade with China started. SEIAB haven't experienced very much of quality problems with the products that are bought from China. In the beginning of the contract they experienced some quality problems with some batches, but the time spent on correcting these problems was about half a workday. From the products that arrive from China a test sample are inspected in every delivery before production, this cost was not considered in the estimation of costs either. The time spent on controlling was also a little bit higher than expected. SEIAB usually make detailed inspections of about 20% of the received goods but they do not have an exact estimation of how much time that takes.

4.5.2 Andritz

Andritz were aware of that the quality part was essential and it was taken into consideration in the estimation of costs. The expectation was that maybe 1-2 persons from Sweden should be in China on full time in the initial phase and then leave. The actual result was that three persons from Sweden were working there on fulltime for four years. In the present situation one person from Sweden and one person from China are working full time with quality issues in China. This change from three persons to one Swedish and one Chinese person has been done during the last year.

The personnel working with quality issues in China are working with inspection, control and developing routines for quality improvement. In the beginning of the project the personnel of

Andritz took over the responsibility for the quality issues, which wasn't the intention. During the last years they have been working on shifting the responsibility to the Chinese plant. Due to that they trusted them too early some quality problems were not discovered until the goods were received at the place where they should be assembled. It was because of this Andritz experienced that the learning curve among the Chinese workers were not as good as they had hoped for.

Andritz has been doing follow ups on the quality costs since 2005 when they contracted a quality manager. The result is that the quality costs have been at least the double compared to what was estimated.

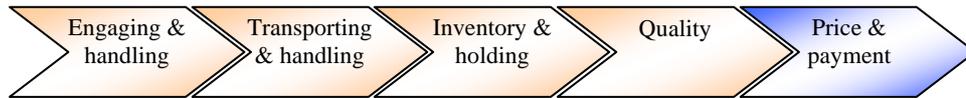
4.5.3 RH-Chairs

Quality costs were not a part of the estimation of costs made by RH-Chairs. Due to inadequate inspection in China one delivery contained defect products. Nothing is sent back, instead the costs for these kind of incidents are negotiated and usually shared with the supplier. More costs that were not taken into consideration are travel expenses to China, for inspection and control. They also have a Chinese worker that checks the quality before the products leave the factory. This Chinese workers' salary is not included in the estimation of costs, but RH-Chairs agrees that it should be.

4.5.4 Invacare

Invacare was aware of the quality aspect but it was not directly taken into consideration in their estimation of costs. They have a unit in China which is working with quality inspection and evaluation and a standard quality evaluation procedure that is the same for all suppliers. The costs for this are joint costs for the whole corporate group and are not considered in the cost of estimation when purchasing from China. Invacare has experienced some quality issues concerning technical specifications. They believe that it is difficult to translate some specifications from Swedish standards to Chinese standards. Invacare believes that the quality costs are approximately the same as they estimated due to their work regarding supplier evaluation before the deal was settled.

4.6. Price and payment



Price and payment are costs related to the purchase price, currency fluctuations and the terms of payment.

4.6.1 SEIAB

The purchase price was considered in the estimation of costs and it is about five Swedish crowns per unit. It is more than a 50 % lower purchase price compared to the Swedish market. The payment to the Chinese supplier is made in US dollars. The supplier wants to get payment in euro instead, but since the dollar value is a more favourable currency at the moment, SEIAB doesn't want to switch. Currency fluctuations were not considered in the estimation of costs, but in this case it is favourable for SEIAB. Since the beginning of the contract the dollar value has decreased almost 20 %. In the beginning of the contract the terms of payment were 30 days. This was not good since Seiab didn't get the goods until after the payment. After the problem was discovered they negotiated the terms of payment to 45 days.

4.6.2 Andritz

The purchase price is calculated for a kilo of material and it is about 20 Swedish crowns for one kilo. On the European market the price is about the double. Lately the prices in China have been rising compared to the European market. Andritz are aware of the currency issues connected with purchasing from China, anyhow no protection for fluctuations were directly considered in the estimation of costs. In this case it is favourable for Andritz due to the current value of the US dollar. Due to the long production time the supplier gets partial payment according to a schedule. This implies that the costs for tied up capital are shared between the supplier and Andritz.

4.6.3 RH-Chairs

The purchase price for one unit is about 55% cheaper in China compared to Sweden. RH.-Chairs has a limit of how much cheaper it must be to purchase from China and this margin is

necessary to cover unpredictable costs. The currency used in the transactions with the Chinese suppliers is US dollars, but the Chinese supplier wants to shift to euro instead. The currency fluctuations were only considered in the estimation of costs for the transportation cost, not regarding the transaction with the Chinese supplier. But in this case it is favourable for RH-Chairs according to the current dollar value. Currency fluctuation is in general not considered unless it is a very big deal. RH-Chairs has experienced that the prices in China are rising, but still believes that goods in China will be cheaper for many years, depending on what kind of product. The terms of payment to the Chinese supplier are 60 days from ordering point or 30% at ordering point and 70% at bill of landing.

4.6.4 Invacare

The purchase price in China is about 25 Swedish crowns which are around 45-75% cheaper compared to the European market. Invacare has experienced that the prices in China have increased the last couple of years, but believes that it will take many years before they will be comparable to the European market. The transactions are done in US dollars but the suppliers are pushing them to switch to euro instead. Currency fluctuations are not directly considered in the estimation of costs, and Invacare consider the present dollar fluctuation as an extreme case. In this case it has been favourable for Invacare. The terms of payment are 60 day from that the goods are loaded on the ship.

4.7 Summary of empirical data

In table 4.2 the costs that the companies were considering in their estimation of costs are summarized. “Not considered” mean that the costs were not a part of the decision base when the company was investigating purchasing from China as an alternative.



	Engaging & handling the supplier	Transportation & handling	Inventory & holding	Quality	Price & payment
SEIAB	Not considered	Freight, toll, taxes, insurance.	Not considered	Not considered	Purchase price
Andritz	Finding, evaluating, negotiation.	Freight, toll taxes, insurance.	Not considered	Personnel in China	Purchase price
RH-Chairs	Not considered	Freight, toll, taxes, insurance.	Not considered	Not considered	Purchase Price, (currency fluctuation)
Invacare	Not considered	Freight, toll, taxes, insurance.	Not considered	Not directly considered	Purchase price

Table 4.2. Summary of estimation of costs

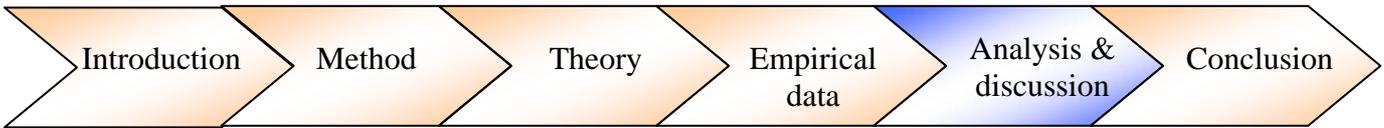
Table 4.3 presents a summary of the companies' perceived and calculated costs in retro perspective. Some of the costs were a part of neither the estimation of costs nor the actual costing, but the companies have in several cases done their own evaluations.



	Follow up	Engaging & handling the supplier	Transportation & handling	Inventory & holding	Quality	Price & payment
SEIAB	Not directly	Higher -time consuming mail contact	Partly higher -air freights	Probably higher -overlooked	Partly higher -controlling	Favorable - decreasing dollar value
Andritz	Partly	Higher -Supplier training	More or less the same	Probably higher -overlooked	Higher -have still employees in China	Favorable - decreasing dollar value
RH-Chairs	Annually revised	Higher -travelling and investments	Partly higher -unwrapping packages	Higher -revised	Partly higher -inadequate control	Favorable - decreasing dollar value
Invacare	Partly	Higher -technology transfer	Partly higher -air freights	Probably higher -overlooked	More or less the same	Favorable - decreasing dollar value

Table 4.3. summary of actual costing

5. Analysis and discussion



In this chapter the collected empirical data is analyzed in accordance with the theory chapter. First the analytical model is presented, followed by the research questions to remind the reader of what this thesis is trying to find out. Further all the cost categories are analyzed out of the research questions' perspective followed by the company and product characteristics analysis.

Figure 5.1 is the analytical model that will be used in this thesis.

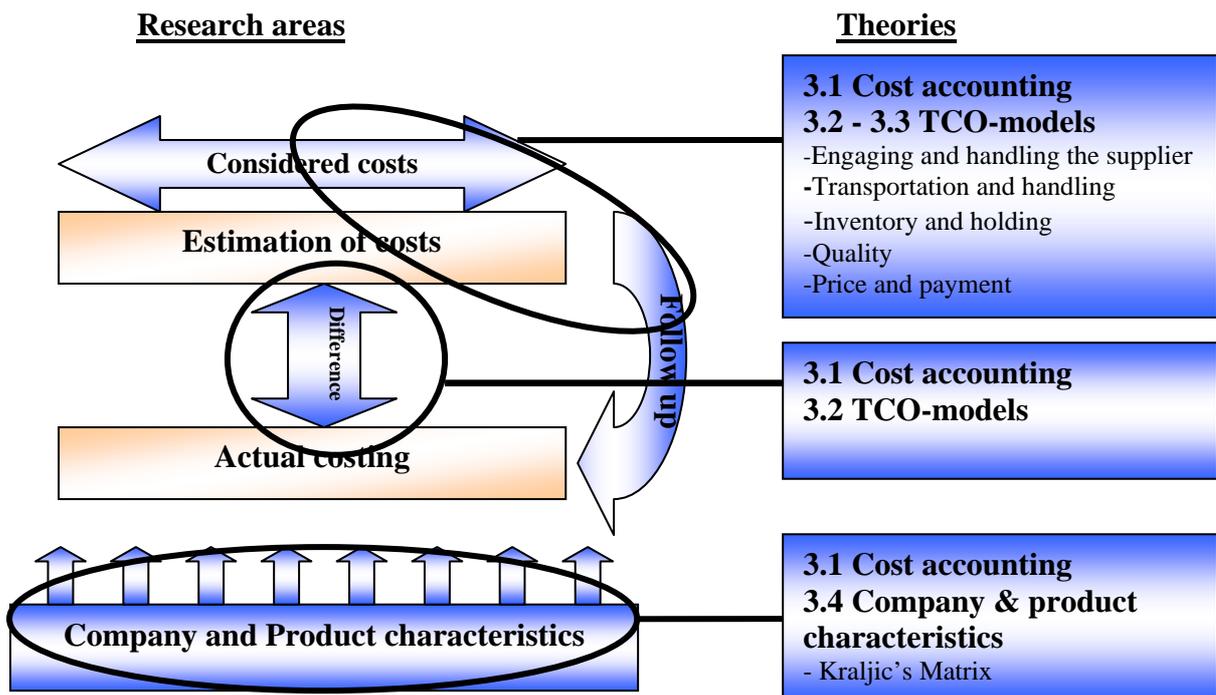


Figure 5.1. Analytical model.

5.1 Analysis of research question 1 and 2

Figure 5.2 shows the part of the analytical model that research question 1 and 2 will focus on.

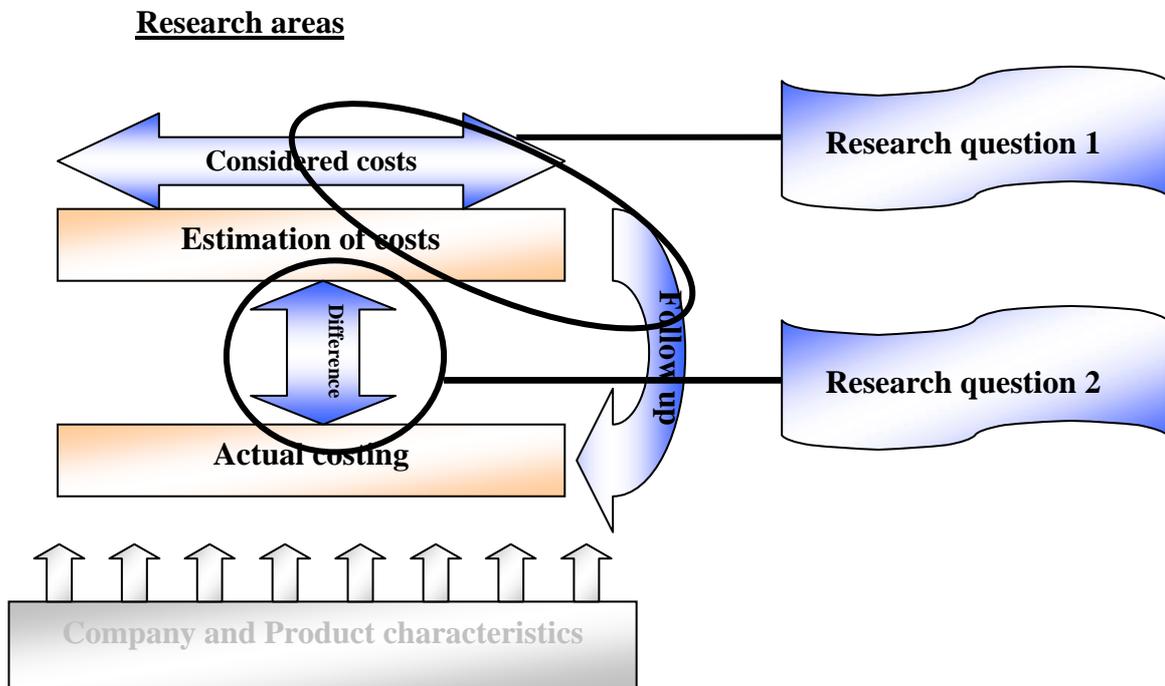
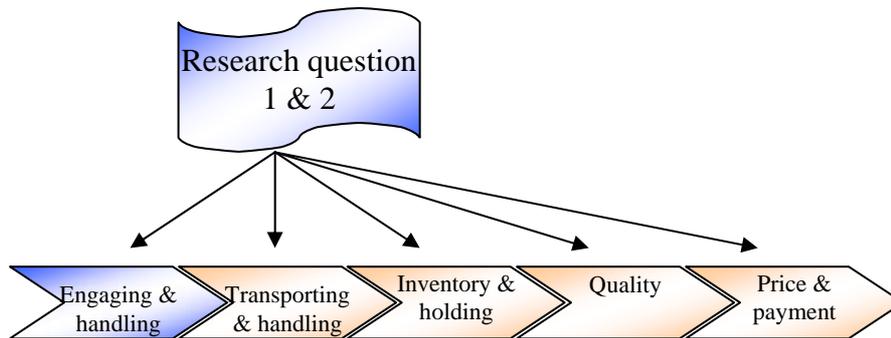


Figure 5.2. Analytical model RQ 1 & 2

Research question 1: *Which costs do the investigated manufacturing companies consider in their estimation of costs when purchasing from China, and how do these estimations match up with the actual costing?*

Research question 2: *What is the explanation of potential differences between the estimation of costs and the actual costing?*

5.1.1 Engaging and handling the supplier



Research question 1

According to the theory costs for engaging and handling the supplier includes costs for: Information collection, supplier selection, negotiation, administration, and supplier management¹⁴². SEIAB, RH-Chairs, and Invacare did not consider these costs in their estimation of costs before they started to purchase from China. Andritz is the only company that considered the costs for engaging and handling the supplier in their estimation of costs. Even though only one of these four companies had considered any of these costs in their estimation of costs, they still afterward think that the cost for engaging and handling the supplier is higher than they could have imagined.

Research question 2

One explanation could be the companies' lack of experience before they began to purchase from China and that the decision to go global was premature. The potential to buy goods in China for less than 50% of the purchase price in Europe may have been an argument that was persuasive enough without doing an extensive costing first.

As mentioned in the theory it is important to have a good knowledge about the costing development procedure to be able to capture the right costs.¹⁴³ Therefore, another explanation why these costs became higher than expected or not considered at all, could be that they are very difficult to estimate since many of these costs have to be translated from non financial terms into numbers. To overcome this problem the companies can adopt Activity Based

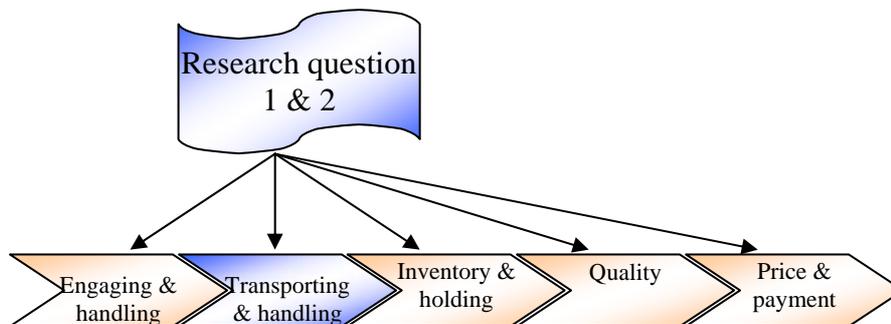
¹⁴² Song, N., et al., (2007) pp. 862

¹⁴³ Norelind, C., Eliasson, B., (2005), p.34

Costing that is covered in the theory¹⁴⁴, to identify the activities and the cost drivers for the activity to be able to estimate and measure the probable costs.

Further the difficulties in finding a supplier in China that is able to meet the companies' requests can probably lead to that the procedure becomes more time consuming than expected. Supplier training and some investments can also lead to additional costs. *"It is not easy to find the small pieces of gold among so many suppliers"*¹⁴⁵. Surprisingly, none of the companies have mentioned supply chain management or collaboration as a tool for cost improvement.

5.1.2 Transportation and handling



Research question 1

According to the theory costs for transportation and handling are connected to: freights, handling and packing, customs, and insurance¹⁴⁶. All the investigated companies have taken these costs into consideration in their estimation of costs. These costs have all been carefully calculated and were not made on guesses or speculations, since they are easy to calculate. Despite these thorough calculations some of the companies experienced marginally higher costs than they expected. SEIAB and Invacare have both experienced partly higher freight costs and RH-Chairs have increased handling costs.

Research question 2

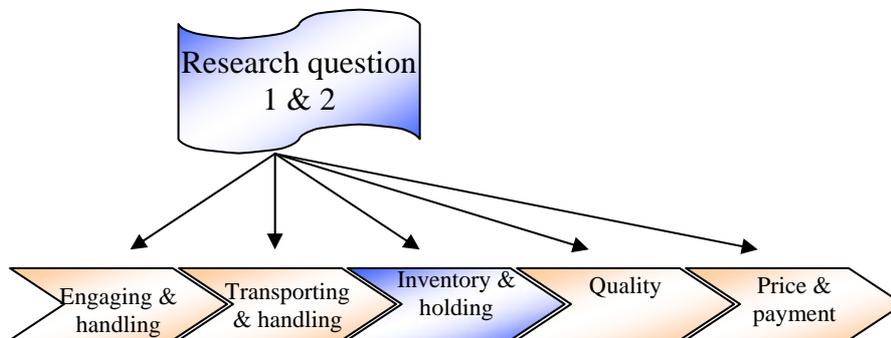
¹⁴⁴ Degraeve Z., et al., (2005) p.17

¹⁴⁵ Interview with Tobias Wärm, RH-Chairs. 2008-04-25

¹⁴⁶ Zeng, A., Rossetti, C., (2003) p.793

The reason why SEIAB and Invacare experienced higher freight costs can be explained with higher number of air freights that had to be used instead of boat freight that was the basis for the estimation of costs. This is an example of expediting that has to be considered as mentioned in the theory chapter¹⁴⁷. Unexpected variations of demand and to eliminate the risk of running out of safety stock can explain the intensified use of airfreight. RH-Chair's increased handling cost is a result of the unpredicted amount of work it takes to unwrap the received goods.

5.1.3 Inventory and holding



Research question 1

The costs that are connected to inventory and holding are: holding and maintenance, tied up capital, and shortage¹⁴⁸. Before the companies started their purchase from China none of the investigated companies considered any of these costs in their estimation of costs. Since a couple of years back RH-Chairs has developed a better costing, and do now include costs for tied capital in inventory and holding. Since the estimation of costs didn't include the inventory and holding costs the actual result is difficult to demonstrate. Even though SEIAB, Andritz and Invacare didn't consider or follow up the costs for inventory and holding, they believe that this is an additional cost. RH-Chairs costs for inventory and holding are also additional costs since these costs were not considered in the estimation of costs before they started to purchase from China, but they are now considered in the costing.

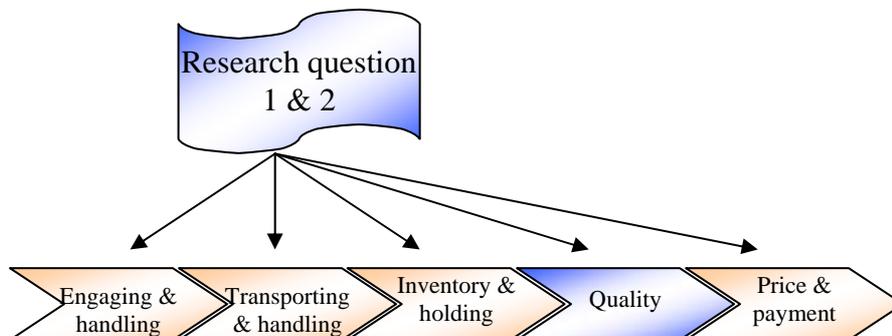
¹⁴⁷ Song, N., et al., (2007) pp. 862

¹⁴⁸ Ibid

Research question 2

The differences can be explained by the fact that the companies didn't consider the costs for inventory and holdings in their estimation of costs, which might be caused by lack of knowledge or ignorance as mentioned in the theory chapter about costing development¹⁴⁹ and TCO¹⁵⁰. This could be found in for example Invacare who admit that they are not good at calculating these costs. Nor did any of the companies see the tied up capital during transportation as a cost that had to be taken into account, probably because they didn't believe that this cost was their burden. In some way the costs for tied up capital during the transportation has to be brought up to make an accurate costing¹⁵¹. One explanation to why the companies didn't consider this cost as their burden could be that they have longer terms of payment in transports from China compared to domestic transports which makes it easy for the companies to claim that they don't have a cost since they have not paid anything yet. Anyhow, even if they have longer times in their terms of payment this one is consumed by the transportation time. If the companies didn't have had longer transportation time they would have been able to sell the goods earlier and get profit from them.

5.1.4 Quality



Research question 1

Quality costs are costs connected with: rejection and return, rework, scrap, repackaging and customer complaint handling¹⁵², as well as inspection and control¹⁵³. The majority of the investigated companies did not think that they would get any costs for quality issues. Invacare

¹⁴⁹ Norelind, C., Eliasson, B., (2005), p.34

¹⁵⁰ Song, N., et al, (2007), pp.862

¹⁵¹ Jonsson, P., Mattsson, S-A., (2005), pp.130

¹⁵² Song, N., et al., (2007) pp. 862

¹⁵³ Van Weele, A., (2005), pp.193

was aware of that some quality issues might appear when purchasing from China, but since these problems are solved by their international office in China these costs are shared by the whole Invacare group. Andritz was the only company that had calculated to some extent with quality costs. All investigated companies except Invacare have experienced some quality issues in some extent, followed by extra quality costs.

Research question 2

The reasons why these differences have appeared are specific for each company. SEIAB experienced quality costs due to extra inspections that had to be made when the goods were received. Andritz got higher quality costs because of the extra time and personnel they have to keep in China for quality management. RH-Chairs quality costs occurred because of poor quality inspection in China which has led to inadequate deliveries. On top of that the cost for the quality inspector in China is not considered in the costing. The quality costs that are experienced by Andritz and RH-Chairs are prevention and assessment costs while SEIAB have experienced only assessment costs mentioned in the theory chapter¹⁵⁴.

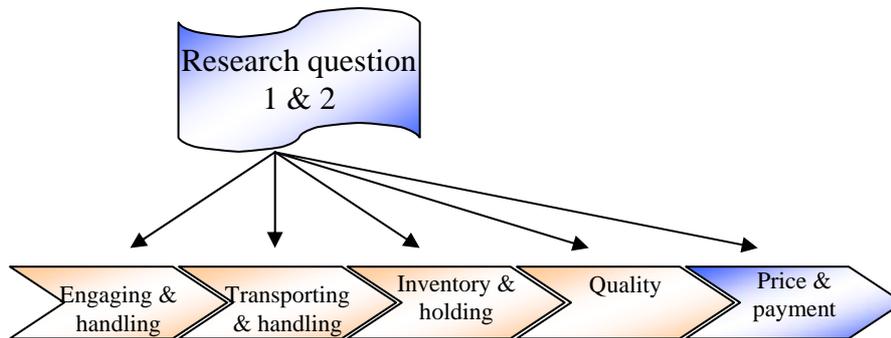
One reason to why companies don't consider quality costs in their estimation of costs could be that they believe that quality costs are only costs for inadequate deliveries and poor quality which are not expected when choosing a supplier. Companies might not consider the costs for prevention, inspection and control as part of the quality costs. These costs can also be very difficult to estimate. "*Lack of quality considerations in the beginning of the contract only leads to double amount of work in the end*"¹⁵⁵. Invacare has an extensive quality evaluation before they are entering any contract no matter of country. The office in Hong Kong deals with all quality inspections and quality issues in China. The costs for this office are as mentioned a joint cost for the entire Invacare group. Perhaps these costs should be more specified and carried by each specific component to get a better picture about the true cost for every component, according to some of the costing models, like for example the absorption method, mentioned in the theory chapter¹⁵⁶. The only quality issue Invacare has experienced are problems caused by themselves because of failure in technical specifications.

¹⁵⁴ Van Weele, A., (2005), pp.193

¹⁵⁵ Interview with Bengt Örning, Invacare 2008-04-29.

¹⁵⁶ Norelind, C., Eliasson, B., (2005), pp.164

5.1.5 Price and payment



Research question 1

The aspects, mentioned in the theory chapter, that have to be included in price and payment are prices with consideration to discounts, taxes and duties as well as currency fluctuations¹⁵⁷. All the investigated companies consider the purchase price in their estimation of costs. Probably because this cost is visible and easy to capture as illustrated in the Ice berg model¹⁵⁸ and doesn't require any of the cost accounting models mentioned in the theory chapter¹⁵⁹. None of the investigated companies did consider the currency fluctuations when doing business with China. The only currency fluctuation cost that was considered was the extra fee that RH-Chairs paid the shipping company. This probably since the cost was already specified by the shipping company.

Since the purchase price is easy to calculate and follow up, the actual costing is similar to estimation of costs. The difference is that the currency fluctuations have made it more favourable than expected since the value of the US dollar is decreasing.

Research question 2

The main reason to why differences exist is the decreasing value of the US dollar. The currency fluctuation is probably not considered in the estimation of costs since it so far have been favourable to Swedish purchaser because of the dollar's decreasing value. In particular for those companies who hasn't been doing business with China for more than a few years. When the currency situation turns or when a shift to Euro is made this aspect might be a part of the estimation of costs.

¹⁵⁷ Song, N., et al., (2007) pp. 862

¹⁵⁸ Jonsson, P., Mattson, S-A., (2005), p.438

¹⁵⁹ Norelind, C., Eliasson, B., (2005), pp.164

Table 5.3 shows a summary of research question 1 and 2's analysis

Estimation of costs & Actual Costing					
	Engaging & handling supplier	Transportation & handling	Inventory & holding	Quality	Price & payment
SEIAB	Not considered Higher	Considered Partly higher	Not considered Probably higher	Not considered Partly higher	Considered Favorable
Andritz	Considered Higher	Considered The same	Not Considered Probably higher	Considered Higher	Considered Favorable
RH-Chairs	Not considered Higher	Considered Partly higher	Not considered Partly higher	Not considered Partly higher	Considered Favorable
Invacare	Not considered Higher	Considered Partly higher	Not considered Probably higher	Not considered The same	Considered Favorable

Table 5.3: Summarizing table

5.2 Analysis of research question 3

Figure 5.4 shows the part of the analytical model that research question 3 will focus on.

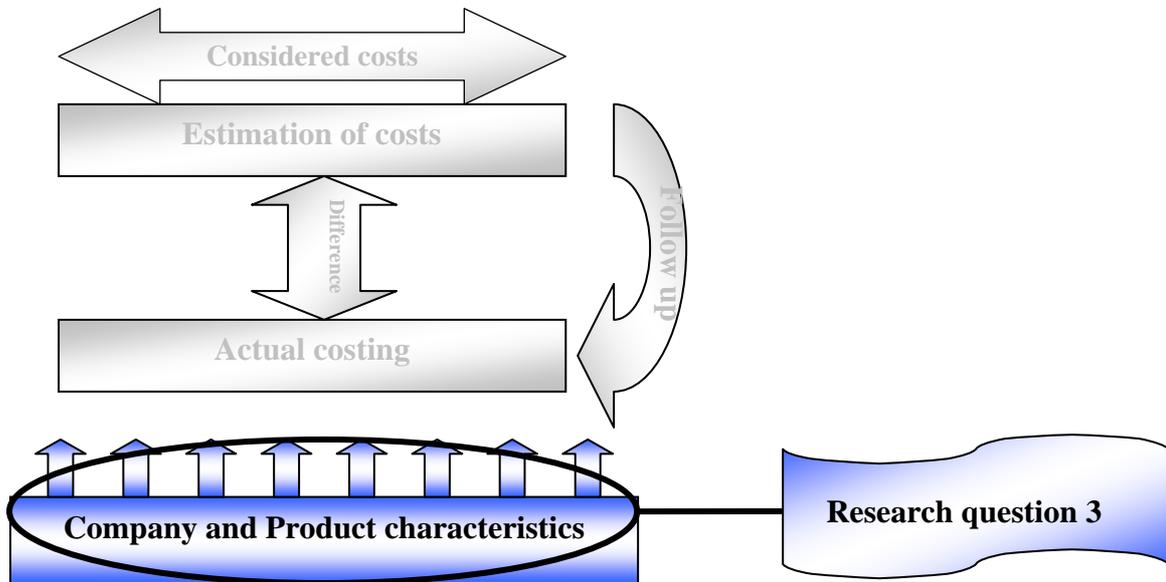


Figure 5.4. Analytical model RQ 3

Research question 3: *How do the companies' characteristics in terms of experience, size and product characteristic affect the formulation of the costing?*

5.2.1 Product Categorization

According to the Kraljic matrix presented in the theory the investigated companies' products can be categorized into different boxes¹⁶⁰. SEIAB, RH-Chairs and Invacare do all purchase products or components with low value. The product that SEIAB purchase can most likely be purchased from many different suppliers and will therefore be placed in the lower left corner. Since the components that RH-Chairs and Invacare purchases from China are a little bit more customer specific but still easy to manufacture they are placed in upper right corner of the non-critical box. Andritz is the one that is different from the others. Since the products are both expensive and customer specific they will be placed in the box for strategic products.

¹⁶⁰ Van Weele, A., (2005) pp.149

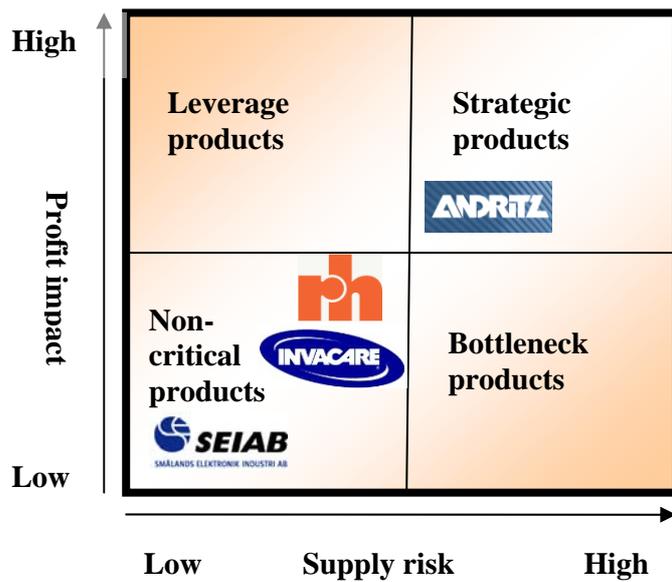


Figure 5.5 Product categorization

5.2.2 Company and product characteristics.

According to the theory, costing is simplified models of the reality which have to contain balance between the reality and simplicity to use¹⁶¹. Due to the low value of some of the products that are purchased from China, companies may not find it necessary to develop any advanced costing models. The development of these models may take more effort than it will gain. In common for all the products that are purchased from China among the investigated companies, are that they are all labor intensive. This may not affect the costing procedure but may be the main reason why the companies considered China as an alternative in the first place. In Andritz's case the products produced in China is not very expensive themselves but after all labor and time spent on them, they becomes very valuable. This may also be a reason why Andritz was considering more costs in their estimation of costs than the others. As a conclusion it seems that the work with costing corresponds quite well to the companies' positions in the Kraljic matrix in figure 5.5.

According to the theory about purchasing and company characteristics larger companies are often more innovative and encourages new approaches in purchasing¹⁶². Due to this, large companies like Invacare and Andritz should probably have more developed and sophisticated

¹⁶¹ Andersson, G., (2001) pp.41

¹⁶² Ellegaard, C., (2006) pp.273

ways of cost accounting. In some aspect this is true among the investigated companies. Andritz, which is the largest company in this investigation, are also considering the most cost aspects in their estimation of costs but in follow up and evaluating RH-Chairs are at least as good as Andritz, even though they have half the number of employees. Andritz is doing follow ups but probably mainly on the purchase price and transportation costs. This assumption is based on that they consider their actual costing to match up quite well with estimation of costs even though their costs for quality and engaging and handling the supplier became much higher than they first expected. RH-Chairs present costing are considering more costs than in the beginning, due to good and revised follow ups. This can be interpreted as if they have been moving along the learning curve¹⁶³, which is presented in the theory.

The learning curve implies that the costs will decrease the longer time and experience moves on¹⁶⁴. This may be exactly the case with Invacare. Invacare's long experience of purchasing from China makes them aware of many different cost aspects but they are still not considering them all in their estimation of costs. Maybe this long experience has given them the knowledge to exclude some of the cost aspects because they have learned that those aspects are not profitable to consider. Compared to RH-Chairs, Invacare have quite similar characteristics. The big difference lies in that Invacare has been purchasing from China much longer and has probably consequently moved further along the learning curve while RH-Chairs are in the beginning of their curve. As mentioned in the theory chapter it is important that the person that is responsible for the costing have good knowledge about the procedure¹⁶⁵, and that careful investigations are made about possible logistic costs to get the costing accurate¹⁶⁶. The lack of knowledge can be the case in some of the companies which are not spending much effort on their costing development, neither in their estimation of costs nor in their actual costing and follow ups. On the other hand, maybe the investigated companies consider the great savings on the purchase price as a buffer that will cover all the costs that are connected with purchasing from China, and have in this way developed costing models that fit their purpose and are easy to use. This is in accordance with the model

¹⁶³ Chase, R., et al., (2006) p.137

¹⁶⁴ Ibid

¹⁶⁵ Norelind, C., Eliasson, B., (2005), p.34

¹⁶⁶ Zeng, A., Rossetti, C., (2003) pp.792

development procedure that is presented in figure 3.2 in the theory chapter¹⁶⁷. “*Unpredicted costs will always appear when a company changes their sourcing strategy*”¹⁶⁸.

Figure 5.6 summarizes the company characteristics and the analysis’ results regarding costing.



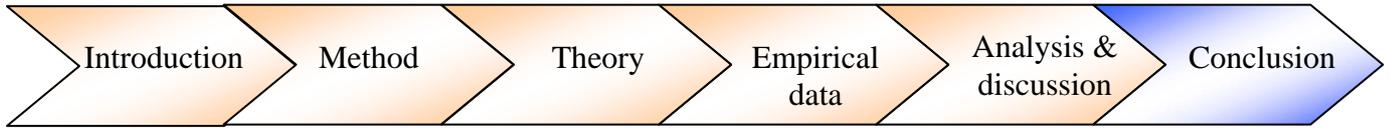
	Product characteristics	Size	Experience	Follow up	Estimation of costs	Actual costing
SEIAB	Non critical	50 employees	< 5 years	Not directly	Transportation, Price & payment	Non
Andritz	Strategic	120 employees	5 years	Focus on price & transport.	Engaging & handling supplier, transportation, quality, price & payment	Engaging & handling supplier, transportation, quality, price & payment
RH-Chairs	Non critical	65 employees	< 5 years	Annually revised	Transportation, price & payment	Transportation, inventory & holding, quality, price & payment
Invacare	Non critical	60 employees	> 20 years	Partly, focus on price & transport.	Transportation, Price & payment,	Transportation, Price & payment,

Table 5.6. Company and product characteristics

¹⁶⁷ Andersson, G., (2001) pp.41

¹⁶⁸ Interview with Olaf Büttner, Andritz. 2008-04-24.

6. Conclusions



In this chapter the three research questions of this thesis are concluded. Then some suggestions to future investigations for other theses are presented. Finally some criticism to this thesis is carried out.

6.1 Conclusions of research questions

Research question 1: *Which costs do the investigated manufacturing companies consider in their estimation of costs when purchasing from China, and how do these estimations match up with the actual costing?*

The costs that the investigated companies are taking into consideration in their estimation of costs are mainly purchase price and costs for transportation. Probably because these costs are easy to calculate and doesn't requires any advanced cost accounting knowledge. Before the investigated companies started to purchase from China only one of them had done extensive estimation of costs. Andritz was considering costs for finding, evaluating, and negotiating with the supplier and quality issues as well. Despite this there are several more aspects that should be considered. In some cases costs are overlooked because of lack of knowledge or the belief that the development of costing will take more effort than it gain. As for example in SEIAB's case, that buys small annual volumes with low value, which probably won't make it gainful to make an extensive costing.

The companies that were only considering purchase price and transportation in their estimation of costs were those that had the best correspondence with the actual costing. However, since they didn't take all costs into consideration, their good match up between estimation of costs and actual costing doesn't mean that their costing was the most correct

one. All companies have in some extent experienced additional or higher costs compared to what they had expected when they first started to purchase from China.

Research question 2: *What is the explanation of potential differences between the estimation of costs and the actual costing?*

The small differences that occurred in the transportation can be explained with increased number of air freights. Those were not considered in the estimation of costs. Other costs than purchase price and transportation are probably more difficult to estimate and that's why companies that have considered these costs have larger differences between the estimation of costs and the actual costing. In other cases companies have not considered these costs in their estimation of costs because they didn't think that it would become a cost at all, either that or they didn't have the knowledge of how to make a proper costing. For example, when it comes to tied up capital some of the investigated companies didn't consider tied up capital at all. *"Calculating the cost for tied up capital is something that we are simply not good at"*¹⁶⁹.

Research question 3: *How do the companies' characteristics in terms of experience, size and product characteristic affect the formulation of the costing?*

According to the analysis, company size and experience can certainly affect the complexity of the costing development, but how and to what extent is not perfectly clear from this thesis. However, the product characteristic is probably the main factor that has an impact on how much time and effort companies spend on their costing. The value and complexity of the product do also seem to be in accordance with costing complexity.

Finally, since cost reductions seem to be a main issue among companies, we are surprised that so many companies are mainly focusing on purchase price and that none of the investigated companies have neither mentioned nor suggested supply chain management or collaboration as a mean for cost reduction.

¹⁶⁹ Interview with Bengt Örning, Invacare 2008-04-29

6.2 Suggestions for future research

To further confirm or revise the findings of this thesis, more extensive empirical research could be done on the same topic. Since three of our companies purchased products with similar characteristics we suggest that future research is directed towards examining the cost calculation practices at companies with products that can be categorized into other parts of the Kraljic Matrix. Beyond diversification within the matrix we also suggest that research should be done on the purchasing practises of more complex products. Since the products purchased by the companies in this thesis can be said to be relatively uncomplicated it would be of value if research was directed towards for example sourcing of high-tech products. It would also be interesting to focus more on the companies experience and compare companies that have the same background and characteristics, but with different long experiences of purchasing from China.

6.3 Criticism to this thesis

As a criticism to this thesis we believe that we could have made this study among a broader range of companies to get better ground to base our conclusions on. We could also have interviewed more people on each company to make sure that our empirical data is correct. Even though the result from this study can be seen as an indication of how companies operate, no definitive conclusions can be drawn on how companies operate in general.

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Appendix A

Interview Guide

- Tell about the product that you are purchasing from China?
- For how long have you been purchasing this product from China?
- Do you purchase any other products from China?

We would like you to use concrete figures when answering the following questions, if that is not possible please try to define in other terms, for example in working hours.

For each of the following categories we would like to know:

- **What did you estimate the cost would be for ... before the purchasing in China was realized?**
- **What was the actual costing?**

If you are not able to give exact figures:

- **What is your general experience of what the actual cost turned out to be in relations to what you expected? Increase/decrease, unchanged.**

Engaging and handling the supplier

Costs related to:

- Finding the supplier
- Assessing the supplier
- Negotiate with the supplier
- Create tools for the relationship, for example business systems, tooling, investments and raining of the supplier
- Other administrative costs, for example travelling.

Transportation and handling costs

Mean of transport?

Who owns the product during transportation?

Costs related to:

- Freight
- Insurance
- Tolls
- Special packing
- Returns

Inventory and holding cost

Define:

- Replenishment frequency
- Annual consumption usage
- Cost of capital
- Price
- Turnover rate
- Transportation time
- Lead-time

Costs related to:

- Tied up capital
- Shortages
- Stock maintenance

Quality

Costs related to:

- Preventing quality problems
- Inspect quality standards
- Correcting quality defects

Price and payment

Terms of payment?

Currency?

Purchase price? (per unit)

Costs related to:

- Currency fluctuations