



**Department of Economic Studies**

**China Strategy for ESP Wire**  
A study of the Chinese market from Sandvik's perspective

*Joel Eriksson Enquist*  
06-2008

Thesis for Bachelor Degree - 15hp  
Business economics

**Energy engineer programme**  
**Examiner and supervisor: Akmal Hyder**  
**Supervisor: Henrik Calander**

# Foreword

During a previous project that I made at Sandvik Materials Technology Wire I was asked to do my bachelor thesis for them. One of the suggested subjects was a study of the Chinese spiral discharge electrode material market. I found the subject very interesting and formed the project together with the University of Gävle and the supervisor at Sandvik in order to fulfill all the requirements from both parties. I studied to be an energy engineer and therefore did not have so much knowledge about corporate economy, marketing etc. However, the energy engineering programme responsible gave a special task to give the project a deeper technical view and I decided to catch up the missed knowledge under the project.

Sandvik supported me in every way possible and helped me to develop a great deal of knowledge during the project. Sandvik allowed me to travel national both within Sweden, and internationally, to China. I want to thank Henrik Calander and Kim Hansen for creating this project. Henrik was my supervisor and gave me unlimited support when it was needed, I want to give you a special thank you.

I want to thank Ulf Larsson for allowing me to carry out this project as my bachelor thesis and Akmal Hyder for accepting to be my supervisor at the University of Gävle (even though I came from another institute) and for giving much needed knowledge.

I also want to thank Jason Zhu, Charles Lien, Daniel Zhao and Jonson Zhang for making my stay in China fantastic.

My reference group at Sandvik Materials Technology Wire also deserves big thanks, especially Phil Etheridge who taught me very important facts about the Chinese culture and gave me much interesting feedback during the project.

Last but not least, I want to thank all persons who have participated in this project and contributed with important information to the thesis.

Joel Eriksson Enquist (Further in this report known as "the author")

A handwritten signature in black ink, appearing to read 'Joel Eriksson Enquist', written in a cursive style.

Sandviken the 10/6-2008

# Abstract

**Title:** China Strategy for ESP Wire

**Level:** Thesis for Bachelor Degree in Energy Engineering

**Supervisors:** Akmal Hyder and Henrik Calander

**Date:** 06-2008

**Aim:** SMT Wire has noticed that their sales of ESP wire are very low in China compared to India. SMT Wire now wonders how they can increase their market share in China.

**Method:** Personal interviews, telephone interviews and interactive conversations.

**Result & Conclusions:** SMT Wire should work each tier in the supply chain to gain more orders and increase their market share. It is important to have local representation and work close to the customers so that the customers can feel trust for Sandvik and Sandvik's employees. The market for spiral discharge electrode material is good in China (the annual consumption is about cccc tonnes) and the market will probably be more and more mature for Sandvik's high quality materials in a couple of years.

**Suggestions for future research:**

Is it possible to have a more long-term price on the products on the Asia market?

How can Sandvik keep its Chinese personnel?

How can the Chinese personnel be trained to make contacting new companies easier for them?

How can a foreign company create a guanxi-based selling with a high personnel turnover?

**Contribution of the thesis:** A strategy that can be adapted for stainless steel wire companies that want to increase their market share in China.

**Key words:** Chinese market, Business-to-business in China, Sandvik, Spiral discharge electrode, China strategy.

<b>1</b>	<b>INTRODUCTION.....</b>	<b>6</b>
1.1	PROBLEM DISCUSSION .....	6
1.2	PURPOSE OF THE THESIS .....	7
1.3	QUESTIONS AT ISSUE .....	7
1.4	DELIMITATION.....	7
1.5	EXPLANATION OF ABBREVIATIONS AND TERMS .....	7
1.6	DISPOSITION .....	8
<b>2</b>	<b>METHODOLOGY .....</b>	<b>9</b>
2.1	CHOICE OF THEORY .....	9
2.2	THE REFERENCE GROUP .....	9
2.3	MARKET INVESTIGATION METHOD .....	10
2.4	QUALITATIVE AND QUANTITATIVE STUDY .....	10
2.4.1	<i>Interviews .....</i>	<i>11</i>
2.5	FIXING THE INTERVIEWS .....	12
2.6	CULTURAL GAP .....	13
2.7	METHOD CRITICISM .....	14
<b>3</b>	<b>THEORY .....</b>	<b>15</b>
3.1.1	<i>Supply chain management .....</i>	<i>15</i>
3.1.2	<i>Business-to-business in China .....</i>	<i>18</i>
3.1.3	<i>SOFT-analysis.....</i>	<i>21</i>
3.1.4	<i>Understanding customer value in the supply chain.....</i>	<i>21</i>
<b>4</b>	<b>ELECTROSTATIC PRECIPITATORS .....</b>	<b>23</b>
4.1	OPERATION.....	23
4.2	DISCHARGE ELECTRODE TECHNOLOGY.....	24
4.3	THE USAGE AREA .....	25
<b>5</b>	<b>EMPIRICAL RESULTS.....</b>	<b>26</b>
5.1	MARKET FOR END CUSTOMERS (COAL FIRED POWER PLANTS).....	26
5.1.1	<i>Procurement process of ESP in coal fired power plants .....</i>	<i>26</i>
5.2	LICENSORS .....	27
5.3	ESP MARKET .....	27
5.3.1	<i>Spare Part Market.....</i>	<i>28</i>
5.4	SPIRAL DISCHARGE ELECTRODE MARKET.....	28
5.4.1	<i>Purchasing process of new material in privately owned SMEs.....</i>	<i>31</i>
5.4.2	<i>Building up business with Guanxi.....</i>	<i>31</i>
5.4.3	<i>Long-term business relationships .....</i>	<i>33</i>
5.5	SPIRAL DISCHARGE ELECTRODE WIRE MATERIAL MARKET .....	33
5.5.1	<i>Bribery .....</i>	<i>34</i>
5.6	OTHER INFLUENCE ON THE MARKET .....	35
5.6.1	<i>The Electric Power Design Institutes.....</i>	<i>35</i>
5.6.2	<i>International ESP Conference .....</i>	<i>35</i>
5.6.3	<i>ESP Business Association.....</i>	<i>36</i>
5.6.4	<i>Import taxes.....</i>	<i>36</i>
5.6.5	<i>The Personnel situation .....</i>	<i>36</i>
5.7	THE SUPPLY CHAIN .....	38

5.8	CHINESE BUSINESS VALUES .....	39
5.9	CHINESE MARKETING CHANNELS.....	40
<b>6</b>	<b>ANALYSIS .....</b>	<b>41</b>
6.1	SOFT-ANALYSIS .....	41
6.2	SUPPLY CHAIN MANAGEMENT .....	42
6.3	CONCLUSIONS .....	46
6.4	SUGGESTIONS FOR FURTHER RESEARCH.....	48
	<b>LIST OF REFERENCES .....</b>	<b>49</b>

# 1 Introduction

This chapter contains a short description of the problem followed by the purpose of the thesis, the questions that the thesis will provide answers to, delimitations for the thesis, explanations for abbreviations and terms and the disposal for the thesis.

## 1.1 Problem discussion

Due to the increased globalization of the worldwide market it is perhaps more important than ever for companies to find long-lasting competitive advantages these days. One of the factors that has contributed to this globalizing of the worldwide market is the arbitrage between different markets. The same products can be produced at a lower cost, but still be sold for the same price when production is moved to another country. China is one such country with this type of advantage and therefore many companies decide to move their production there. One economic forecast from Öhrlings PricewaterhouseCoopers tells us that China will grow past the USA and be the world's largest economy by the year 2025.<sup>1</sup>

China's expansion needs increasing amounts of energy. By 2009 the world's largest water power plant will be completed and by 2020 today's seven nuclear reactors will increase to a further 30 reactors. The Swedish electricity market newspaper ERA (2007-06-21) writes that two coal fired power plants are built every week in China<sup>2</sup> and an environmental forecast from the Nederland's environmental evaluate office, MNP, tells us that it is possible that China will outgrow the USA as the biggest polluter of greenhouse gases by the year 2009.<sup>3</sup> The greenhouse effect is also affected by particles in the atmosphere and the most common ones are sulphate and coal particles.<sup>4</sup> There are several ways of preventing this type of environmental impact. One way is the use of ESPs (electrostatic precipitators) which prevent particle discharge to the air from industrial processes such as coal-fired power plants. Some of these filters use spiral discharge electrodes. The spiral discharge electrodes are made of various types of stainless steel wire.

SMT Wire (Sandvik Material Technology Wire) is a stainless steel wire producer within Sandvik Materials Technology. The PA (Product Area) Wire has four PU's (product units) worldwide: Sweden, Spain, Brazil and USA. The PU in Sweden has noticed that the sales of ESP Wire (wire material that is used for spiral discharge electrodes for electrostatic precipitators) are very low to China compared to other developing countries like India. The GPM (global product manager) for the energy segment wishes to know the reason for low sales to China, which strategy and which value arguments they shall use to penetrate the Chinese market to increase their market share.

---

<sup>1</sup> E24. Näringsliv. [http://www.e24.se/samhallsekonomi/varlden/artikel\\_299631.e24](http://www.e24.se/samhallsekonomi/varlden/artikel_299631.e24)

<sup>2</sup> ERA. [http://www.era.se/nyheter/visa\\_nyhet.shtml?id=167751288](http://www.era.se/nyheter/visa_nyhet.shtml?id=167751288)

<sup>3</sup> Sydsvenskan. <http://sydsvenskan.se/varlden/article215329.ece>

<sup>4</sup> GÖTEBORGS UNIVERSITET CHALMERS. <http://www.miljoportalen.se>

## 1.2 Purpose of the thesis

The purpose of the thesis is to investigate how SMT Wire can increase its market share in China.

## 1.3 Questions at issue

1. Which strategy shall SMT Wire have to increase their market share for ESP in China?
2. Which value arguments should stainless steel wire companies focus on to increase their market share for ESP spare parts in China?
3. What does the process of purchasing look like in Chinese companies?
4. Who are the big actors in each tier in the supply chain?

## 1.4 Delimitation

5. The thesis will only investigate how Sandvik Materials Technology Wire can increase the selling of ESP wire to China. There will also be a focus on the ESP market for coal fired power plants.

## 1.5 Explanation of abbreviations and terms

ESP = Electrostatic Precipitator (emission filter)

GDP = Gross Domestic Production

GPM = Global Product Manager

CEO = Chief executive officer

ESP Wire = Spiral discharge electrode wire material

SMEs = Small and medium sized enterprises in China

VBS = Value Based Selling

CRM = Custom Relationship Management

SMT = Sandvik Materials Technology

SMT Wire = Sandvik Materials Technology Product Unit Wire in Sandviken

SMT Tube = Sandvik Materials Technology Sales Unit Tube in Shanghai

Guanxi = Guanxi is a term that describes informal influence, personal connections, relationship and favouritism.

Renqing = Exchange of favours

Mianzi = Preserving individual dignity or enhancing someone's social status

PU = Product unit

PA = Product area

## 1.6 Disposition

### **Introduction**

This chapter contains an introduction followed by the purpose of the thesis and the questions that the thesis will provide answers to.

### **Methodology**

This chapter contains the choice of methodology for the thesis. It also shows how data have been collected, how meetings have been booked, who participated in the meeting and information about cultural gaps that forced some changes to the original plan.

### **Theory**

This chapter contains the information that has been used as a basis for the thesis.

### **Electrostatic Precipitators**

This chapter contains information about the electrostatic precipitator, ESP, and gives the reader an explanation about how ESP's work, the elements in the filter and where it fulfils a purpose.

### **Empirical results**

This chapter shows the result from interviews, the journey to China and several interactive conversations.

### **Analysis**

This chapter uses the theory chapter as a basis for analysing the empirical results.

### **Conclusions**

This chapter shows the conclusions of the analysis chapter

### **List of references**

This chapter contains the references that have been used in this bachelor thesis.

## 2 Methodology

This chapter contains the methodology for the thesis. It shows how data have been collected, how meetings have been booked, who participated in the meetings and information about cultural gaps that forced some changes to the original plan.

### 2.1 Choice of theory

The thesis included questions at issue about mapping the supply chain and business to business in China. The main part of the information for this subject was collected, by recommendations from the examiner and supervisor professor Akmal Hyder at the University of Gävle, from scientific journals. The two sources for these journals were Emerald Insight and Science Direct (Journal of Business & Industrial Marketing, Industrial Marketing Management and Journal of Enterprise Information Management). A compilation of the journals used can be seen at the end of this thesis. Because of the author's former scant knowledge about business economics and marketing the author also read literature recommended by the supervisor at Sandvik (the GPM for energy products at PU Wire) Henrik Calander, on these subjects.

Google was also searched with words like (separate and/or together): ESP, Electrostatic precipitator, spiral discharge electrodes, emission filter, Chinese market, Coal fired power plants, China, Energy market etc. The Chinese search engine Baidu was also searched with similar words as for Google. These words were translated by two Chinese thesis workers at PU Wire and by AltaVista's translator Babel fish.

The empirical data of the thesis is both secondary and primary data. Internal documents like a market survey on the markets of Italy, German and France and educational ESP material for the Sandvik personnel were used in the beginning of the project. A market study, carried out by Sandvik's Chinese personnel, was released a couple of weeks after this project had started. However, the main part of the data was collected by personal interviews.

### 2.2 The reference group

The group consisted of the GPM for energy products, the marketing manager for energy and fine mechanical products, the marketing manager for flat wire and medical products and the product specialist for the ESP wire.

There was one reference group meeting held and several e-mail conversations. Important subjects that were discussed: the interview questions, the visit plan and the important cultural differences that could be experienced in China.

## 2.3 Market investigation method

The project was carried out according to the method shown below:

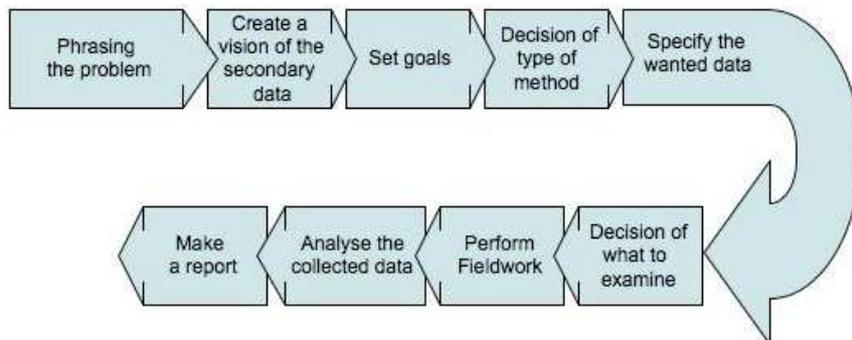


Figure 1. The chain of a marketing project according to Arman Seiler 2001

The marketing project methodology was adjusted for this project and the step “Create a vision of the secondary data” was deleted.

## 2.4 Qualitative and quantitative study

The main part of the empirical content of this thesis comes from several qualitative interviews. This method was more suitable for this project as no similar studies had been made on the Chinese market and it was therefore hard to find material to base quantitative questions on.

It was also advantageous to use the qualitative investigation method as it made different personal perspectives on the Chinese market visible. It was decided that the information would be gathered from actors in each tier in the supply chain and the qualitative interview method allowed further discussion beyond the interview questions.

A quantitative question form was also created after interviews with two Swedish companies that shared their experience of the Chinese market. The question form was filled in by six persons from two different companies in China.

### 2.4.1 Interviews

There was no existing data for the Chinese ESP market to base the thesis on when the project started so the GPM suggested visits to two of SMT Wires customers in Sweden. These companies had great knowledge on the Chinese discharge electrode market and the overall ESP market. The companies, people interviewed and the type of meeting can be seen in the table below:

Company	Type of Company	Person	Type of meeting
EWES Stålfjäder	Discharge electrode maker	Kjell Svensson (C.E.O)	Interview according to Appendix E, visit to the manufacturing area, interactive conversation
ALSTOM Power Växjö	ESP Equipment provider	Siegfried (Sales Manager)	Interview according to Appendix E, visit to the manufacturing area of ESP electrical equipment, interactive conversations
		Martin	
		Maria	
		Tobias	
		Material Technician	

Table 1– Interviews with companies in Sweden

The remaining interviews were all made in China. A salesman from Sandvik Beijing was present at all interviews (besides the interviews with Sandvik’s personnel) where the participants were Chinese. The first interview was made with ALSTOM Beijing. Several interviews were made with people from Sandvik Shanghai, one interview with the Swedish Trade Council and BB EETC (a customer to Sandvik). There were also two telephone interviews made with salesmen at two Chinese companies. The companies, people interviewed and the type of meeting can be seen in the table below:

Company	Type of Company	Person	Type of meeting
ALSTOM Power Beijing	International ESP Equipment provider	Doyle Huang. (Senior Sales Manager)	Interview according to Appendix A, interactive conversation
		Zhong Mu (Director of Products Department)	
		Liu Zhenghu, (ESP Products Engineer)	

Sandvik Shanghai	Sales Unit for Spiral discharge material	Daniel Zhao. (North East Asia Strip & Wire Sales Manager)	Interview according to Appendix B, interactive conversation
Swedish Trade Council in Shanghai	Trade council	Jonas Cidrin. (Project Leader)	Interactive conversation
BB EETC	Spiral discharge electrode maker (for export)	Dou Tianran. (Material Manager)	Interview according to Appendix A, interactive conversation
		Sun Huizhong. (Procurement Engineer)	
		Chang Xueping. (International Customer Manager)	
Sandvik Shanghai	Sales Unit for Spiral discharge material	James Shipley. (Asia Tube, Primary and Welding Sales Manager)	Interview according to Appendix C, interactive conversation
		Vincent Ren. (Logistics & Warehouse manager)	Interview according to Appendix D
Kunshan electrostatic precipitator equipment plant	ESP Equipment provider	Salesman	Telephone interview according to Appendix A
KS Yucheng	Spiral discharge electrode maker	Salesman	Telephone interview according to Appendix A

Table 2 – Interviews with persons in China

## 2.5 Fixing the interviews

The interviews in Sweden were arranged by the author without any former contact persons. During a web conference in Sweden together with Sandvik Shanghai it was decided that Sandvik Shanghai should book the interview meetings in China. Sandvik Shanghai successfully booked a meeting with one of their customers: BB EETC.

An e-mail conversation with Sandvik China's president also resulted in a meeting with the North East Asia sales manager for strip and wire.

The meeting with ALSTOM Power in Växjö resulted in the meeting with ALSTOM Power in Beijing.

The meeting with the Swedish Trade Council in Shanghai wasn't in the original plans. It was difficult to get the planned Chinese companies to participate so the author wanted to try

another way of gathering information. The meeting was booked and held directly because the contact person at the Swedish Trade Council in Shanghai was about to return to Sweden. The meeting with the Asia sales manager for tube was booked during a lunch at Sandvik Shanghai's restaurant. The meeting with the Asia sales manager for tube resulted in a contact with the Sandvik Shanghai logistics and warehouse manager. The telephone interviews were made with contact persons recommended by the Energy Segment Leader in China.

## 2.6 Cultural Gap

A visit plan was developed that described which company, the companies' type of tier in the supply chain, information wanted from the meeting and in some cases contact information. Six companies were in the meeting plan and two extra companies were added after the plan was sent. Together with Sandvik Shanghai a deadline for booking all the meetings in China was put to 30th April. The date passed and not a single word had been heard from Sandvik Shanghai. The author contacted the person responsible and received the answer that the companies were not willing to participate at any meetings. However, answers from a couple of other companies were expected so the planned trip to Shanghai could continue.

When the author arrived China there were no more meetings booked than the one that the author had booked himself with ALSTOM Beijing . This was first explained by the responsible for booking the meetings that it was very hard to get the Chinese companies to participate in meetings, especially new companies where no former contacts existed.

While travelling with the Chinese salesman, who helped the author with translation, this issue was discussed. The salesman explained that it is considered rude for a Chinese salesman to contact a new company without having any former contact person in that company. This was connected with the cultural phenomenon "Guanxi". Guanxi is a personal network of friends that can be used to handle business or gain information (more information on this under the heading "Theory"). Guanxi is very important both in private life and in business.

Discussions at the meeting with the Swedish Trade Council in Shanghai resulted in another explanation. The interviewed person was experienced as a Swedish project leader in China. He had worked with Chinese personnel and explained that in his experience Chinese people are often more careful in making new contacts compared to Swedish people. Chinese people did not want to call a company where no former contacts existed. His explanation was that a task of this kind was something new for the Chinese personnel and that they were afraid to fail. However, he had also experienced that if he reminded the responsible person a couple of times to call the new company, the call was usually made. He also experienced that as the Chinese people got more used to make calls of this sort to new companies it all went much easier and the Chinese became more comfortable with it.

During the meeting with the Asia sales manager for tube he explained that this issue with very careful personnel was a problem at Sandvik's sales unit (SU) in Shanghai too. It was very hard to get the salesmen to visit potential customers. They had done several group trainings but still the salesmen did not go to new companies. The sales manager also said that in his experience it was usually very easy to get Chinese companies to participate in meetings.

However, it was very hard to get the interviews in this project, either because the Chinese companies didn't want to participate or there was some cultural differences that made it more complicated. It was later decided that telephone interviews should be made instead. The author was assigned a person from Sandvik Shanghai to help him make the calls in Chinese. Together with the person from Sandvik Shanghai it was decided that a plan of which companies that should be called and which questions that should be asked to each company needed to be developed first. The person that was going to make the calls got the plan and looked through it. She told the author that the plan looked good and that she was going to make the calls during the day and show the results the next day. The next day there were no results. She told the author that she wasn't allowed to make the calls for her manager. Her manager (also the person responsible for booking the interview meetings) explained the situation that it could damage a potential business relationship with the companies. However, the manager recommended two other companies to contact that resulted in two telephone interviews.

## 2.7 Method criticism

As mentioned in the text above it was hard to get the planned meetings. If on the reason for this is that it is rude to contact companies without any former contact or if it was something new for the responsible person the issue could possibly be solved with an interpreter. The interpreter may not feel that he or she represents Sandvik and therefore may not be afraid of fail the task in the same way as a Sandvik employee.

The low number of participants in the questionnaires and the fact that these companies do not sell any ESP equipment on the Chinese market make the results of these questionnaires weak. However, the results can still be used as an indicator in some statements and as suggestions for further research. See the heading "cultural gap" above for more information about the low number of participants. To gain more material the questionnaires could be sent out by e-mail to all the companies that no meetings were held with. The interpreter should first translate the questionnaires and a phone call should be made to ensure that the questionnaires come to the right person. If a Chinese employee at a Chinese company gets an e-mail that another person in the company is better able to answer, it is not unusual that the employee that received the e-mail simply ignores it instead of forwarding it.

One more issue during the meetings was that the Sandvik employee that participated in most of the meetings did not want to ask questions that had been answered during previous meetings. He often answered the questions himself during the meetings and the participants from the companies were affected by his answers, often agreeing with his statements without adding anything to them. He also did not want to translate the questions and forms that could have lead to misunderstandings. An interpreter may not feel the same pressure to show that he had the knowledge himself.

Interviews with salespeople at Sandvik in China could have clarified the situation about contacting new companies, what values the salespeople see in Sandvik's ESP wire materials and the values they see in the competitors. If they do not see the benefits with the products they are selling it could be very hard for them to sell the products, partly because of "guanxi" and partly because that they want to have a good personal relationship with the persons they are doing business with.

## 3 Theory

Marketing strategies cover a wide domain such as branding, advertising, pricing, product development, professional selling, integrated marketing communication, distribution/logistics, competitor behaviour, positioning and segmentation. We could also adopt a customer value perspective and start to focus on the customers. We gain information through customer relationships in understanding the complexity of customer value perceptions, process for customer value monitoring and process for leveraging that organizational knowledge. The strategy is then based on the customer value definition, value development and value delivery process<sup>5</sup>. Customer value is generally a trade off between different benefits (such as perceived product benefits, perceived strategic benefits and perceived personal benefits) and sacrifices perceived for the customer.<sup>6</sup> To get a good survey for helping us to gain the right information that we need we can use supply chain management.<sup>7</sup>

### 3.1.1 Supply chain management<sup>8</sup>

Supply chain is a logistic term that describes the chain from raw material to the ultimate consumer. It is very rare that a company is in just one supply chain. The supply chain looks more like an uprooted tree than a chain where the roots are suppliers and the branches are the customers. One of the important questions in supply chain management is how many and which of these roots are important to manage. Not all links throughout the supply chain need to be integrated. The most appropriate relationships to be shown in the supply chain are the ones that best fit in to the circumstances at the time. Douglas M. Lambert & Marta C. Cooper suggest that a supply chain framework structure should contain the three primary aspects: The members of the supply chain, the structural dimensions of the network and the different types of process links across the supply chain. Figure 2 below shows how the three aspects integrate with each other.

---

<sup>5</sup> Strategic marketing in global supply chains: Four challenges. Daniel J. Flint.

<sup>6</sup> Business-to-business marketing as a key factor for increasing service revenue in China. Heiko Gebauer, Chunzhi Wang, Bernd Beckenbauer and Regine Krempf

<sup>7</sup> Strategic marketing in global supply chains: Four challenges. Daniel J. Flint.

<sup>8</sup> Issues in Supply Chain Management. Douglas M. Lambert and Martha C. Cooper

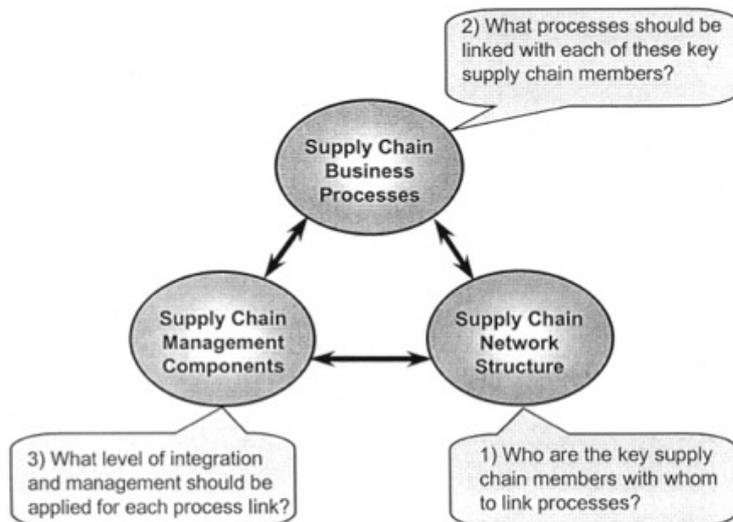


Figure 2 - Supply chain management framework: elements and key decisions (source: Issues in Supply Chain Management)

When creating the network structure it is important to identify all the members of the supply chain, even if it makes the network highly complex. The members of the supply chain are all the companies or organizations that interact with the focal company, directly or indirectly. The next step is to sort the network based on how important the members are for the focal company and its supply chain. Douglas M. Lambert & Marta C. Cooper distinguishes between primary and supporting members. The primary members of the supply chain are defined as follows:

“All those autonomous companies or strategic business units who carry out value-adding activities (operational and/or managerial) in the business processes designed to produce a specific output for a particular customer or market.”

And the supporting members are defined as:

“Companies that simply provide resources, knowledge, utilities or assets for the primary members of the supply chain.”

The origin of the supply chain is where no more previous primary members exist and the consumption of the supply chain is where no more value is added and the product or service is consumed by the end customer.

After the members of the supply chain are decided three structural dimensions are needed to describe, analyze and manage the network. These three dimensions are the vertical structure, the horizontal structure and the horizontal position of the focal company within the origin and the end point of the supply chain. The horizontal structure refers to the number of tiers in the supply chain. The vertical structure refers to the number of suppliers or customers that are represented in each tier and the company’s horizontal position in the supply chain shows if the company is near the initial source, near the end customer or somewhere between these.

As mentioned before integrating all supply chain information can make the supply chain very hard to understand. When choosing which types of business process links are some more critical than others. Douglas M. Lambert & Marta C. Cooper have identified four important business process links as followed:

Managed process links

These links are important for the focal company to manage and are integrated in the company’s supply chain.

### **Monitored process links**

These links are not as critical as the managed process links but it is important that they are integrated between other companies in the supply chain. The focal company just audits or monitors these links.

### **Not-managed process links**

The focal company is not actively involved in these links. They are not critical enough to spend resources on so the focal company trusts the supply chain members to manage these links themselves.

### **Non-member process links**

These links are not in the focal company's supply chain but decisions can be taken in these links that affect the focal company in one way or another.

When the company has surveyed its supply chain it can integrate individual functions into key supply chain processes. This is called supply chain management, SCM. Traditionally the purchasing department periodically places orders to the suppliers, responding to the customer's demands, and their suppliers have no insight into why the order was placed right now or what their products were going to be used for some time away. If a company starts to work with an integrated supply chain with a continuous flow of information it can manage to create the best product flow. The customer shall still be in focus. To get a good customer-focused process a system needs to receive accurate information in a timely manner. It also needs a system to respond quickly to this information if there are fluctuations in the customer's demands. For an effective SCM it is important to have good control of the uncertainty in customers' needs, manufacturing processes and supplier's performance. It can be handled with the key supply chain processes:

#### **Customer relationship management**

This process is about identifying key customers and customer groups. Product and service level agreements about the performance of each company are specified with these key customer groups. Customer service teams work further with the key customers to eliminate sources of demand variations.

#### **Customer service management**

This process provides real time information about promised shipping dates and product availability to the customers and becomes the key point of contact for administering the service level agreements. The customer service also needs to be able to assist the customer with the product application.

#### **Demand management**

Customer demand is often by far the most variable object to handle and it is a hard thing to predict due to irregular order patterns. The process of demand management balances the company's supply capacity with the customer's requirements. This process uses "key" customer information to make production plans as an example. Multiple sourcing and routing options are also paths that need to be considered in demand management.

#### **Order fulfilment**

The customer order fulfilment process is also one very important object for effective SCM. This is about meeting the customer's needs on the right dates. The company should create alliances with the key supply chain members and integrate the company's manufacturing and

distribution of the product. The goal is to achieve a seamless manufacturing process from the initial suppliers to the end customer.

### **Manufacturing flow management**

In this process the product is pulled through the supply chain and not pushed as it has been traditionally. Instead of basing the manufacture of a product on historical forecasts, which often results in the wrong mix of products produced, the manufacturing process needs to be flexible and quickly respond to market changes. Orders are manufactured with the just-in-time philosophy, JIT, in the smallest possible amounts and production gives priority to delivery dates.

### **Procurement**

This process is about the development of strategic plans together with the company's suppliers. The strategic plans are created to support the manufacturing flow but also to develop and improve new products. In this process the suppliers shall also be categorized to show how important each one is to the company. The core group in the supply chain should develop long-term alliances to create a win-win situation where the suppliers have safe sales without big variations and the focal company will have the right supply at the right time. This alliance includes early involvement of the suppliers in product development, which can reduce product development time. It reduces the changeover time for the supplier as they already know how they need to coordinate the engineering, purchasing and what is important in the product design.

### **Product development and commercialization**

This part is about how to integrate customers and suppliers in product development through coordinating with customer relationship management to clarify the customer's needs. Also selection of materials and suppliers in concurrence with the procurement process and develop the technology in the product flow and integrate it to the best supply chain flow. This is done to shorten product development. It is very important to develop the right product and successfully launch it on the market in a very short time-frame in order to be competitive.

### **Returns**

The returning process helps the focal company to improve the product and find problems in the manufacturing process.

There are also several management key factors in SCM that need attention from management but the writer thinks that they belong outside of this thesis, so they are simply mentioned: Planning and control of operations, work structure, organizational structure, product flow facility structure, information flow facility structure, management methods, power and leadership structure and culture and attitude.

### **3.1.2 Business-to-business in China**

To succeed with business in China it is important for foreign managers to understand the management culture in China, which can be very different from their own culture<sup>9</sup> with guanxi, gift giving, giving face (it's a Chinese translation about how to praise someone's reputation in society), face saving and the importance of family that pervade all aspects of

---

<sup>9</sup> Business-to-business negotiating in China: the role of morality. Jamal A. Al-Khatib, Stacy M. Vollmers and Yusin Liu.

business.<sup>10</sup> There is a view on China's business culture that it couldn't work in an entirely legal way because of the importance of guanxi networks. Guanxi is a term that describes informal influence, personal connections, relationship and favouritism. Chinese negotiators usually make an ethical approach to other actors inside the guanxi network, to safeguard the benefits of the network, when doing business. The Chinese negotiators adjust their negotiating tactics to the situation and concern about face-saving in direct negotiations by applying negotiation tactics that are gentler and less hard when negotiating in the guanxi network. But when they are dealing with someone outside the guanxi network it might be considered legitimate to bend the rules and take advantage of people, especially when doing business with foreigners. They may act in a more brutal and unethical way. This is one important reason for foreign companies to build up long-term relationships and trust with Chinese companies before negotiating with them. This will increase the chances that the Chinese company will use a more gentle negotiation tactic.<sup>11</sup> When a company wants to create a guanxi relationship it is also important to have knowledge about renqing (exchange of favours) and mianzi (preserving individual dignity or enhancing someone's social status)<sup>12</sup>.

The business environment in China today is the result of a disappointing and difficult transition to a free market economy together with a poorly defined legal system that has led to relaxed and consequence-free behaviour among some business people when they negotiate. This makes it important for international companies that are operating in China to codify the behaviour of the workers, host country staff, customers, suppliers and negotiating partners. This needs to be developed together with the Chinese culture, economic challenges and past history in mind. But if Western companies want to create legal contracts together with Chinese companies for a safe business process the Chinese companies may see this action as a way for the western company to control the Chinese company. It is often better to rely on a trust-based exchange if possible, which can often lead to a more effective and efficient negotiation process.<sup>13</sup>

A case study of a Swiss machine and equipment manufacturer showed that encouraging employees and customers to increase their knowledge about the value of product related services can damage the "face" of both employees and the customers. The Swiss company trained their Chinese service managers and technicians in Switzerland instead, to help them understand what empowerment according to western culture meant. This helped the Chinese staff to recognize different customer situations more successfully and how they should communicate their product-related services in a better way. To increase the employee's knowledge about the value of product related services they started to do internal marketing.

---

<sup>10</sup> Business-to-business marketing as a key factor for increasing service revenue in China. Heiko Gebauer, Chunzhi Wang, Bernd Beckenbauer and Regine Krempf

<sup>11</sup> Business-to-business negotiating in China: the role of morality. Jamal A. Al-Khatib, Stacy M. Vollmers and Yusin Liu.

<sup>12</sup> Business-to-business marketing as a key factor for increasing service revenue in China. Heiko Gebauer, Chunzhi Wang, Bernd Beckenbauer and Regine Krempf

<sup>13</sup> Business-to-business negotiating in China: the role of morality. Jamal A. Al-Khatib, Stacy M. Vollmers and Yusin Liu.

The company gave the service employees that had understood the value of product-related service internal awards and at the same time “face”.<sup>14</sup>

In the past Chinese companies have not usually had the authority to choose their own customers and suppliers. They now have much greater freedom to build relationships with foreign and domestic companies. This has put greater pressure on suppliers to meet the customers’ growing demands because the customer can usually change their suppliers who cannot fulfil the customer’s requirements. The greater part of the Chinese market is known as a buyers market where the customers have the power to dissolve a relationship. But the influence of the culture still remains in some cases, when companies decide which customers and suppliers they will have business relationships with. Some reports have shown that managers have been forced to choose their suppliers to retain the guanxi network with other actors. Also, in one case study one manager saved the entire sales force when the company stood in front of a major downsizing. The manager did not want the salesmen with strong guanxi networks to move to other companies and take the customers with them. Common business relationships are initiated through family, friends or officials. If the company wants to end the business relationship, the managers need to consider the third part in the guanxi network. In some cases, companies maintain their business relationship even if it is a poor relationship because the introducer is critical for their business. Damage to the guanxi when dissolving the poor business relationship has a greater impact on the company’s business than keeping it.<sup>15</sup>

When a customer wants to change a supplier in China they first gather information about other suppliers. When they have found a new supplier they will start to slowly reduce the size of the orders from the first supplier and after a while fully change to the new supplier while trying to maintain the guanxi relationship with the first supplier.<sup>16</sup>

Small and medium-sized enterprises (SMEs) in China constitute 99 percent of domestic companies, 69,7 percent of all employment, 48,5 percent of companies’ assets and 65,6 percent of the countries gross output value of Chinese industry. The SMEs in China experience many challenges such as limited resources, lack of experience in conducting formal market research & segmentation studies, lack of marketing skills, expertise in specific questions and limited access to both internal and external financial resources. Many companies are not familiar with the SWOT analysis (or SOFT analysis), the Experience Curve and PIMS methods. They rely more on intuition for market analysis and decision-making. Due to the tough competition in China is there clearly a call for the SMEs to adopt long-term differential marketing strategies and focus on research and development (R&D) to gain a greater market share. The limited size of the SMEs and the difficulty in gaining financial means to fund R&D makes it very hard for them to adopt these kinds of long-term differential marketing strategies.<sup>17</sup>

---

<sup>14</sup> JBusiness-to-business marketing as a key factor for increasing service revenue in China. Heiko Gebauer, Chunzhi Wang, Ber nold Beckenbauer and Regine Krempf

<sup>15</sup> Buyer-supplier relationship dissolution: the Chinese context. Andrew D. Pressey and Xin Xuan Qiu

<sup>16</sup> Buyer-supplier relationship dissolution: the Chinese context. Andrew D. Pressey and Xin Xuan Qiu

<sup>17</sup> JMarketing and business performance of construction SMEs in China. Yiming Tang, Paul Wang and Yuli Zhang.

To gain a good relationship with other companies to succeed with business in China Dr Brian Low, Dr Wesley J. Johnston and Jennifer Wang propose that network legitimacy on the Chinese market may be a key factor for long-term successful business. Many foreign companies have failed because of inappropriate or ineffective efforts to build legitimacy. Network legitimacy can lead to return of economic, social, technical and political capital through an appropriate analysis of the network opportunities and limitations. As an example: companies that increasingly take social responsibility are creating state-oriented network legitimacy through cooperation with regional and provincial authorities. Positive legitimacy outcomes may include benefits such as recognition as a good corporate citizen; possible access to privileged information, including timing and the awarding of local manufacturing licenses. Establishing and maintaining networks in government-controlled enterprises may be more efficient for companies than guanxi networks.<sup>18</sup>

### **3.1.3 SOFT-analysis**

SOFT – analysis is a model for analysis of a company’s market situation. The model considers the aspects of S = strengths, O = opportunities, F = faults and T = threats. The model has the advantage of fitting all kinds of companies, from the very small to the very large.<sup>19</sup>

### **3.1.4 Understanding customer value in the supply chain**

To understand customer value in a supply chain perspective means to understand the customers’ values and their customers’ values all the way to the end customer. In business-to-business commerce, where several people influence the buying decisions, it is very important to understand each of these people’s value perspectives and integrate them all to get a clear vision of what the customers really value. The focal company needs to see the supply chain through the customer’s lens, to understand and analyze the many goals of the managers in the supply chain. When a supply chain reaches through many different countries and cultures the company’s goals, decision maker’s values, relative importance of the product and use of the product may vary between customers.

The first thing to do for the supply chain partners is to understand each company in the supply chain value in depth. The second thing is to take into account complexities such as companies having different national cultures, regional business norms, economic situations and regulatory environments. These different complexities can drive companies to value different benefits, different goals and other barriers that can be troublesome when doing business with them. When a company has understood that companies in different cultures may value different things, they need to find out the best way to collect data.

Companies change their values very often these days which makes it hard to know and understand the customer’s values, but it is still very important. It is hard to predict how values will change, but it will be much easier for market strategists to look further along the supply chain. Knowing what happens further down the supply chain will give additional lead time for strategic planning and adjustments. Competitive advantages will be created if the company

---

<sup>18</sup> Securing network legitimacy in China’s telecommunication market. Brian Low, Wesley J. Johnston and Jennifer Wang.

<sup>19</sup> Marknadsföring. Sten Albertsson & Olof Lundqvist. 2007. Tredje upplagan.

develops a method for prediction of customer values both regional and international. To do this you first need to understand the customers values through customer value analysis processes like market opportunity analysis, customer value determination, customer value change understanding, customer value prediction and forecasting. The more turbulent the environment is, the harder it is to take decisions and the greater the need for strong supply chain relationships between the actors. The companies in a supply chain need to share and link information like market information and plans within the supply chain. This can be a difficult task to manage as many companies already have a hard time managing this within the firm.<sup>20</sup>

---

<sup>20</sup> Industrial Marketing Management. 33 (2004) 45-50. Strategic marketing in global supply chains: Four challenges. Daniel J. Flint.

## 4 Electrostatic Precipitators

This chapter contains information about the electrostatic precipitator, ESP, and gives the reader an explanation about how ESPs works, the elements in the filter and where it fulfils a purpose. The chapter also brings up advantages with electrostatic precipitators.

The electrostatic precipitator, referred to as ESP in this thesis, is a device that separates particles from particulate gas. ESPs are designed to remove particles with a diameter from  $0,1\mu\text{m}$  to  $10,0\mu\text{m}$  and to have an efficiency that sometimes exceeds 99,5%. The ESPs are very attractive to many industries due to the filter's ability to handle large volumes of gas at high temperatures (between  $175^{\circ}\text{C}$  and  $700^{\circ}\text{C}$ ).<sup>21</sup>

### 4.1 Operation<sup>22</sup>

The working principle of an ESP-system contain four distinct steps: Discharge the particles, capture the charged particles, remove the captured particles to temporary storage and finally disposal. This process is described below:

#### **The dust particles are electrically charged**

The carrier gas that contains the particulate emissions first passes between discharge electrodes with a strong electric field as can be seen in figure 3. When the particle passes the corona around the discharge electrode it becomes ionized.

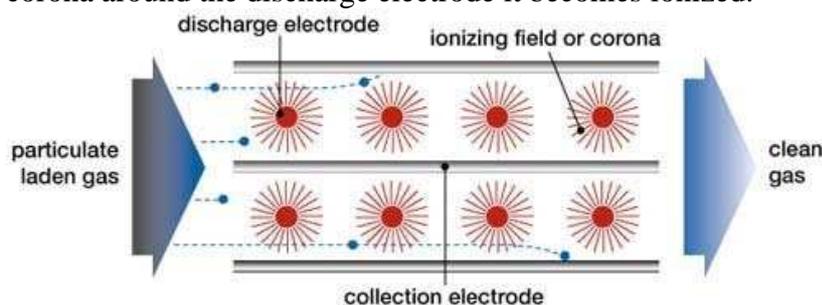


Figure 3 - Top view of a schematic vision of the discharge electrodes and the collection electrodes. (Source: ASU Electrical Engineering. Original source: Powerspan Corp.)

#### **The particles are captured by the collection electrodes.**

The collection electrode is a tube or flat plate (flat plates in figure 3) with a positive charge. The positive charge attracts the negatively charged particles and collects them on the collection electrode's surface. The course of the particles (blue dots) in figure 3 bends to the wall of the collection electrode after the particle has passed through the corona around the discharge electrode.

#### **The particles are removed from the collecting plates for temporary storage**

The rappers (see figure 4) expose the electrodes, both the discharge electrodes and the collecting electrodes, to a vibration or shock which causes the collected dust to fall down to

---

<sup>21</sup> U.S. Environmental Protection Agency. Available:

[http://yosemite.epa.gov/oaqps/EOGtrain.nsf/DisplayView/SI\\_431\\_4?OpenDocument](http://yosemite.epa.gov/oaqps/EOGtrain.nsf/DisplayView/SI_431_4?OpenDocument)

<sup>22</sup> U.S. Environmental Protection Agency. Available:

[http://yosemite.epa.gov/oaqps/EOGtrain.nsf/DisplayView/SI\\_431\\_4?OpenDocument](http://yosemite.epa.gov/oaqps/EOGtrain.nsf/DisplayView/SI_431_4?OpenDocument)

the hoppers at the base of the ESP. Sometimes water is sprayed to remove the collected dust (water-walled ESPs).

### **The collected dust is removed for final disposal**

Some gas flue contains particles with a high resistivity. Resistivity is a term that describes the resistance from the layer of collected dust to the electric current flow. This will affect the ESP's collection efficiency due to the dust layer break down flow of electric current between the discharge electrode and the collecting electrode. Gas flue with high resistivity has reduced the efficiency of some ESPs by up to 50%. This problem often occurs when low sulphur coal is burned in boilers. There are two common ways to reduce this problem. The first is to increase the gas temperature to over 260°C or to decrease the temperature to under 150°C.

## 4.2 Discharge Electrode Technology<sup>23</sup>

The above text explained the function of ESPs and mentioned some of the significant components in the device. There are six significant components in the ESP but the author decided to only write about the discharge electrode's accuracy as this is the most important component in this project. The six significant components are discharge electrodes, collection electrodes, electrical system, rappers, hoppers and the shell. The collection plates, rappers, hoppers, shell and some of the electrical system can be seen in figure 4 below.

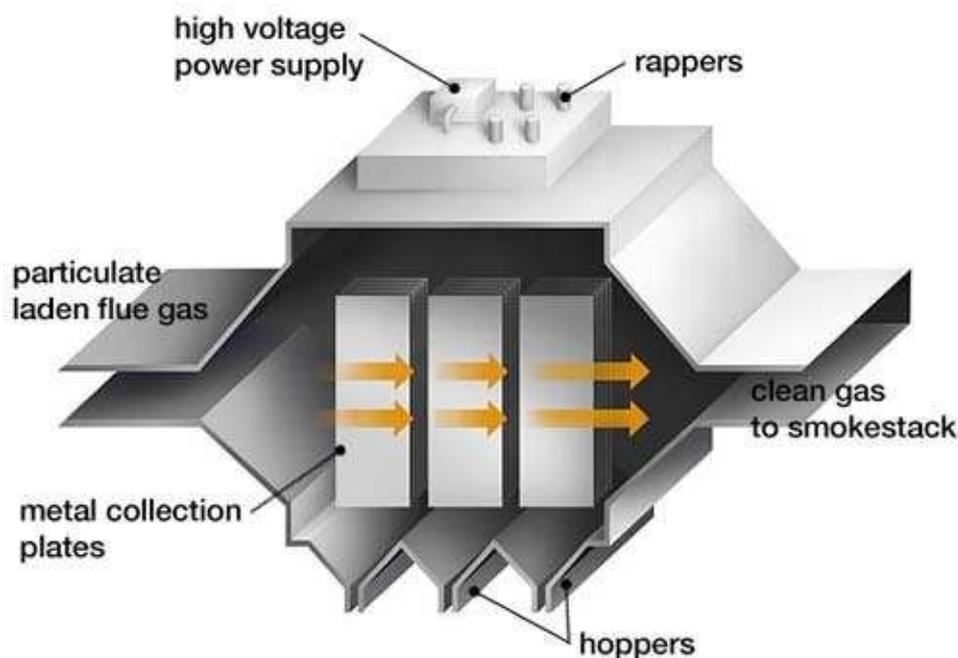


Figure 4 - Side view of a schematic electrostatic precipitator. (Source: ASU Electrical Engineering. Original source: Powerspan Corp.)

The discharge electrodes (as mentioned under operation above and as seen between the collecting plates in figure 3) provide a strong electric field. The particles become charged

---

<sup>23</sup> U.S. Environmental Protection Agency. Available:  
[http://yosemite.epa.gov/oaqps/EOGtrain.nsf/DisplayView/SI\\_431\\_4?OpenDocument](http://yosemite.epa.gov/oaqps/EOGtrain.nsf/DisplayView/SI_431_4?OpenDocument)

when they pass through the corona around the discharge electrodes. The wires are usually made of stainless steel (SS 23 43 (316) or SS 25 62 (904 L)), but they are also manufactured in high carbon steel, copper, titanium alloy, Inconel® and aluminium. The size and shape of the discharge electrodes is governed by the mechanical requirements of the system. There are several types of design and the most common is a thin, round wire. But some designers have decided to use twisted wire, square wire, barbed wire or even other styles. You can see some of the most common designs in figure 5. The company ALSTOM uses spiral electrodes made of high Ni-alloy material wires with a thickness of 2,7mm.<sup>24</sup>

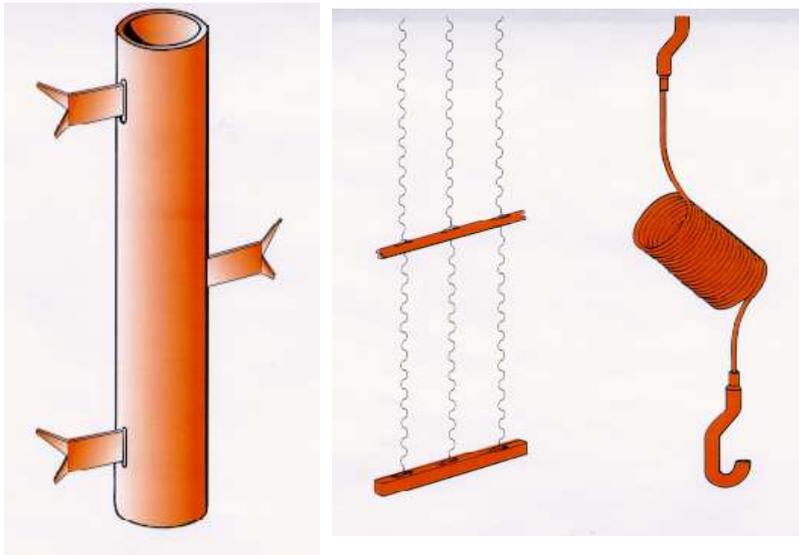


Figure 5 – Multipipeak discharge electrode and Spiral discharge electrode. (Source: ALSTOM)

#### 4.3 The Usage Area<sup>25</sup>

The usage of ESPs as a remover of particles from power plant **plums** and from other industrial applications that provide particulate emissions is widespread. The ability of ESPs is especially desired for emission reduction in cement kilns and in the steel industry where basic oxygen steel furnaces are used because the flue gas has a temperature greater than 350°C. Other common usage of ESPs is for fly ash control from industrial boilers, blast furnaces and sintering operations in the steel industry and in liquor operations in the pulp and paper industry.

---

<sup>24</sup> ALSTOM power. Description ESP.

<sup>25</sup> U.S. Environmental Protection Agency. Available:

[http://yosemite.epa.gov/oaqps/EOGtrain.nsf/DisplayView/SI\\_431\\_4?OpenDocument](http://yosemite.epa.gov/oaqps/EOGtrain.nsf/DisplayView/SI_431_4?OpenDocument)

## 5 Empirical results

This chapter contains the information that has been used as a base for the thesis.

### 5.1 Market for End Customers (Coal fired Power Plants)

If China continues to expand with 10% GDP per annum the energy market will need to expand with 20% per annum. The market can expand either by saving existing energy or building new energy sources. Today power plants with 600MW capacity are built every week and the majority are coal fired power plants.<sup>26</sup> The government has decided that China shall spend 190 billion US dollars on environmental protection within five years.<sup>27</sup>

The Chinese government has divided the energy market into five parts and each part is controlled by one large energy company that is owned by the government.<sup>28</sup> The five energy companies are: China Huaneng Group (control one third of the market), China Da Tang Power Group, Guo Dian, Hua Dian and China Power Investment Corporation.<sup>29</sup>

7-8 years ago the Chinese government decided to prohibit foreign companies delivering ESP into China. The five energy companies demanded that their suppliers deliver domestically manufactured products if possible. However, licenses and control systems are still allowed to be sold.<sup>30</sup>

#### 5.1.1 Procurement process of ESP in coal fired power plants

The coal fired power plants advertise that they need ESP equipment. Advertising usually takes place on the internet. Local Chinese ESP equipment providers then submit an offer to the power plant. The power plant has a business group of administration people and technical experts. When at least 3 suppliers have made proposals the business group will look at the offers. The supplier with the best offer will then receive the order.<sup>31</sup>

When the power plant shall buy spare parts to the ESP it is either the business group<sup>32</sup> or just one manager that makes the decisions.<sup>33</sup> Normally do they follow the OEM recommendations<sup>34</sup> but if the power plant has found some problem with the used equipment or better options among new equipment may they try new alternatives than the OEM recommendations.<sup>35</sup> The process of purchasing is in some cases bureaucratic and it is often one manager that takes quick decisions. The quick decisions are often based on VBS arguments and advices from the business group.<sup>36</sup>

---

<sup>26</sup> Siegfried Eyes & Martin. ALSTOM Växjö.

<sup>27</sup> Jonas Cidrin.. Swedish Trade Council Shanghai

<sup>28</sup> Kjell Svensson. EWES Stålfjäder

<sup>29</sup> Liu Zhenghu,. ALSTOM Beijing.

<sup>30</sup> Siegfried Eyes & Martin. ALSTOM Växjö.

<sup>31</sup> Doyle Huang. ALSTOM Beijing.

<sup>32</sup> Doyle Huang. ALSTOM Beijing.

<sup>33</sup> Daniel Zhao. Sandvik Materials Technology.

<sup>34</sup> Kunsham electrostatic precipitator equipment plant

<sup>35</sup> Doyle Huang. ALSTOM Beijing.

<sup>36</sup> Daniel Zhao. Sandvik Materials Technology.

## 5.2 Licensors

One opportunity for foreign companies is technology transfer. The foreign company starts a partnership with one or several local Chinese companies. The foreign company then sells licenses for the ESP products to the local Chinese company that start to manufacture ESP's locally in China. The same day the foreign company sells the licenses to a local Chinese company, the foreign company needs to count on the drawings now being public property in China. According to ALSTOM, every ESP manufacturer in China has a copy of the drawings that were relinquished in the 80's.

## 5.3 ESP Market

The Equipment providers either get spiral discharge electrodes from the discharge electrode producers or in some cases manufacture the electrodes themselves. The equipment provider sells the ESP to the end customer. They manufacture the whole filter, parts to the filter and/or assembly parts that they have bought from other companies. The ESP equipment providers are often small to medium sized enterprises. The business situation is more or less the same as for the discharge electrode makers (see the text below). The competition is hard and one equipment provider can easily lose a big order to another equipment provider. There are some large national companies that have a stable working routine and therefore can make long-term plans.<sup>37</sup> The ESP equipment provider has responsibility for the design of the filters and for choosing sub-suppliers.<sup>38</sup>

The ESP market has a turnover of 10 billion Yuan and it will expand with the increasing energy market and with international demands. One threat to the ESP market is improved fabric filters that reduce the emission level in the outlet air easier.<sup>39</sup> Several ESP equipment providers are located in Hangzhou and the biggest actors are FJ Longking and ZJ Feida. These two actors control about 40% of the market.<sup>40</sup>

Rules that prohibit emission discharge around large cities have been introduced by the Chinese government. But the government doesn't seem to care to any great extent. In any case it is important to add that cities like Shanghai have much cleaner air these days than a couple of years ago. China is becoming more and more aware of environmental questions but it can still be summarized as follows: if the Chinese energy companies have badly working ESPs but experience a need for energy, they forget all about the environmental aspects.<sup>41</sup>

When an ESP is being sold to one energy company, 80-85% of the contract value constitutes deliverance of material and services for building the ESP and 15-20% is for fulfilling guarantee of the emission level to the outlet air. Usually the Chinese energy companies don't have any great interest in the last mentioned part and the ESP equipment providing companies often have a bigger interest in selling and building new filters.<sup>42</sup>

---

<sup>37</sup> Daniel Zhao. Sandvik Materials Technology.

<sup>38</sup> Siegfried Eyes & Martin. ALSTOM Växjö.

<sup>39</sup> Liu Zhenghu, ALSTOM Beijing..

<sup>40</sup> Doyle Huang.. ALSTOM Beijing.

<sup>41</sup> Siegfried Eyes & Martin. ALSTOM Växjö.

<sup>42</sup> Siegfried Eyes & Martin. ALSTOM Växjö.

### 5.3.1 Spare Part Market

The spare part market for ESPs in China is increasing with the expanding ESP market but it is at the same time limited. One reason is connected to the energy companies' interest in fulfilling the guarantee of emissions in the outlet air. In comparison with a machine that needs new spare parts to work, the ESP simply loses efficiency at the same time as the process of producing electricity still works.<sup>43</sup>

The domestic production of spare parts is high, often very close-by and can be delivered with a very short lead-time. ESP technology is over 100 years old and it is rather easy. It is the selection of material that is most important. Many spare parts are produced within the company at their mechanical workshops and more advanced spare parts are produced in local forges that have moved alongside the big coal fired power plants. The local forges manufacture copies of the old parts but it is unusual that these companies are competent enough to choose the right material and produce good products.<sup>44</sup>

### 5.4 Spiral Discharge Electrode Market

The spiral discharge electrode maker creates the electrodes from wire material. They form the wire as spirals and weld hooks to the end of the spirals.<sup>45</sup> These are usually small privately owned enterprises on the Chinese market.<sup>46</sup> The situation for these companies is very insecure because of the hard competition. The market is expanding rapidly and everyone wants to be the business leader. These companies can either get an order or lose a whole order without any insurance; they don't have any regular order pattern.<sup>47</sup> When one of these companies loses an order, 30% of their business can disappear. There are no legal agreements like on the Swedish market, so if one company has a delayed order and another has its products finished, the customer may simply switch their order to the company with the finished products. These kinds of companies are not mature enough to make long-term plans, partly because their customers usually don't have (or don't share) any long term plans. This situation makes it very hard for the spiral discharge electrode makers to plan the annual consumption for the next year. They don't know how much that could be confident and how much that is just by chance.<sup>48</sup>

Many spare part makers are located in Xiamen and also in Hangzhou. The biggest actors in this tier in China are: BHA that belongs to GE and is located in Shanghai. BHA is the largest spare part provider in the world. One other big actor is KS Yungchein.<sup>49</sup> The ESP technique that uses the spiral discharge electrode originally comes from ALSTOM. There are three companies in China that use ALSTOM ESP license today. These companies are ZJ Feida, ZJ Xinyada and Shanghai Keye (a branch of S4M).<sup>50</sup>

---

<sup>43</sup> Siegfried Eyes & Martin. ALSTOM Växjö.

<sup>44</sup> Siegfried Eyes & Martin. ALSTOM Växjö.

<sup>45</sup> Kjell Svensson. EWES Stålfjäder

<sup>46</sup> Daniel Zhao. Sandvik Materials Technology.

<sup>47</sup> KS Yucheng

<sup>48</sup> Daniel Zhao. Sandvik Materials Technology.

<sup>49</sup> Liu Zhenghu, ALSTOM Beijing.

<sup>50</sup> Jonson Zhang. Sandvik International Trading Co Ltd.

Many companies world wide have tried to produce good spiral discharge electrodes but just a few have succeeded. Under the apartheid time one company in South Africa tried to manufacture spiral discharge electrodes without success. The customers that bought these products now think the spiral discharge electrode is a bad product. Due to the bad reputation it is almost impossible to sell spiral discharge electrodes in South Africa.<sup>51</sup> Many Chinese companies have tried to produce the spiral discharge electrode with bad results as well. Longking, one of the biggest ESP equipment providers, do not provide filters with spiral discharge electrodes because they have experienced that they easily break. The main reason why spiral electrodes easily break today in China is poorly welded hooks.<sup>52</sup>

There are several kinds of discharge electrodes on the Chinese market. One of the most common is the multipeak discharge electrode. The multipeak technique originated with a Swiss company called Elex. About half of the discharge electrode market is spiral and the other half is multipeak. The spiral and the multipeak discharge electrodes have the same basic function but some properties differentiate them. This is illustrated in the table on the next page:

---

<sup>51</sup> Siegfried Eyes & Martin. ALSTOM Växjö.

<sup>52</sup> Liu Zhenghu, ALSTOM Beijing..

Aspect	Property with:	
	Multipeak discharge electrode	Spiral discharge electrode
Discharge capacity	One multipeak discharge electrode is needed for every two spiral discharge electrodes. <sup>53</sup>	
Costs	A ESP with multipeak discharge electrodes costs -33 % less compared to a ESP with spiral discharge electrodes	
Transportation	The electrode is about 15 meters and can be separated in 2-3 parts. <sup>54</sup>	The electrode is about 20-25cm and is very easy to transport. The electrode is also very light.
Installation		The spiral electrode is self tensioned and very easy to install (with the right tool).
Large dust particles	Suitable for large dust particles. <sup>55</sup>	When used with large dust particles the corona may be blocked. This leads to lower dust gathering efficiency.
Small dust particles	Due to an uneven corona the electrode is fairly unsuitable for small dust particles.	Suitable for small dust particles. <sup>56</sup>
Rapping (clean the dust layer)		Easy to rap because of the light weight.
Voltage use		Easy to discharge particles with low initiative discharge voltage
Electrical use		Lower use of electricity needed
Reputation		Bad reputation because of locally produced spiral discharge electrodes with badly welded hooks

Table 3 - Business properties compared between multipeak discharge electrodes and spiral discharge electrodes

A new popular design for ESP's in China uses the multipeak electrodes in the front, at the dust gas inlet, and then spiral discharge electrodes.<sup>57</sup> The high concentration of large dust particles and fly ash in the inlet gas makes the multipeak discharge electrode more suitable in the front. Then the even corona of the spiral discharge electrode reduces the small dust particles.<sup>58</sup>

<sup>53</sup> Doyle Huang. ALSTOM Beijing.

<sup>54</sup> Liu Zhenghu, ALSTOM Beijing..

<sup>55</sup> Chang Xueping. BB EETC

<sup>56</sup> Chang Xueping. BB EETC

<sup>57</sup> Jonson Zhang. Sandvik International Trading Co Ltd.

<sup>58</sup> Liu Zhenghu, ALSTOM Beijing.

#### **5.4.1 Purchasing process of new material in privately owned SMEs**

Small sized enterprises often have one manager that is responsible for several areas in the company. It is unusual that these kinds of companies have long-term plans because of the insecure order income in the future.<sup>59</sup>

Equipment providers and spiral discharge electrode makers are often medium sized enterprises. The privately owned medium sized enterprises usually have one material manager and one procurement engineer. When a new supplier wants to deliver their product to the medium sized enterprise the supplier will first be checked. They investigate the supplier's reputation, situation, and production capacity. If it's a small supplier it will be an even more careful investigation. If the supplier passes the first investigation the supplier needs to provide a sample of their product. The material manager will then investigate the new product. If everything seems to be good the material manager decides whether to try the new product. If the material manager decides that they shall buy the product the procurement engineer will take care of the purchasing part from the new supplier.<sup>60</sup>

One more important aspect in the purchasing process is about payment. Most Chinese companies offer open credit. Sandvik either want their customers to pay in advance or offer 30 days credit. The competition often have much more flexible payment terms. This is a disadvantage for Sandvik today. If a competitor offers 90 days credit they often get the money in 90 or 120 days. It is considered very rude to charge an extra fee for the delay. The extra charge should only be carried out if the company wants to stop the business with the customer. A better trend can be seen in China today because many companies have suffered from the flexible payment terms. The customers start to be more open to discuss shorter payment terms.<sup>61</sup>

#### **5.4.2 Building up business with Guanxi**

Guanxi is a well known concept but is considered to be rather secret in the society. Many companies build up their business through their guanxi network. The guanxi network is built of personal relationships and in this business it can be translated as follows:

A former employee of a coal fired power plant starts to work at an ESP equipment providing company. The ESP equipment providing company also has former employees from other coal fired power plants. The former employees have personal relationships with the coal fired power plants that they have worked at and this opens up a business opportunity for the ESP equipment providing company.

An employee from this ESP equipment providing company start his own spiral discharge electrode company and starts to sell electrodes to the ESP equipment providing company that he once worked for.

---

<sup>59</sup> Daniel Zhao. Sandvik Materials Technology.

<sup>60</sup> Dou Tianran. Material Manager. EETC.

<sup>61</sup> Daniel Zhao. Sandvik Materials Technology.

The guanxi network is established but the supplier also needs to build up relationships with other customers.<sup>62</sup> The first contact is very important when a company is contacting a potential customer, without any former relationship, in China. This is important when telephone calls are made as well. One should introduce oneself and have something interesting to offer. It is important to meet the customers face-to-face, get to know each other and ask questions about the customer's business relationship with other actors (competitors) instead of just showing up one day with some really good VBS argues.<sup>63</sup> The company that establishes a quanxi-network still needs to reckon with competitors. If you compare with Wal-Mart that is very much cost driven, businesses that are established with guanxi networks constitute a bigger amount of CRM and VBS arguments become less important. So even if a supplier has rather expensive products with poor quality they can still run the business with the customer because they trust each other in a way that makes the business worthwhile for both. It is very important to feel trust in these privately owned enterprises. However, this part can't be denied in any market. It is just a question of how much it affects the business.<sup>64</sup>

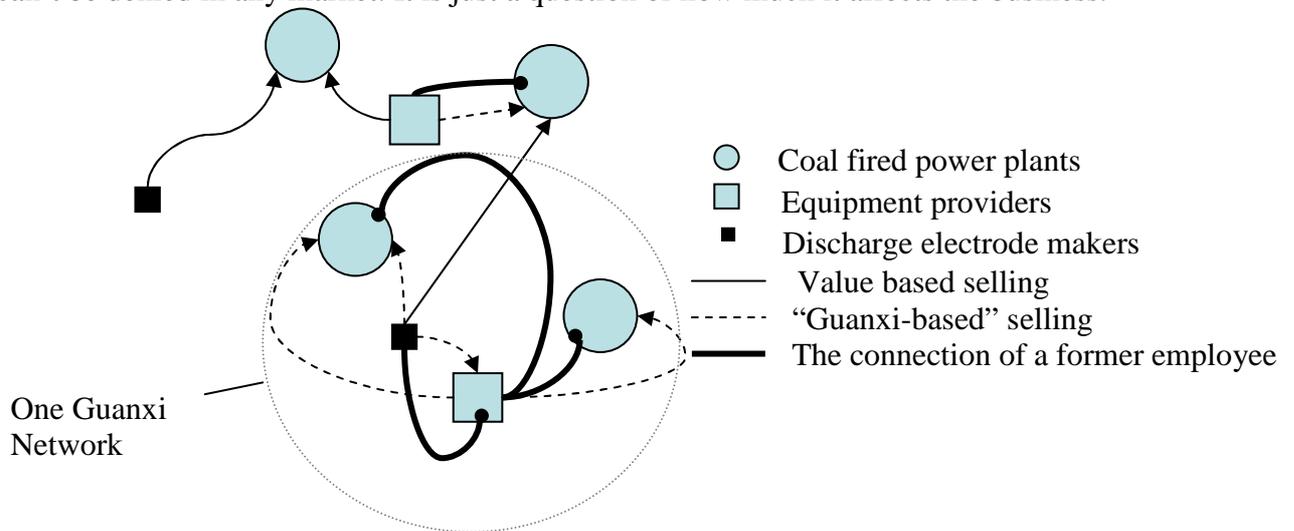


Figure 6 Building up the business of guanxi networks

Many local Chinese companies work with local agents in different areas in China. These agents get many orders because they work close to the customers and often pay them a visit. VBS arguments are very important to keep up the price and make the customers interested in the product but this need to be combined with relationships to get the business running and it is probably the same world wide.<sup>65</sup>

<sup>62</sup> Daniel Zhao. Sandvik Materials Technology.

<sup>63</sup> Jim Shipley. Sandvik Materials Technology.

<sup>64</sup> Daniel Zhao. Sandvik Materials Technology.

<sup>65</sup> James Shipley. Sandvik Materials Technology.

### 5.4.3 Long-term business relationships<sup>66</sup>

It is also important to have a long-term structure of the business with Chinese companies. Chinese companies compensate for the ups and downs in a business cycle because they continue to keep in contact and do business without changing the price to any large extent. The price is kept the same even if manufacturing costs go up or down.

As an example: Sandvik Materials Technology has a customer in China that has bought a product from Sandvik for five years with an initial price 100 RMB/KG. The price has increased to 140, 150 and now 200. The customer does not understand why Sandvik raises the price when the customer can turn to a competitor and get a similar product cheaper. When Sandvik has over-capacity and wants to sell the product cheaper to the customer again, the customer may not want to buy because the relationship been broken. When a relationship has been broken, the customers remember it and the supplier will have no chance to do any further business. It is therefore important to have a long-term strategy where the fluctuation in the alloy price varies too much. SMT Tube has some fluctuation in the alloy price but not as much as in the rest of the world. SMT Tube has a more long-term plan and acts more as a price follower than a price leader on the Asian market. Long-term plans, relationship and price are very important aspects on the Chinese market.

### 5.5 Spiral Discharge Electrode Wire Material Market

The market seems to be driven by the end customers<sup>67</sup> but big equipment providers also have a great influence on the end customers' decisions.<sup>68</sup> There are also other actors, like Electric Power Design Institutes, that may influence the end customers' choice.<sup>69</sup>

The most common material in China for spiral discharge electrodes is the steel grade 316. The wire rod material probably comes from Japan. The spiral discharge electrode wire with steel grade 316 is then manufactured locally in China.<sup>70</sup> A comparison between Sandvik's differential steel grade 904 and the locally produced 316 material is shown in the table on the next page.

---

<sup>66</sup> James Shipley. Sandvik Materials Technology.

<sup>67</sup> Chang Xueping. BB EETC

<sup>68</sup> Jonson Zhang. Sandvik International Trading Co Ltd.

<sup>69</sup> James Shipley. Sandvik Materials Technology.

<sup>70</sup> ALSTOM Beijing

Aspect	Property with:	
Costs	Local produced 316 material	Sandvik's 904L
	Low cost. Cost about 54% of the price on Sandvik's 904L material.	
Durability of spiral discharge electrodes	Keep about 3 years.	Keep about 15-25 years.
Lead-time	The material is usually local in stock and the suppliers can deliver for big buyers weekly or monthly.	The lead-time is a-b months.
Demand	High demand on the domestic market.	Probably most for export projects and the aftermarket.
Competition		Almost no competition.
Other	Short durability contributes to more opportunities for bribes.  The competitors often can offer very flexible payment terms.	The fluctuation in the alloy price makes the electrode makers unwilling to keep stocks.  Sandvik is a well known high quality brand in China. <sup>71</sup>  Seem to have good welding properties

Table 4 - Business properties compared between the local produced 316 material and Sandvik's 904L material

ZJ Feida is one of Sandvik's biggest customers in China. Their total use is about xxx tons wire material per annum. Of these xxx tons is only yy-zz tons is Sandvik's material. ZJ Feida has started to recommend the local 316 material instead because they make a larger profit from that.

Nobody wants to do anything complicated. These companies cannot see any reasons, why they should let their customers wait a-b months when they can get the material today, even if they can only get low quality material.<sup>72</sup>

### 5.5.1 Bribery

A lot of business in the wire market takes place under the table. Some years ago nobody knew exactly how the local 316 material was going to work in the ESP application but the suppliers bribed the right persons so customers tried. It showed that the 316 material kept about 3 years compared to Sandvik's 904L material that lasted between 15 and 25 years. However, a short life-time of the material opens up more opportunities for shady deals.<sup>73</sup> In the past, it has

---

<sup>71</sup> Chang Xueping. BB EETC

<sup>72</sup> Daniel Zhao. Sandvik Materials Technology.

<sup>73</sup> Tomy Qiu. Sandvik International Trading Co Ltd

happened that Sandvik has relinquished opportunities on the Chinese market because the competitors were using bribes to increase their market share.<sup>74</sup>

## 5.6 Other influence on the market

### 5.6.1 The Electric Power Design Institutes

The Electric Power Design Institutes main role on the Chinese market is to guide companies that don't have so much knowledge about the products that they are interested in.<sup>75</sup> The institutes define the design, both mechanical and electrical interfaces, between the OEM and their customers. They introduce new products, provide information about projects and recommend products.

The Electric Power Design Institutes can also sometimes do local adjustments on the licensors specifications. The institutes are known as "bribe friendly" organizations. This makes it possible for Sandvik's competitors to change the licensors local material specification to the competitors' material.<sup>76</sup>

The institutes can recommend products but they usually only recommend extraordinary products or materials. They also define emission level requirements, according to demands from the government, in the bidding documents when coal fired power plants invite suppliers for bidding (see purchasing process of ESP in coal fired power plants). Major Electric Power Design Institutes are: China Power Engineering Consulting Group Corporation, Northeast Electric Power Design Institutes, East China Electric Power Design Institute, Central Southern China Electric Power Design Institute, Northwest Electric Power Design Institute, Southwest Electric Power Design Institute and North China Power Engineering Co. Ltd.<sup>77</sup>

There are also provincial Electric Power Design Institutes that become more active in 600MW engineering. Some of these are: Hebei, Shandong (active for export projects), Shanxi, Hunan, Anhui, Zhejiang and Guangdong.<sup>78</sup>

### 5.6.2 International ESP Conference

There is a large annual international ESP conference in Hangzhou. This conference is very important for the ESP business area and it usually takes place in October. Hangzhou is also the same city that ZJ Feida and many other ESP equipment providers and spare part makers operate in.<sup>79</sup>

---

<sup>74</sup> Daniel Zhao. Sandvik Materials Technology.

<sup>75</sup> Doyle Huang. ALSTOM Beijing.

<sup>76</sup> James Shipley. Sandvik Materials Technology.

<sup>77</sup> Siegfried Eyes & Martin. ALSTOM Växjö.

<sup>78</sup> Siegfried Eyes & Martin. ALSTOM Växjö.

<sup>79</sup> Liu Zhenghu,. ALSTOM Beijing.

### 5.6.3 ESP Business Association

There is a business association for the companies that provide ESP equipment. The name of the association is Chinas Association of Environmental Protection Industry. The website is: [www.caepi.org.cn](http://www.caepi.org.cn)<sup>80</sup>

### 5.6.4 Import taxes

Another limitation for foreign companies is import taxes. Some foreign companies buy local companies in China and provide these companies with their technology and only produce the high quality products in European countries. This will reduce the import taxes.

The import taxes to China depend on the product that is going to be imported. If it is a high technology product, that is not being manufactured locally in China at the time, the taxes can be reduced. If a part of the product is low technology and another part is high technology that can be used as an argument to reduce the import taxes. When it comes to materials almost every material is counted as a low technology product. Therefore the taxes cannot be reduced for most materials.<sup>81</sup> However if the material is used in high technology projects the taxes could be reduced.<sup>82</sup>

#### 5.6.4.1 Free Trading Zone

The cost of storing products in Free Trading Zones in China is about 0,5 RMB per ton and day. There are several free trading zones that can be used as storage areas. The advantage with these free trading zones is that a company can import products to the zone without paying any taxes. The material can be stored without the tax wired to the stored capital.<sup>83</sup> When the products are sold into China will the regular tax (duty 5%-20% plus tax of 17% based on purchase price plus import duty for raw material) be added.<sup>84</sup> These free trading zones can be found in Shanghai<sup>85</sup> (Waigaoqiao).<sup>86</sup>

### 5.6.5 The Personnel situation

China could reduce their particulate emissions if they committed to it but China has a limited number of engineers so there is not much activity on the way today. Personnel change their place of work as fast as they get a new or better opportunity. Due to the limited number of qualified personnel they don't usually put people on maintenance for the filters.<sup>87</sup>

SMT Tube experiences a problems getting the salesmen to visit the customers. This is probably more about fear than anything else. Also the Swedish Export Council in Shanghai experiences some trouble when their personnel need to make new contacts. If mainland China is compared with Taiwan, the Taiwanese people not afraid to contact new customers. This is probably a result of the last 30-40 years when Mao was Chinas leader. The policy starting that a family can just can have one child has also affected the personnel situation. Many mainland

---

<sup>80</sup> Vincent Ren. Sandvik International Trading Co. Ltd.

<sup>81</sup> Doyle Huang. ALSTOM Beijing.

<sup>82</sup> Vincent Ren. Sandvik International Trading Co. Ltd.

<sup>83</sup> Vincent Ren. Sandvik International Trading Co. Ltd

<sup>84</sup> Willa Lu. Sandvik (Qingdao) Ltd. .

<sup>85</sup> Daniel Zhao. Sandvik Materials Technology

<sup>86</sup> James Shipley. Sandvik Materials Technology.

<sup>87</sup> Siegfried Eyes & Martin. ALSTOM Växjö.

Chinese have financial pressure to support older relatives on themselves. These two aspects have made mainland Chinese, in general, willing to climb over each other to obtain more money. They are also willing to inform on each other to gain benefits.<sup>88</sup>

It is often very expensive for foreign companies to place personnel in China and if the foreign company chooses to educate the Chinese personnel, these become even more attractive on the labour market. One aspect that makes the Chinese personnel more attractive is the fact that they can handle English. Many Chinese people gladly change jobs if they get a better offer. This is not considered to be a bad behaviour. Loyalty towards family and old friends is often much greater than the loyalty to a foreign company.<sup>89</sup>

A new engineer usually earns between 3000-6000 RMB/month.<sup>90</sup> After 2-3 years they have more experience can receive a higher salary. SMT Tube only employs more experienced engineers as salesmen and they look carefully to see if the person has jumped between many jobs in the past. However, they still experience a high turn-over of personnel.<sup>91</sup>

---

<sup>88</sup> James Shipley. Sandvik Materials Technology.

<sup>89</sup> Siegfried Eyes & Martin. ALSTOM Växjö.

<sup>90</sup> Jason Zhu. Sandvik International Trading Co Ltd.

<sup>91</sup> James Shipley. Sandvik Materials Technology.

## 5.7 The Supply Chain

The supply chain contains several tiers with actors that have different kind of influence on the chain. Some actors are directly involved and others are indirectly involved. The material is developed through five or six tiers. In several cases the ESP equipment provider also creates discharge electrodes. Some of the ESP equipment providers in China today create their equipment from ALSTOM's license.<sup>92</sup> The Electric Power Design Institutes provides specifications so the filters fulfil emission levels in outlet air. The level of permitted emissions in the outlet air is provided by the government.<sup>93</sup> It is important to work with every actor to gain an order in China.<sup>94</sup> The interesting part, for this project, of the supply chain, for this project, begins after the stainless steel wire company (Focal).

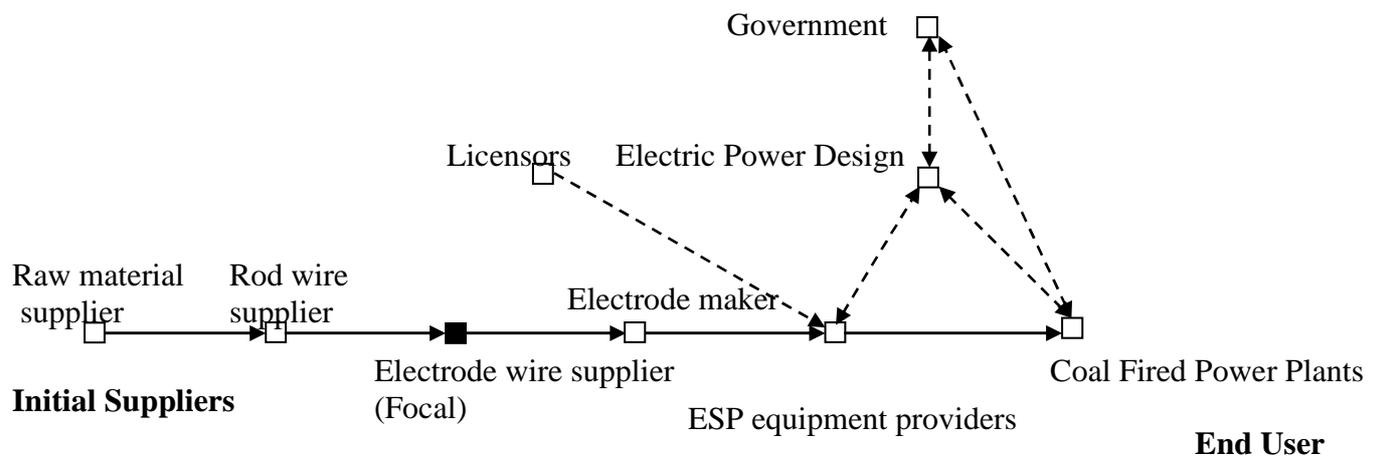


Figure 7 - The supply chain

<sup>92</sup> Kjell Svensson. EWES Stålfjäder.

<sup>93</sup> Doyle Huang. ALSTOM Beijing.

<sup>94</sup> James Shipley. Sandvik Materials Technology.

## 5.8 Chinese business values

The case study showed local Chinese companies care about life-cycle costs and quality initially but the hard competitive environment forces companies to prioritize price and delivery time the most. The following table is based on responses to questionnaire (see Appendix A) that was answered by 6 persons from two companies:

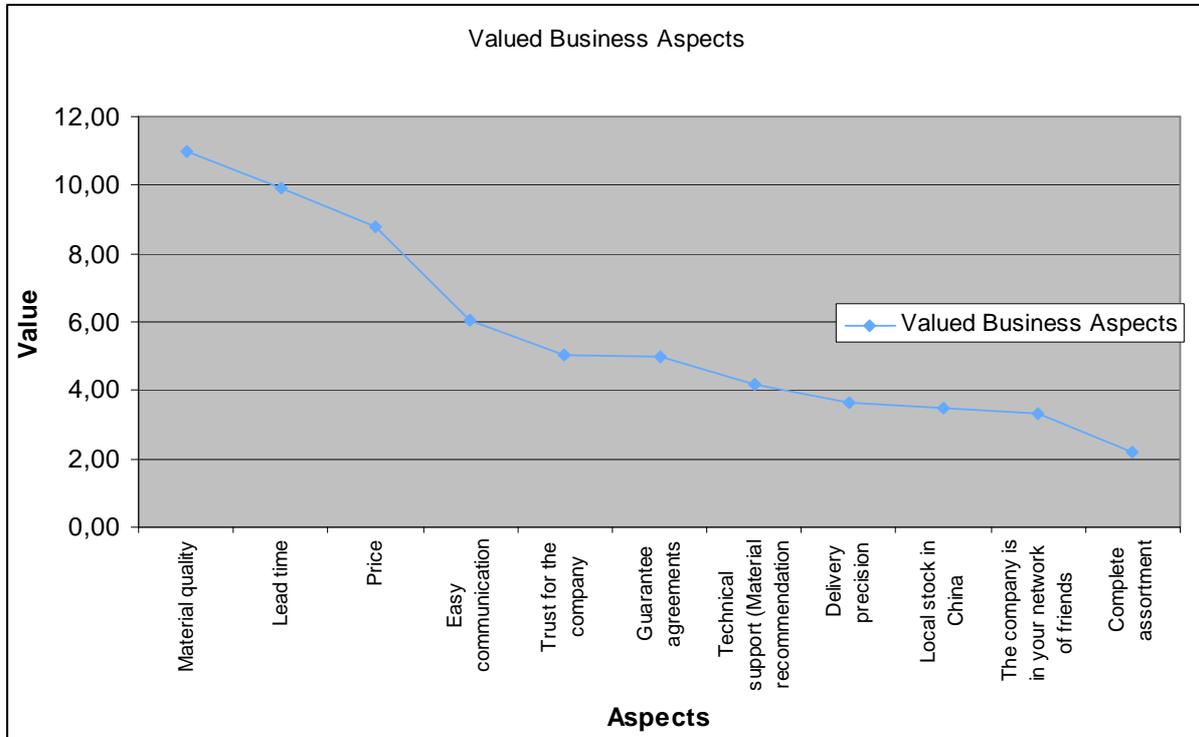


Figure 8 - A compilation of answers to the questionnaire.

The result can only be used as an indicator because the Chinese companies that participated and answered the forms do not sell any ESP equipment on the Chinese market.

One more important business aspect is the brand. Several customers evaluate the brand the most.<sup>95</sup> Some companies think that there is more prestige in importing foreign material because of the well known high quality.<sup>96</sup>

<sup>95</sup> Kunshan electrostatic precipitator equipment plant

<sup>96</sup> Jonas Cidrin.. Swedish Trade Council Shanghai

## 5.9 Chinese marketing channels

The case study showed that from six alternatives given, recommendations from existing customers was the best way to market a company in the ESP business on the Chinese market. The following table is based on responses to a questionnaire (see Appendix A) that was answered by 6 persons from two companies:

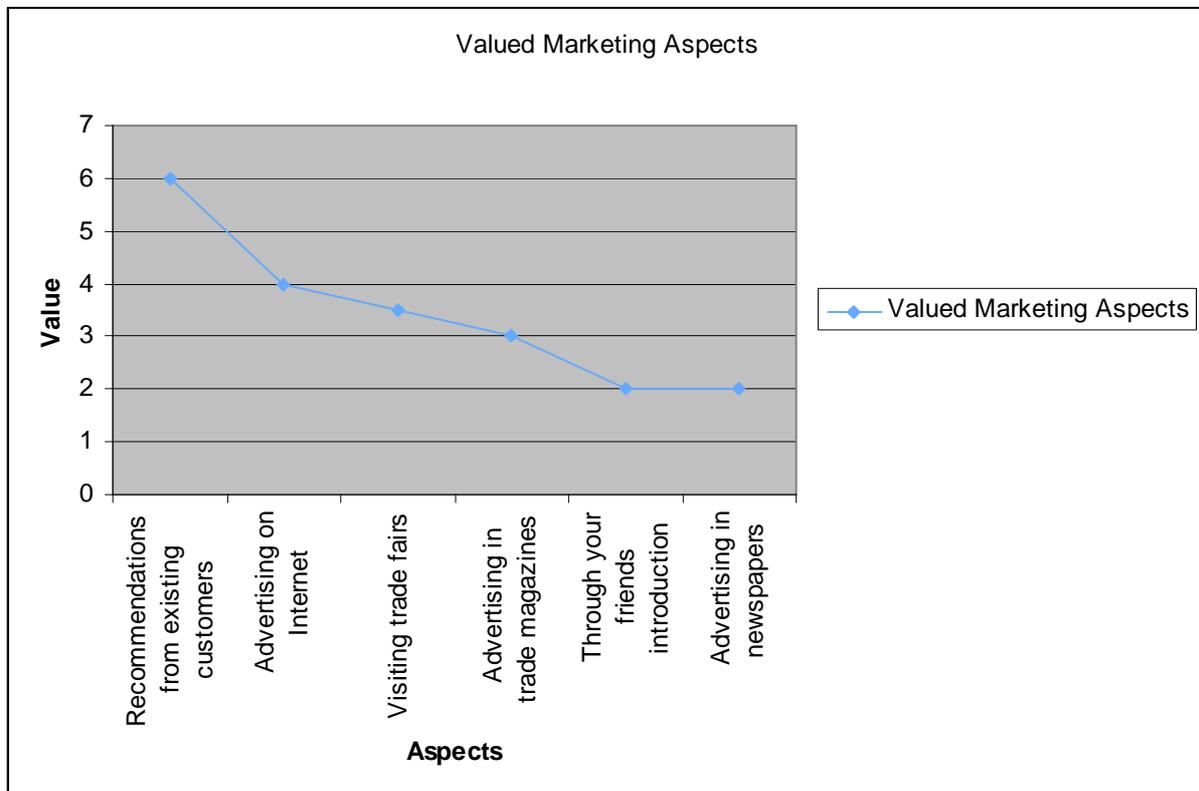


Figure 9 - A compile of the question forms

The result can only be used as an indicator because the Chinese companies that participated and answered the forms do not sell any ESP equipment on the Chinese market.

## 6 Analysis

This chapter will analyse the theory with the empirical results and apply the theory where it is possible.

### 6.1 SOFT-analysis

The empirical result showed that it is important to include the Chinese cultural aspects and business differences when developing a strategy for China. It is important to develop a customer relationship with trust and also a personal relationship (guanxi). Sandvik has several disadvantages compared to a number of competitors. Sandvik has a relative short credit time for their customers, Sandvik cannot use bribes and Sandvik has a long way to transport the material. At the same time, Sandvik has very good materials for the ESP application for coal fired boilers and almost no competitor on the Chinese market when it comes to the high quality grades. There are also other threats that make it very important to use SCM and work close to the customers and other actors in all tiers in the supply chain. The strengths, opportunities, faults and threats are compiled in a SOFT-analysis in the table on the next page:

Strengths	
	904L has low life-cycle cost compared to the local 316 material
	Sandvik can offer free technical services
	Some Chinese companies think it is prestigious to import Swedish materials
	Sandvik is a known high quality trade mark
Opportunities	
	Sandviks 904L material seems to have good welding properties (can be used to prove that spiral discharge electrodes can have good durability)
	Local test storage in a free trading zone can shorten lead times
	Technical services as a concept for value based selling
	Educate small to medium sized enterprises in high quality products so they can be separated from their competitors
	Better credit trend in China
	Long durability (If the market becomes more mature for high quality materials)
Faults	
	Long lead-time
	Long durability (fewer opportunities to sell discharge electrodes)
	High initial price compared to the local 316 material
	The bad reputation of the spiral discharge electrode
Threats	
	Sandvik start to "lose face" in some cases because of delayed material
	Some competitors use bribes to increase their market share
	Improved fabric filters are a threat for the ESP-market
	Cheap multipeak electrodes with long durability are a threat to the spiral discharge electrode
	The local 316 material
	The big actor ZJ Feida starts to recommend the 316 material to customers that ask for 904L material.

Table 3 - A SOFT-analysis of Sandvik's situation on the Chinese market

The whole supply chain should be worked on so that each tier in the supply chain understand the benefit of being a customer to Sandvik and with that increase the market share. Each tiers' market situation and how the tier shall be worked on is described in the text below:

## 6.2 Supply Chain Management

### The Energy Market

The energy market is expanding fast and there are no conflicting signs. On average two coal-fired power plants are built every week. Today the managers of the coal-fired power plants do not care to any great extent if their ESP filters need spare parts. As demands from the outside

world grow stronger and the Chinese people become more and more concerned for the environment, there will probably be tougher demands from the government on the coal fired power plants having their ESPs fully working. This will lead to increased sales of replacement spiral discharge electrodes.

The end customer appears to play the most important role in the supply chain when it comes to deciding the type of electrodes and the materials in the spiral discharge electrodes in the ESP. The technical group on the coal fired power plant needs to be worked on with value-based arguments. The most important person to work on is the manager for the group. The group often takes fast decisions based on value-based arguments. It could be hard to contact this group for Sandvik's Chinese employees because of the culture but an opening possibility is the annual ESP-conference in Hangzhou. This is held every year around October and is known to be a very big international ESP-conference. It could be a very good opportunity to work on several actors simultaneously.

The business group should be persuaded with value based arguments such as that spiral discharge electrodes made from Sandvik's 904L material have at least 5 times longer durability than electrodes made of local 316 materials. This means about 170% cheaper life-cycle cost plus costs for transportation and maintenance.

### **Licensors**

ALSTOM seem to be the biggest actor as a licensor on the Chinese spiral discharge electrode ESP market. Sandvik has a good relationship with ALSTOM today. The drawings that ALSTOM released during the 80's probably have Sandvik's material specified. However, local Electric Power Design Institutes sometimes make local adjustments to the licensors drawings.

### **Electric Power Design Institute**

The design institutes have the power to change the licensors specification of Sandvik's material to materials from local competitors. The Electric Power Design Institutes are also known as "bribe friendly" organisations, though Chinese companies seem to trust these institutes anyway. ESP-technology is well known in China so the institutes are rarely contacted for ESP projects, apart from when it comes to specifying the emission levels in the outlet air. It is very possible that Chinese companies make short contacts with these institutes and ask what they think about materials for discharge electrodes.

It is possible that competitors to Sandvik use bribes to have the Electric Power Design Institutes recommend the competitors' material. It is therefore very important that Sandvik keep their material specified on the licensors drawings. Sandvik need to work on the institutes with value based arguments about the high quality of the material. This can be difficult partly because of the bribes and partly because Sandvik do not have any former contact with any institute. These institutes probably have much knowledge about the material market and also many contacts. One opening possibility is to book a meeting to ask their opinions about materials for discharge electrodes.

### **ESP market and discharge electrode material market**

The ESP-market has a turnover of 10 billion Yuan (8,76 billion SEK, 2008-06-23). The ESP-market is growing as a result from the expanding energy market. Half of the market is for the

multi-peak discharge electrode and the other half is for spiral discharge electrodes. One big threat against the ESP-application is the new improved fabric filters that have the advantage to reducing the emission level more easily, with a lower initial price. However, the fabric filters also have a much higher pressure-drop and higher operating costs.

The market for spiral discharge electrode materials is very large in China according to the interviews that were made. ZJ Feida has an annual consumption of xxx tonnes and controls about 20% of the ESP market. This should mean that the Chinese ESP-market has a total consumption of about cccc tonnes. The multi-peak discharge electrode is starting to get very popular, partly because of the bad reputation of the locally produced Chinese spiral discharge electrode that says that the electrodes easily break. Sandvik's 904L material seems to have good welding properties in the spiral discharge electrode hooks. This is one of the most important aspects for preventing that breakage of the electrodes. If Sandvik were to develop an educational material for the spiral discharge electrode makers and teach them about the welding advantage with Sandvik's material, probably more actors would choose Sandvik's material. The spiral discharge electrode makers could use Sandvik's value arguments to motivate a higher price on their products.

However, there are some disadvantages with Sandvik's materials. It has a higher price and a long lead-time that forces the small actors to choose the cheap local 316 material instead. If one of the small actors loses an order it can mean that 30% of their business is gone. The educational material mentioned above could help to some extent but it is important to reduce the lead-time. This can be done by first setting up an experimental storage in the free trading zone in Waigaoqiao. The free trading zone in Waigaoqiao could let Sandvik store their products with a 32% less cost (before it is sold into China). If the order intake increases this trend could be used to make a forecast for a permanent storage in China. Waigaoqiao is also close by Hangzhou, which has a very large market for ESP-products.

One advantage with Sandvik's 904L material is that spiral discharge electrodes that have been made from this material last between 15 and 25 years, compared to electrodes made from the local 316 material, which last about 3 years. This can also be a disadvantage, partly because fewer opportunities for bribes will appear, but mainly because the spiral electrode makers can sell more electrodes for spare parts if they don't have such a long durability.

The person to persuade with value-based arguments in spiral discharge electrode making companies is the material manager. This person is in charge of deciding what kind of materials the company shall buy in small and medium sized enterprises. For the small sized enterprises could Sandvik's free technical services could be of interest. Sandvik could present their technical support and laboratory as a product that the small sized Chinese enterprise could have free access to as a customer for Sandvik. The good welding properties of the 904L material is also an important point to communicate to both small and medium sized enterprises. The information on durability could be dangerous to use in this case. One opportunity is to use it so the customer can motivate the higher price but the customer can lose some business in the future because the electrodes will last longer.

It is also very important to use well-planned customer relationship management and try to establish a guanxi-network with these companies. Sandvik could establish a guanxi-network with different customers by working close to them. Work close to the customers and often

visit them for short meetings (as an example) about opportunities to develop in their business situation and check so they are satisfied with Sandvik's services and products. It is important that the customers have one stable contact person at Sandvik (if possible) so this contact person can develop personal relationships with persons within the company. This could be a way for Sandvik to gain the benefit of the Guanxi-network and with that gain new customers. This contact person at Sandvik should also be the one that visit customers to educate them in the good welding properties of Sandviks materials.

ZJ Feida is a very big actor on the Chinese market. They are customers to Sandvik but Sandvik experience that ZJ Feida start to decrease their orders to Sandvik. Sandvik has also heard that ZJ Feida persuades customers that want Sandvik's material to choose the local 316 material instead. This is probably because ZJ Feida earns more when the electrode more easily breaks. Sandvik has a good relationship with ZJ Feida so it could be a good opportunity to introduce a new grade that is more suitable for the Chinese market together with ZJ Feida because of ZJ Feida's big influence on the market.

The market seems to be divided into two parts: export and domestic sales. The market for selling materials into China seems to put the aspects of price and lead-time as most important. This market is not mature enough for high quality materials yet but it is possible that it will be soon when more and more customers see that the spiral discharge electrodes that are made of local 316 don't have such a long durability. The part for export seems to have a bigger demand for high quality material from the end customer

### 6.3 Conclusions

SMT wire have products with higher quality (and higher price) than the market feel the need for right now. This will probably change in a couple of years partly because the end customers start to notice that the spiral discharge electrodes that are created by the local 316 material only last for 3 years. The market for spiral discharge electrodes in China has a total consumption of about cccc tonnes of discharge wire materials. The market will increase with tougher environmental restrictions from the government, the outside world and together with the increasing energy market.

The supply chain for spiral discharge electrodes has the structure that can be seen figure 7 (p.38) .

The largest actors are:

**Electrode makers:**

BHA (General Electric) and KS Yungchein

**ESP equipment providers:**

FJ Longking and ZJ Feida

**Coal-Fired Power Plants:**

China Huaneng Group (control one third of the market), China Da Tang Power Group, Guo Dian, Hua Dian and China Power Investment Corporation

Interviews showed that SMT Wire should work on each tier in the supply chain to gain better contacts with different actors in the supply chain and with that obtain a greater influence on the market. SMT Wire should focus on the cities Xiamen and Hangzhou because there are many actors in the ESP business there. SMT Wire can with that also influence the market to mature for high quality materials. The various tiers that should be worked on are described as follows:

- The end customers are probably the most important tier. The business group should be worked on with value-based arguments. The best argument for this tier is the long durability (and low life-cycle costs) of the 904L material.
- The spiral electrode makers are also very important because they have the power to convince the end customer to choose another material that the electrode maker earns more money on (often materials with less durability). This tier should be worked on the value-based arguments of 904L's good welding properties that also could counteract the bad reputation of the spiral discharge electrodes. It is also very important with well-planned customer relationship management in this tier to establish good personal relationships. Using that could help to gain access to other guanxi-networks (with more customers for Sandvik).
- Sandvik has a good contacts with the licensor ALSTOM but it is important to continue to have Sandvik's materials specified on ALSTOM's drawings. Establishing a contact with the Electric Power Design Institutes is therefore also important.
- The Electric Power Design Institutes should be worked on with the value-based argument long durability.

The end customers (the business group on the coal fired power plants) require short delivery times. That forces the material manager (choosing the material for the spiral discharge electrodes that the company manufacture) and the procurement manager (handling the whole procurement process) in the electrode making companies to choose material suppliers with fast delivery times. Sandvik should stock material in a free trading zone (a zone where products can be stored without paying any import taxes) as a trial. If Sandvik experience that the order intake increases they should make the stock permanent in China and use the trend from the trial to make a forecast for the permanent stock.

Sandvik has a good relationship with ZJ feida today. But as ZJ Feida make larger profits on the 316 material, they have started to persuade their customers to buy 316 products rather than the products made by Sandvik's high quality material. ZJ Feida is one of the biggest actors on the ESP-market in China and probably has a lot of good connections with other actors on the market. Sandvik should try to develop the relationship with ZJ Feida. One opportunity is the shorter lead-time but that may not be enough. One other way is to develop a new cheaper steel grade but this would require a high investment.

#### 6.4 Suggestions for further research

Is it possible to have a more long-term price on the products on the Asian market?

How can Sandvik keep its personnel?

How can the Chinese personnel be trained so that contacting new companies will be easier?

How can a foreign company create guanxi-based sales with a high personnel turnover?

## List of References

This chapter contains the references that have been used in this bachelor thesis. The list of references is divided into three parts: “Electrostatic Precipitators”, “Marketing, Supply Chain and Business-to-business” and “The Case Study”. The list is divided to make it easier to connect the references to the text they are used in.

### 6.5 Electrostatic Precipitators

#### 6.5.1 Brochure

ALSTOM Environmental Control Systems. 2005. Electrostatic Precipitators: Effectively Improving the Environment.

ALSTOM power. Description ESP.

#### 6.5.2 References to Internet

ALSTOM Environmental Control Systems. 2007. Electrostatic Precipitators. Visited at 31-03-2008. Available on:

[http://www.environment.power.alstom.com:80/home/power/esp/publications/ files/file\\_3566\\_2\\_2413.pdf](http://www.environment.power.alstom.com:80/home/power/esp/publications/ files/file_3566_2_2413.pdf)

GÖTEBORGS UNIVERSITET CHALMERS. 2007-07-02. Växthuseffekt och växthusgaser – vad är det egentligen?. Visited at 31-03-2008. Available on:

<http://www.miljportalen.se>

International Union of Pure and Applied Chemistry. A. D. McNaught and A Wilkinson. 1997. IUPAC Compendium of Chemical Terminology. Visited at 01-04-2008. Available on:

<http://old.iupa.org/publications/books/author/mcnaught.html>

U.S. Environmental Protection Agency. APTI Virtual Classroom: SI 431 – Lesson 4: Electrostatic Precipitators. Visited 03-04-2008. Available:

[http://yosemite.epa.gov/oaqps/EOGtrain.nsf/DisplayView/SI\\_431\\_4?OpenDocument](http://yosemite.epa.gov/oaqps/EOGtrain.nsf/DisplayView/SI_431_4?OpenDocument)

E24. Näringsliv. Samhällsekonomi. Published: 080304. Visited: 03-04-2008. Available on:

[http://www.e24.se/samhallsekonomi/varlden/artikel\\_299631.e24](http://www.e24.se/samhallsekonomi/varlden/artikel_299631.e24)

ERA. Sveriges och nordens största elmarknadstidning. Published: 21-06-2007. Visited: 03-04-2008. Available on:

[http://www.era.se/nyheter/visa\\_nyhet.shtml?id=167751288](http://www.era.se/nyheter/visa_nyhet.shtml?id=167751288)

Sydsvenskan. Published: 03-02-2007. Visited: 03-04-2008. Available on:

<http://sydsvenskan.se/varlden/article215329.ece>

## 6.6 Marketing, Supply Chain and Business-to-business

### 6.6.1 Literature

Armin Seiler. Marketing – BWL in der praxis IV. 6 edition. 2001. ISBN 3-280-02644-X.

Arjan J. Van Weele – Purchasing & Supply Chain Management. Analysis, strategy planning and practice. Forth Edition. 2005. ISBN-10: 1-84480-024-5.

Sten Albertsson. Olof Lundqvist. Marknadsföring. Third Edition. 2007. ISBN 978-91-622-8246-2

### 6.6.2 Journals

Paul Hong, Jungbae Noh and Woosang Hwang. Global supply chain strategy: a Chinese market perspective. Journal of Enterprise Information Management. Volume 19. Number 3. 2006. 320-333.

David J. Closs and Diane A. Mollenkopf. A global supply chain framework. Journal of Business & Industrial Marketing. Volume 33 · 2004 · 37 – 44.

Jamal A. Al-Khatib, Stacy M. Vollmers and Yusin Liu Business-to-business negotiating in China: the role of morality. Journal of Business & Industrial Marketing. Volume 22. Number 2. 84 – 96. 2007.

Daniel J. Flint. Industrial Strategic marketing in global supply chains: Four challenges. Marketing Management. 33. 45–50. 2004.

Douglas M. Lambert and Martha C. Cooper. Issues in Supply Chain Management. Industrial Marketing Management 29. 65–83. 2000.

Yiming Tang, Paul Wang and Yuli Zhang. Marketing and business performance of construction SMEs in China. Journal of Business & Industrial Marketing. Volume 22. Number 2. 118 – 125. 2007

Andrew D. Pressey and Xin Xuan Qiu. Buyer-supplier relationship dissolution: the Chinese context. Journal of Business & Industrial Marketing. Volume 22. Number 2 . 107 – 117. 2007

Heiko Gebauer, Chunzhi Wang, Ber nold Beckenbauer and Regine Krempf Business-to-business marketing as a key factor for increasing service revenue in China. Journal of Business & Industrial Marketing. Volume 22. Number 2. 126 – 137. 2007.

Brian Low, Wesley J. Johnston and Jennifer Wang. Securing network legitimacy in China's telecommunication market. Journal of Business & Industrial Marketing. Volume 22. Number 2. 97 – 106. 2007.

## 6.7 Case study

### 6.7.1 Interviews

Kjell Svensson. CEO, EWES Stålfjäder. 080411.

Siegfried Eyes. ALSTOM Växjö. 080414.

Maria. ALSTOM Växjö. 080414.

Martin. Worked with ESP equipment on the Chinese market a long time. ALSTOM Växjö. 080414.

Tobias. ALSTOM Växjö. 080414.

Doyle Huang. Senior Sales Manager. ALSTOM Beijing. 080509.

Zhong Mu. Director of Products Department. ALSTOM Beijing. 080509.

Liu Zhenghu, ESP Products Engineer. ALSTOM Beijing. 080509.

Daniel Zhao. North East Asia Strip & Wire Sales Manager. Sandvik Materials Technology. 080513.

Jonas Cidrin. Project Leader. Swedish Trade Council Shanghai. 080514.

Dou Tianran. Material Manager. BB EETC. 080515.

Sun Huizhong. Procurement Engineer. BB EETC. 080515.

Chang Xueping. International Customer Manager. BB EETC. 080515.

James Shipley. Asia Tube, Primary and Welding Sales Manager. Sandvik Materials Technology. 080521

Vincent Ren. Logistics & Warehouse manager. Sandvik International Trading Co. Ltd. 080522.

### 6.7.2 Telephone interviews

Kunshan electrostatic precipitator equipment plant. ESP Equipment Provider. 080522.

KS Yucheng. ESP spare part maker (including spiral discharge electrode). 080522.

### 6.7.3 E-mail interviews

Jibu Peter. Sandvik Materials Technology Asia Ltd. 080502.

Willa Lu. Tax expert. Sandvik (Qingdao) Ltd. 080513.

#### **6.7.4 Interactive conversations**

Jason Zhu. Field Sales Engineer-Strip & Wire. Sandvik International Trading Co Ltd. 080508.

Jonson Zhang. Energy Segment Leader in China. Sandvik International Trading Co Ltd. 080516.

Tomy Qiu. Segment Leader - Precision Wire. Sandvik International Trading Co Ltd. 080522.

#### **6.7.5 Reference group meeting**

Participants:

Henrik Calander. Global Product Manager. Sandvik Materials Technology Wire Sandviken.

Phil Etheridge. Marketing Manager - . Sandvik Materials Technology Wire Sandviken.

Jessica Hillgren. Product Specialist. Sandvik Materials Technology Wire Sandviken.

Berndt Stenlund. Marketing Manager – Sandvik Technology Wire Sandviken.

## 7 Attachment

### 7.1 Appendix A

OEM Equipment providers

Purchasers

How do you find suppliers?

What are the factors you will consider to choose a supplier?

What are the factors you will consider to choose a product?

Who takes care of purchasing?

What is the process for purchasing?

Do you decide which supplier is chosen?

How can a stainless steel wire supplier become your supplier?

How can a foreign company reduce the import duty?

How many key suppliers of wire/spiral electrodes do you have?

Who are your key suppliers?

Do you always turn to the same suppliers?

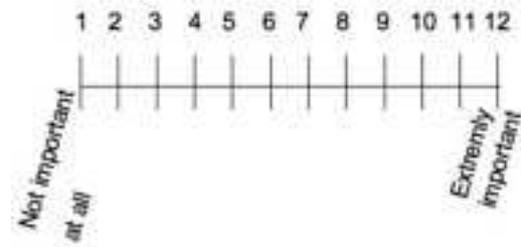
What is your relation to China Power Engineering Consulting Group Corporation and North China Power Engineering Co Ltd?

What are the areas you see opportunities to further improve in the ESP suppliers?

What is important for you when you choose suppliers?

Put in a value from 1 to 12 in the box below. Each number can only be used one time.

Value Scale



Aspect	Value
Lead time	
Material quality	
Technical support (Material recommendation & Cooperation in material questions)	
Delivery precision	
Complete assortment	
Price	
Trust for the company	
The company is in your network of friends	
Easy communication	
Guarantee agreements	
Payment	
Local stock in China	

Salesmen

What is the purchasing process of ESP equipment in Chinese coal fired power plants?

What is the purchasing process of ESP discharge electrodes in Chinese coal fired power plants?

Do the customers care about the lifetime of the discharge electrodes?

Who are your customers buying spare parts from?

What about your relationship with other companies that manufacture ESP in China?

Do you sell any ESP equipment in China?

How many key customers do you have?

Who are your key customers?

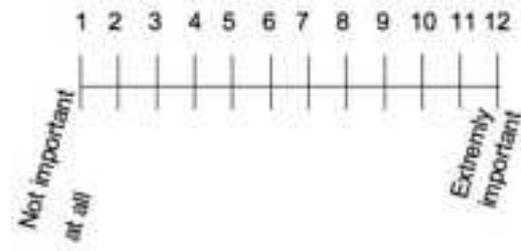
What are the concerns customers normally raise in your meetings?

What do you think are the major issues to get into this business?

What is important for your customers?

Put in a value from 1 to 12 in the box below. Each number can only be used one time.

Value Scale



Aspect	Value
Lead time	
Material quality	
Technical support (Material recommendation & Cooperation in material questions)	
Delivery precision	
Complete assortment	
Price	
Trust for the company	
The company is in your network of friends	
Easy communication	
Guarantee agreements	
Payment	
Local stock in China	

Market responsible

How do you experience the Chinese market in general for electrostatic precipitators?

How do you experience the aftermarket for ESP spare parts?

How do you experience the market for selling ESP equipment to foreign companies in China?

Have you done any market surveys on the Chinese market?

Who are the big ESP equipment providers?

Who are the big ESP discharge electrode makers?

Who are the big coal fired power plant actors?

What is your relation to China Power Engineering Consulting Group Corporation and North China Power Engineering Co Ltd?

What is the Electric Power Design Institutes role on the Chinese ESP market?

Does Chinese companies have to contact Electric Power Design Institutes when they want to buy an ESP?

Who are your big ESP competitors in China?

How can a Swedish stainless steel wire company become a supplier to a discharge electrode maker in China?

What are your opinions about Sandviks material?

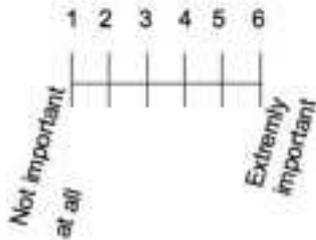
What are the strengths?

What are the weaknesses?

How do you market your company?

Put in a number from 1 to 6 in the box below. Each number can only be used one time.

Value Scale



Aspect	Value
Through your friends introduction	
Visiting trade fairs	
Advertising in newspapers	
Advertising in trade magazines	
Advertising on Internet	
Recommendations from existing customers	

## 7.2 Appendix B

Questions:

What are your opinions of the Chinese markets for the ESP in general?

How important is personal relationships when you shall book meetings with companies?

What is important to think about in the Chinese business culture?

What are the things you need to consider when you thinking of starting up a local workshop in China?

What aspects can be reduced with a local ESP wire workshop?

What aspects can be reduced with a local ESP wire storage?

How can you get information about:

What is the purchasing process of:

How superstitious are the customers? (The number four for an example in 904L)

## 7.3 Appendix C

How does the import taxes system work?

What aspects can be reduced with a local ESP wire workshop?

What aspects can be reduced with a local ESP wire storage?

What is the purchasing process of:

Materials in spring maker companies.

General purchasing behaviours in china

Discharge electrodes in equipment provider companies

ESPs in coal fired companies

Is it illegal to give expensive gifts and money as presents to customers?

How superstitious are the customers? (The number four for an example in 904L)

## 7.4 Appendix D

Questions:

What are the things you need to consider when you thinking of starting up a local workshop in China?

What aspects can be reduced with a local ESP wire workshop?

What are the things you need to consider when you thinking of starting up a local storage in China?

What aspects can be reduced with a local ESP wire storage?

How can you get information about:

Chinas import and export of products.

Do china have business associations? Where can I find information about them?

## 7.5 Appendix E

6. Hur upplever ni eftermarknaden för ESP i Kina?

7. Hur aktiva är Ni på Kinesiska marknaden?

8. Hur sker Er reservdelsförsäljning i Kina?

9. Vilka slutkunder har Ni i Kina?
10. Finns det kontaktpersoner på dessa företag som jag kan ta kontakt med?
11. Vilka är Era konkurrenter på den kinesiska marknaden?
12. Vad har Ni gjort för typer av undersökningar när det gäller den Kinesiska marknaden
13. Är det något Ni önskar få ut av min undersökning?
14. Vad har ni för åsikter om SMT Wire som företag:
15. Sandviks material?
16. Sandviks leveranstider?
17. Hur tror ni SMT Wire kan göra för att öka sina marknadsandelar i Kina?
18. Övriga åsikter? Vad kan göras bättre?
19. Hur ser Ni på EWES som företag. Är det en konkurrent eller en samarbetspartner?
20. Tar Ni marknadsandelar i Kina från EWES?
21. Hur länge håller Era ESP innan de behöver renoveras?
22. Vilka är de vanligaste trådarna till elektroder?/bekräfta de som jag tagit upp i text
23. Vad finns det för andra sorters rökgasfilter?
24. Vad finns det för energimässiga fördelar med ESP?
25. Vad finns det för övriga för och nackdelar med respektive?
26. Få syftet och frågeställningarna bekräftade.

## 7.6 Appendix E

27. Hur upplever ni eftermarknaden för ESP i Kina?
28. Hur aktiva är Ni på Kinesiska marknaden?
29. Hur sker Er reservdelsförsäljning i Kina?
30. Vilka är Era konkurrenter?
31. Vad har Ni gjort för typer av undersökningar när det gäller den Kinesiska marknaden?
32. Är det något Ni önskar få ut av min undersökning?
33. Vad har ni för åsikter om SMT Wire som företag:
34. Sandviks material?
35. Sandviks leveranstider?
36. Hur tror ni SMT Wire kan göra för att öka sina marknadsandelar i Kina?
37. Övriga åsikter? Vad kan göras bättre?
38. Hur ser Ni på ALSTOM som företag. Är det en konkurrent eller en samarbetspartner?
39. Fått syftet och frågeställningarna bekräftade.
40. Bekräftat vilka de vanligaste trådarna är i ESP.