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Structured Spend Analysis

Integrated Requirements from the Business and Operations

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Acknowledgements

This master thesis is the ending course of the Master of Science in mechanical engineering at Lund University. The thesis has been conducted at the Department of Industrial Management and Logistics and was assigned by the Purchasing department at ST-Ericsson in Lund, Sweden.

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Abstract

Title:	Structured spend analysis
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Background:	In the ongoing joint venture between Ericsson and ST Microelectronics, EMP spend data needed to be extracted, consolidated and analyzed to support the ongoing joint venture. Provide an understanding what spend analysis is and how it can support the business and operations in the company.
Purpose:	The purpose with this master thesis was to create a foundation of spend analysis knowledge at the company and how this can be used for the purchasing department at ST-Ericsson. The study clarified weaknesses and gaps how the function works today in this area and recommendations how spend analysis can be conducted at the company. The author proposes changes to the new company and new information about spend analysis, how the purchasing department can use this sort of tool in their business and operations.
Methodology:	The working procedure for this master thesis was to analyze current situations and find gaps where ST-Ericsson should concentrate efforts to secure spend visibility and conduct analysis of spend in the new company. Logical reasoning in the company's current spend to find weaknesses and opportunities in reducing costs.
Conclusions:	The company should focus on securing their processes for extracting and consolidating spend data. Considering new commodity classification to easier find opportunities and pooling spend with parents companies. Finally implement recommended spend analysis tool for analyzing both Performa spend and future spend in ST-Ericsson.
Keywords:	Spend analysis, spend visibility, purchasing, spend leakage

Sammanfattning

Titel:	Strukturerad kostnads analys
Författare:	Christoffer Kamf
Handledare:	Adjungerad universitetslektor Bertil Nilsson, <i>Institutionen för teknisk ekonomi och logistik</i> , Lunds Universitet, tekniska fakulteten
Bakgrund:	Under den pågående sammanslagningen mellan Ericsson and ST Microelectronics, EMP utgifts data behövdes för att framställas, sammanslås och analyseras för att stödja den pågående sammanslagningen. Ge en förståelse vad kostnads analys är och hur den kan stödja verksamheten i företaget.
Syfte:	Syftet med detta examensarbete var att skapa en kunskapsgrund vad kostnads analys är och hur detta kan användas på inköpsavdelningen vid ST-Ericsson. Studien klargjorde svagheter och luckor på avdelningen inom detta område och rekommendationer hur kostnads analys kan utföras på företaget. Författaren föreslår förändringar till det nya bolaget och ny information om kostnads analys, hur inköpsavdelningen kan använda denna typ av verktyg i sin verksamhet.
Metod:	Arbetsproceduren för detta examensarbete var att analysera nuvarande situation och hitta luckor där ST-Ericsson bör koncentrera sina insatser, för att få synlighet i sina kostnader och utföra kostnads analyser i det nya bolaget. Logiska resonemang i bolagets nuvarande kostnader för att hitta svagheter och möjligheter att minska kostnaderna.
Slutsats:	Företaget bör säkra sina processer för att få fram kostnadsdata. Ny klassificering gör det lättare att hitta möjligheter och förenade kostnader med föräldrar bolagen. Slutligen implementera rekommenderade kostnadsverktyg för att analysera både Performa kostnader och framtida kostnader i ST-Ericsson.
Nyckelord:	Kostnads analys, kostnads synlighet, inköp, kostnads läckage

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1 Introduction

In the introduction the background of the master thesis will be described. Reasoning about question formulation, purpose, focus, delimitation and target group will be presented.

1.1 Background

Spend analysis is the starting point of strategic sourcing and creates the foundation for compliance and control. Spend analysis organizes procurement information via supplier hierarchies, commodity alignment and spend amount, in order to:

- Ascertain true category spend
- Identify strategic sourcing opportunities through demand aggregation and supplier rationalization
- Identify expense reduction through increased compliance – in the form of vendor rebates, maverick spend and contract compliance

Put it more simply, spend analysis is a process of systematically analyzing historical spend (purchasing) data of an organization in order to answer the following type of questions:

- What was the corporate-wide spend associated with each cost center last year? Does the aggregated amount enable the company to increase leverage with supplier?
- What are the top commodities? Which of these commodities represent opportunities for spend reduction?
- What percentage of spend is associated with contracts?

Early 2009, Ericsson and ST Microelectronics formed a joint venture between Ericsson Mobile Platforms (EMP) and the semiconductor company ST-NXP Wireless. It is a 50/50 joint venture which will have approximately 8000 employees and the headquarters will be in Geneva. The new name of the company is ST-Ericsson. Data needs to be aggregated to help this joint venture go as smoothly as possible and find supplier synergies between the two companies.

During spring 2009 EMP have implemented ST's ERP system and are operational in their procurement system since June 2009. New processes for extracting and consolidating spend data in the new ERP system needs to be defined, to support decision making and sourcing.

1.2 Problem description

EMP's problems with extracting and consolidating spend data worldwide forms the foundation of this master thesis. The problems occur in EMP's weak ability to extract spend data from numerous sources and that EMP's spend is embedded in their parent company Ericsson's spend. Extracted spend data will be analyzed to answer questions for the master thesis. The thesis work has also

introduce the concept of spend analysis to the company and how it can support the new purchasing department at ST-Ericsson.

Key questions:

- How can spend analysis support the business and operations in the company?
- Is the cooperation with other functions and with all global sites working?
- Is ST-Ericsson committed to make the purchasing function a best-in-class organization?

1.3 Purpose and Objectives

The overall purpose of this master thesis is to obtain EMP's spend and analyze it to help the ongoing joint venture. The aim is also to benchmark spend analysis tools and suppliers, to get an understanding of what opportunities ST-Ericsson can achieve with a tool.

The data will be extracted from numerous sources, consolidated and analyzed to:

- Support the joint venture with meaningful data
- Secure spend visibility and perform data analysis

1.4 Focus

This project has focused on EMP's local and global spend data that will be analyzed to receive information about the company's spend picture and achieve accurate spend data. Focus is also on ST-Ericsson way forward in spend analysis and implementing a tool to support this in the new company.

1.5 Delimitations

To limit the study, only indirect material¹ has been studied and a deeper analysis in this material group has been conducted in order to setup the new purchasing department. Valuable information about spend analysis from the entire company's points of view could not be achieved, since both Ericsson and Sony-Ericsson could not participate in this study.

All empirical data gathered and analyzed at ST-Ericsson could not be published in this master thesis because of confidential issues.

1.6 Target Group

The primary target group of this master thesis is the purchasing function at ST-Ericsson in Lund. Other groups are the department of Industrial management and logistics and students from the same department with interests in this area.

¹ Indirect material is defined as: Services, materials and suppliers used in the operation of the business, not directly associated with production.

1.7 Disposition

The disposition of this master thesis and a short presentation of the thesis chapters are illustrated in figure 1.1:

- *Introduction*: Background situation, problem description and the purpose and objectives for the thesis
- *Presentation of ST-Ericsson*: The companies ST, EMP and the joint venture (ST-Ericsson) are described
- *Methodology*: Different approaches and methods are discussed
- *Theoretical framework*: Chapter will give insight in existing research material of spend analysis
- *Empirical framework*: Findings are presented and discussed
- *Analysis*: Theory is used as a baseline to discuss the empirical findings and support the conclusions in the next chapter
- *Discussion and Conclusions*: Comments on the result and conclusions are presented

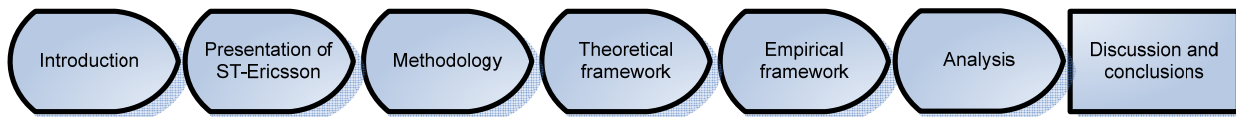


Figure 1.1 - Outline of the thesis

2 Presentation of ST-Ericsson

In the following chapter Ericsson and the joint venture between Ericsson and ST are presented.

Ericsson was founded in 1876 by Lars Magnus Ericsson and is today the world-leading provider of telecommunications equipment and related services to mobile and fixed network operator. Ericsson is one of the leading companies that offer end-to-end solutions for all major mobile communications standards. The headquarters is stationed in Stockholm, Sweden.

In 2001 Ericsson formed Ericsson Mobile Platforms, the research and development group that developed core technology for mobile phones, to offer 2.5G and 3G platforms to manufactures of mobile phones and other wireless devices. The unit was headquartered in Lund, Sweden and part of the Business Unit Multimedia within the Ericsson Group.

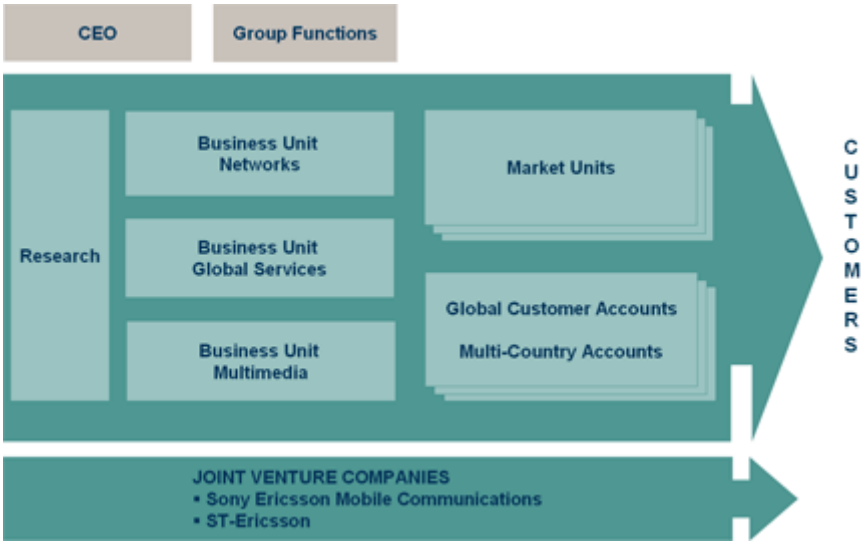


Figure 2.1 - Ericsson Organization²

As shown in the figure above, Ericsson is structured in three different business units (Networks, Global Services and Multimedia) and two operational business units.

2.1 ST-Ericsson³

On August 20th, 2008, ST Microelectronics and Ericsson announced an agreement to merge Ericsson Mobile Platforms and ST-NXP Wireless into a joint venture. It is a 50/50 joint venture and will have one of the industry’s strongest product offering in semiconductor and platforms for mobile applications. In a business where scale matters, the complementary product portfolios that both parent companies processes, will deliver significant scale and synergies.

The business in this 50/50 joint venture will be lead by a development and marketing company with approximately 7000 employees. A separate platform design company with approximately 1000

² Ericsson internal

³ www.stericsson.com

employees will provide platforms designs to the development and marketing company. Of the company's 8000 employees, approximately 5000 will be from ST-NXP Wireless and about 3000 from Ericsson Mobile Platforms. The headquarters will be stationed in Geneva, Switzerland.

In the joint venture both companies contributes with different solutions. ST contributes with its industry-leading multimedia and connectivity solutions as well as a complete world-class 2G/EDGE platform and strong 3G offering, including customer relationship with Nokia, Samsung and Sony Ericsson. The other part in the joint venture Ericsson contributes with its industry leading 3G and LTE platform technology, consumer relationships with Sony Ericsson, LG and sharp. The joint venture is designed for long-term stability and is set to become an industry leader in product research, as well as design, development and the creation of cutting-edge mobile platforms and wireless semiconductors.

2.1.1 Products and costumers

The joint venture will rely on its complete platform offering, which include modems, multimedia and connectivity solutions for 2G/EDGE⁴, 3G⁵, HSPA⁶ and LTE⁷ technologies. The portfolio also includes appropriate hardware, software and support to enable handset manufacturer to develop mass-market products to end-user customers. ST-Ericsson solutions cover all market segments, from entry level to smart phone, and can be delivered as completely integrated solution, as well as individual components. With this complete portfolio ST-Ericsson customers are the world-leading mobile phones companies, such as Sony Ericsson, Nokia, Samsung, LG and Sharp.⁸

⁴ Enhanced Data rates for Global Enhancement

⁵ Third Generation

⁶ High Speed Packet Access

⁷ Long Term Evolution

⁸ www.stericsson.com

3 Methodology

In the following chapter different relevant methodologies are discussed. These methodologies describe the approach the study uses to achieve the objective of the master thesis.

3.1 Choice of scientific approach

Methodology in the business research area can be described in three different views of methodology: the analytical approach, the system approach and the actors approach. First approach is based on classic analytical philosophy and is common in the subject of business research. Their assumption is that the approach strives to explain reality objective as far as possible and that the whole is the sum of all the parts. The analytical approach requires an existing theory and a couple of predefined chosen techniques that enables verification of hypothesis. Objective facts are identified and contain subsets of the objective reality, at a summoned of different objective facts a more holistic picture is obtained. The analytical approach is mainly used in natural science.⁹

Next methodology is the system approach and it differs from the analytical approach that is not of a summarize character; the whole departs from the sum of all parts. This approach is used in business and management science. Instead relations between the whole parts become essential and value can exist in the relation between parts, this leads to both positive and negative synergies. With help from the system approach knowledge is developed and is depended on systems or classes of systems. This approach explains parts as through the characteristics of the whole and without some of the parts the risk of affecting the whole picture is considered severe. Within a systems approach it is possible to study details and not only getting an overview.¹⁰

Last methodology is the actors approach and is mainly used in social science. This point of view has no interest in explanation only to understand the social whole. The approach focus on mapping the importance and meaning, that different actor put in their acts and their surrounding environment. The actor approach differs from the other approaches concerning core of knowledge comes from the understanding/meaning for the subject.¹¹

The approach that is most suitable for this master thesis is the system approach. Investigating the spend analysis functionality at the company, both in a holistic view and from a department point of view this approach is most suitable.

3.2 Data Collection

3.2.1 Literature Studies

Literature is all kind of written and published material. This can be material published in books, magazines, brochures, scientific articles and journals. This information is so-called secondary information. It is important to have in mind that information from literature studies can be angled or incomprehensive. Also that selected search methods in databases can cause an incomplete

⁹ Arbnor and Bjerke (1994) *Företagsekonomisk metodlära*, p. 49-64

¹⁰ Arbnor and Bjerke (1994) *Företagsekonomisk metodlära*, p. 49-70

¹¹ Ibid

information ground. Therefore it is vital to the master thesis where to search, which key words to use, and how to browse in finding material that fits the researcher's own context.¹²

The advantages with literature studies are that on a relative short time and with small amount of resources, large amount of data can be collected. This information often helps the researcher to chart existing knowledge within chosen field to build a solid theoretical framework for the master thesis. The weakness is that the material is secondary data, it has been gathered for other purposes, and it is difficult for the researcher to understand way this information has been collected and with which kind of methods. That is why it is important to be critical to this information and use it carefully.¹³

The publications used in the literature study of this master thesis are books in research methods and methodology, purchasing and spend analysis. An extensive amount of scientific articles have been found through Electronic Library Information Navigator (ELIN). Following key words were used: Spend analysis, spend management and spend visibility. Books in the area of spend analysis and purchasing has also been studied.

3.2.2 Interviews

Interviews are associated to different kinds of hearings, which can be conducted in several different ways. This way can be personal, face to face or over the telephone, a dialog over e-mail or with a group of people answering questions at the same time.¹⁴

Interviews are divided into three different kinds of setup. First interview is a structured interview where all the questions are prepared in advance and goes through them in a predefined way. A semi-structured interview has a predefined area of interest and questions are gradually formulated and asked when time is suitable. Last is an unstructured interview where questions are formed spontaneously during the discussion. Questions can be more or less leading, it is important that the researcher is well aware of the situation and as far as possible avoid this kind of questions.¹⁵

As the author is located on site at ST-Ericsson at the department where the master thesis is done, face-to-face interviews is conducted. In most cases interview questions are prepared in beforehand in order to be efficient during the interview - semi-structured interviews. Due to the close cooperation with responsible employees at the Procurement and Supply department, discussion and unstructured interviews are conducted throughout the thesis and will not be attached in the thesis. Structured interviews are also performed and attached in Appendix 1.

3.2.3 Primary and Secondary Information

There are two types of data collection, primary and secondary information. Primary information is the data that are collected especially for the study, secondary information is gathered for other purpose during previous investigations. Primary information is gathered from primary source using methods as interviews, observations, simulations, tests, action research or questionnaires. This information is collected for a project at hand and makes the data more consistent with the

¹² Björklund and Paulsson (2003) *Seminarieboken*. p. 67-68

¹³ Ibid

¹⁴ Arbnor and Bjerke (1994) *Företagsekonomisk metodlära*, p. 242-243

¹⁵ Björklund and Paulsson (2003) *Seminarieboken*.

researcher's questions. Secondary data is information that has been collected for other purposes during previous studies.¹⁶

Both primary and secondary information will be gathered in this master thesis. Primary data will be obtained through data collection and interviews both at ST-Ericsson and other companies. Secondary information will be the foundation to the theoretical framework.

3.2.4 Case Study Method

The basic of the case study method is to explore, explain or describe a phenomenon of interest to the researcher. Case studies can both be used to create theory to test with surveys, or as a follow up to surveys to provide greater insight. The type of data can be empirical and has been gathered in the real world for analysis, often through surveys or case studies. It can also be modeled data, which means it is either hypothetical or real data to be artificially manipulated by a model. The empirical data uses a quantitative or a qualitative analysis, a combination of the analysis can also be conducted. Case study method can be conducted as a single case study or multiple case studies.¹⁷

Case studies are conducted to achieve deeper insight in different material groups¹⁸. In order to analyze purchased material and achieve a better understanding what is being purchased.

3.2.5 Qualitative and Quantitative Studies

Qualitative and quantitative studies state how primary data should be analyzed and proceed. It is foremost the purpose of the study that decide whether it is qualitative or quantitative and analysis methods decide how data will be expressed.¹⁹

Quantitative studies contain information that can be measured or valued numerically. Mainly surveys and mathematical models are methods that are recommended for this. It is important to get close to the respondent's perspective, which is why observations and interviews often are suitable when conducting qualitative studies. Generalization is lower compared to quantitative studies since the totality of each situation is taken into concern.²⁰

In the study the author investigated spend analysis at the department. To be able to build up a broad foundation of understanding and information a qualitative approach consisting of interviews with key persons and observations will be carried out. After a certain level of understanding, knowledge and information is gained, calculations will be performed to be able to evaluate and investigate the acquired information. The author will therefore use a combination of qualitative and quantitative approach.

3.3 Analysis models

Different analysis models will first be described and then how they are used in this master thesis.

¹⁶ Björklund and Paulsson (2003) *Seminarieboken*. p. 68

¹⁷ Ellram (1996) *The use of the case study method in logistics research*. p.93-117

¹⁸ SAP classify the purchase of goods or services into logical groups

¹⁹ Björklund and Paulsson (2003) *Seminarieboken*. p. 63

²⁰ Ibid

3.3.1 Gap analysis²¹

To identify, specify and execute the gap between the existing and wanted situation, a common term is the gap analysis. The gap can be the difference between the company's existing competence and the competences needed to realize chosen strategy. The analysis includes six tollgates:

1. Define area of analysis. For example; efficiency, competence performance etc.
2. Describe the existing situation
3. Describe wanted situation and targets
4. Analyze the gap between wanted and existing situation
5. Take decision of ways to fulfill the gaps
6. Follow up and if necessary change the way erasing the gaps.

3.3.2 Logical reasoning²²

Logical reasoning are divided in three categories; deduction, induction and abduction. Examples are set up with preconditions, rules and conclusions, the rule and the precondition implies the conclusion. It will be used to explain the difference between the three reasoning types.

When using inductive method it starts with collecting unlimited empirical data. This data is analyzed and combined to sort out pattern that can be matched with suitable theoretical framework. While in deductive method theoretical framework is first gathered and from this information empirical hypothesis are concluded. Finally the abductive method can be seen as a combination between the inductive and deductive method, means that the researcher can alternate between the theoretical and empirical findings.²³

3.3.3 Action Research

This research method starts with observing a situation or a phenomenon to identify or clarify a problem that is going to be solved. Next step is to come up with a proposal to a solution and execute it. After that it is important to evaluate the solution, both to observe it in its context and analyze how it worked out. This is an iterative process that needs to be repeated all over again until the problems solved.²⁴

Studies with action research often follow the development of a study and the cycle needs to be conducted a couple of times. Working like this it is important to keep the distance to the problem that is being evaluated and take precautions to minimize this threat.²⁵

3.3.4 Analysis models used in this thesis

This master thesis analysis model uses a mix of gap analysis and logical reasoning. The logical reasoning style that is used is the deduction type. Deduction type is chosen because of the preconditions and rules are given, through the gap analysis and the conclusions are searched for. The analysis will be conducted as case study of empirical data gathered at ST-Ericsson.

²¹ Karlöf and Helin Lövingsson (2007) *Management från A till ö – Förklaringar till 150 begrepp och modeller*

²² Menzies (1996) *Applications of abduction: knowledge-level modelling.*

²³ Björklund and Paulsson (2003) *Seminarieboken*, p. 62

²⁴ Höst, Regnell and Runesson (2006) *Att genomföra ett examensarbete.*

²⁵ Ibid

Action research will be used as a system approach and a deductive approach. First situation is current reality problem at the company. Lack of knowledge what spend analysis is and how it should be conducted, also to identify EMP spend. In the next situation the author will structure and analyze the current system in a logical way. This will be done by help of theoretical research in the area and case studies. Eventually the author will come to suggestions for ST-Ericsson where spend analysis process for ST-Ericsson is structured and suitable. Finally the implementation of the process will be made in the last step. Figure 3.1 shows the system approach.

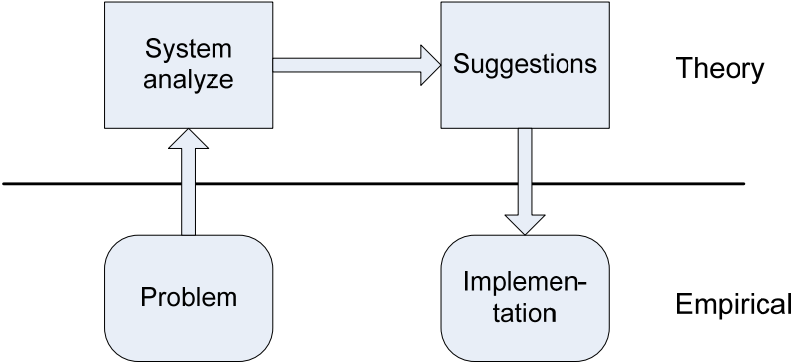


Figure 3.1 - The System Approach ²⁶

3.4 Credibility

Three different measurements define a study is credibility: reliability, validity and objectivity. Reliability describes if the extent of a study remains consistent, if it is repeated with the same subject and under same conditions. Validity refers to what is being measured and what is intended to be measured. Finally objectivity defines a person personal value concerning the working procedure and thereby the whole study.²⁷

During the study the researcher has discussed topics with various persons to prevent personal opinions and has been integrated with as many people as possible at ST-Ericsson and used multiple sources of data. After interviews the answers has been analyzed and to some extent the answers have been confirmed with the interviewed people so that the answers have not been misinterpreted.

²⁶ Arbnor and Bjerke (1994) *Företagsekonomisk metodlära*. p. 377
²⁷ Björklund and Paulsson (2003) *Seminarieboken*, p. 59-62

4 Theoretical Framework

In the following chapter different relevant theories are discussed. These theories describe the approach the study uses to achieve the objectives of the master thesis.

4.1 Three Approaches to Spend Analysis²⁸

When talking about spend analysis, there are three available approaches for a company to do this.

- Reports of transaction systems (ERP, Procurement etc.)
- Manual analysis of Purchase Orders²⁹, invoices, receipts
- Automated spend analysis

First one is reports of transactions system, meaning that data will be extracted from an ERP system and analyzed. It is a manual approach and should only be used by small firms with lack of internal budget for spend analysis.

Pros: There are not so many benefits with this approach, primary one that it is cheaper than the other approaches. For small amounts of data, this approach can be fast and get an overview of a companies spend.

Cons: Data quality is generally poor and incomplete, difficult to obtain a good detailed spend picture of the organization and can only be conducted at one site at a time.

The next approach is manual analysis of purchase orders. This approach is often performed by consultants that analyses purchase orders and invoices. It is used for a single project to obtain a snapshot of historic spend.

Pros: It is cost-effective when one-time snapshots of a company historic spend is used, usually for a project.

Cons: As said above this approach is used for one-time snapshot, meaning that it will be expensive to do this on a regular basis. If it is a medium to large company with sites all around the world, this approach is going to take a long time.

The last approach is automated spend analysis, which is used when specialist software vendors provide automated tools. Data is collected automatically from all transactions system and is normalized, enriched before analyzing data in the tool. This is the ideal of spend analysis and is a must for companies who wants to have a best-practice purchasing and sourcing.

Pros: Spend data can be extracted fast and from all companies ERP system, it is repeatable and can be used at anytime. A complete tool for managing a company spend and sourcing activities.

Cons: The system needs to be trained for improved accuracy and have a high cost.

²⁸ Ariba (2005) *Spend visibility: a guide to Effective Program Design*.

²⁹ Commercial document issued by a buyer to a seller, indicating types, quantities, and agreed prices for products or services the seller will provide to the buyer

4.2 What to look for in a spend analysis solution³⁰

To acquire a suitable spend analysis tool, these questions should be asked:

- Ability to cleanse, normalize, and categorize spend data from a variety of sources
 - Most important to have a tool that can do all this (cleansing, normalize and categorize spend data)
- Efficiency of analysis engine –how much data can it handle, how quickly can it generate results, what level of accuracy?
- Structure of analysis engine:
 - Rules-based engines work best on direct and indirect materials
 - Based upon a lot of analysis and work that they have done with clients to generate a set of rules that every time a particular data field, name or reference shows up, the engine knows in which category it belongs
 - Neural network engines are best for services
 - Analyzes wording in invoices to a dictionary to classify
- In-house software or outsource service?
 - Many companies start with outsourcing and continue with that
- Experience in analyzing spend in your industry
 - All tools are knowledge based and built up over time, the knowledge will be better if a supplier have lots of experience in the industry
- Integration with sourcing tools
 - First spend analysis to identify opportunities to quickly turn it into a sourcing event
- Portfolio of analytical reports and data views
 - To address the need a company has in compliance, reports and the perspective of a buyer or a supplier or both
- If you are a multi-national company; language and currency support

4.2.1 Which company should look into an automated spend analysis tool

States

One can use figure 4.1 to identify where an automated spend analysis tool makes sense for a company. Companies who have a very complex business environment and are widespread in multiple markets and industries, and a complex technology environment having multiple ERPs can dramatically benefit from an automated spend analysis tool. Companies that are not that complex but provide products in a couple of industries and with a few ERP system can also benefit from this tool. A company in a single market and having a single ERP system should most likely not look into it, but they can benefit from a tool in getting more detailed information about their spend. Interview with three hundred supply management executives states that: “Number one priority for supply management executives for next 24 months: Improve visibility into timely and accurate spend data”^{31, 32}.

³⁰ Web seminar. *Beyond Spend Visibility*.

³¹ Web seminar. *Top 5 Supply strategies (Survey of 300 supply mgmt execs)*.

³² Web seminar. *Beyond Spend Visibility*.

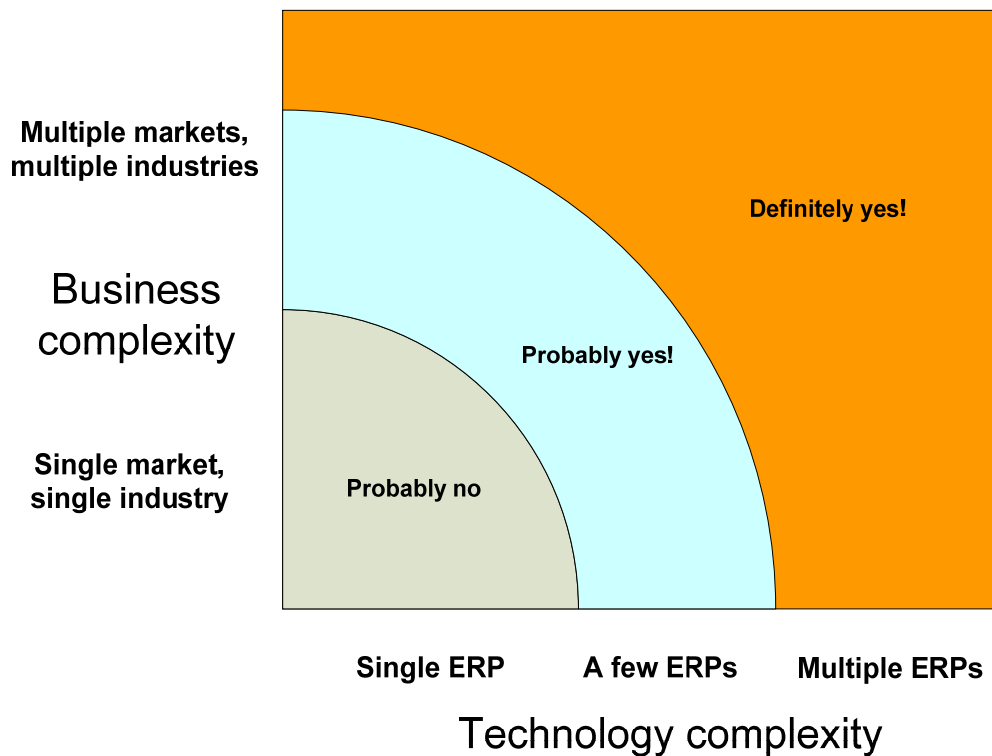


Figure 4.1– Who needs automated spend analysis³³

4.3 Spend Under Management³⁴

In strategic sourcing it is important to have the amount of spend under active management. Active management means that on an ongoing basis, the corresponding commodities are being analyzed for cost reduction and benchmarked with other suppliers in the commodity.

Through acquisitions and expansions new supplier/commodities are added, new spend need to be pulled under active management. Spend analysis should always capture 100% of spend, but only a share of that spend might be under management. It makes sense to target the top ten suppliers of the largest commodities and bring them under active management, that way they can be benchmarked for price, and the supplier base can be rationalized with preferred suppliers' status and entered into contracts with pricing and other terms.

4.4 Commodity Classification³⁵

Many companies are using their own internal commodity codes or many different types of commodity schemas across division. Rather than go through a painful process of merger these different schemas into one, companies should consider using an industry standard taxonomy such as UNSPSC (United Nation Standard Products and Service Code®) or eClass (also eCl@ss; a four-level hierarchy for classifying materials). Using an industry standard will also free a company from the burden of managing the evolution of the schema. A good advice could also be to remain the companies' old category schemas and established mapping between the old schemas and the new

³³ Web seminar, *Beyond Spend Visibility*. (©2007 Forrester Research, Inc)

³⁴ Pandit and Marmanis (2008) *Spend analysis: the window into strategic sourcing*

³⁵ Ibid

industry standard schema. With standardization a company might be able to leverage commodity benchmarking information that research firms could provide in the future. It can be difficult to change the mindset of hundreds of material planners and buyers to transition from a legacy commodity code that they are used to. That is why a spend analysis implementation can serve as an opportunity to roll out a new schema and let users be familiarly with it. Once they understand this new schema the other one will slowly phase out.³⁶

4.5 ETLA³⁷

From a technical perspective, most data warehouses and spend analyze implementations use a form of an ETLA (Extract → Transform → Load → Analyze) approach:

- Extract – Extract the information from various IT systems
- Transform – Normalize and enrich data
- Load – Load the data into a database
- Analyze – Create a library of reports to mine the data

Starting with extract. Spend data rarely comes from only one system, it usually reside in different IT systems that are spread out across various divisions in companies. The divisions are often geographically dispersed and in many different language. These systems are managed by different groups that might not report into a centralized IT department. The spend transaction can come from hundreds different systems and tens of ERP platforms including legacy system across tens of subdivisions on four continents. Synchronization of data can become very difficult in such situations.

Transform, where the end goal is to aggregate and organize spend (transaction amounts) in order to make analyze easier based on supplier, division, commodity, etcetera. There are some special considerations in this process:

Quality of vendor data. The same vendor might be entered differently in different transaction. Company like I.B.M can both be entered as I.B.M, International Business Machines, IBM Global services, or other variations. Also with merger and acquisitions activities, two different suppliers might in fact only be one. There is a need to consolidate this spend with a parent company.

Quality of transactional data. In many transaction data are constantly poorly formatted and incomplete. Data is often duplicated, commodity code assignment are missing, incorrect or not detailed enough. Also an item description might be blank or of poor quality. Assigning proper commodity codes to the transaction becomes difficult if these fields are not cleansed.

Quality of category schema: This is the heart of a good spend analysis program because most opportunities are found by commodity managers. Commodity codes used in the material master files are often at too high a level for purpose of detailed spend analysis, which means the schema needs to be modified. Commodity schemas evolve constantly and grow both horizontally and vertically. Now day's many companies adopt industry standard schemas so that they can utilize the learning from the peers and enable benchmarking exercises.

³⁶ Pandit and Marmanis (2008) *Spend analysis: the window into strategic sourcing*

³⁷ Ibid

Type of data enrichment needed: Might not be enough to clean up the vendor files but also necessary to enrich vendor list with additional information, such as diversity, credit ratings, quality ratings etcetera.

It is of critical importance that this process is good because of the effectiveness of spend analysis is determined largely by how accurately and quickly transformations (that have poor information) are classified to an evolving commodity structure. With this critical importance the commodity managers must have some control in approving the schema evolutions, as well as the assignment of commodity codes. What is even more important is that this information is stored and leveraged in processing new transactions. This continuous feedback cycle is what enables spend application to “learn” as it grows and become increasingly more accurate over time. Most traditional data warehouse approaches rely on static metadata schemas that have rigid security and access controls. They are built to capture periodic data from transaction systems that can be analyzed. Good spend analysis applications are knowledge based systems and not pure analytical systems.

The last letter for analyze. When the data is enriched and loaded into a database, different appropriate reports need to be run. Many companies have done attempts by implemented a reporting engine on top of a data warehouse to analyze spend. This has not been a success because of several limitations. The reports are often finance-centric and not procurement-centric and it takes a lot of time to get these reports modified. It is often questionable how accurate the reports are when data is extracted from a business warehouse, this according to the data have not been enriched.

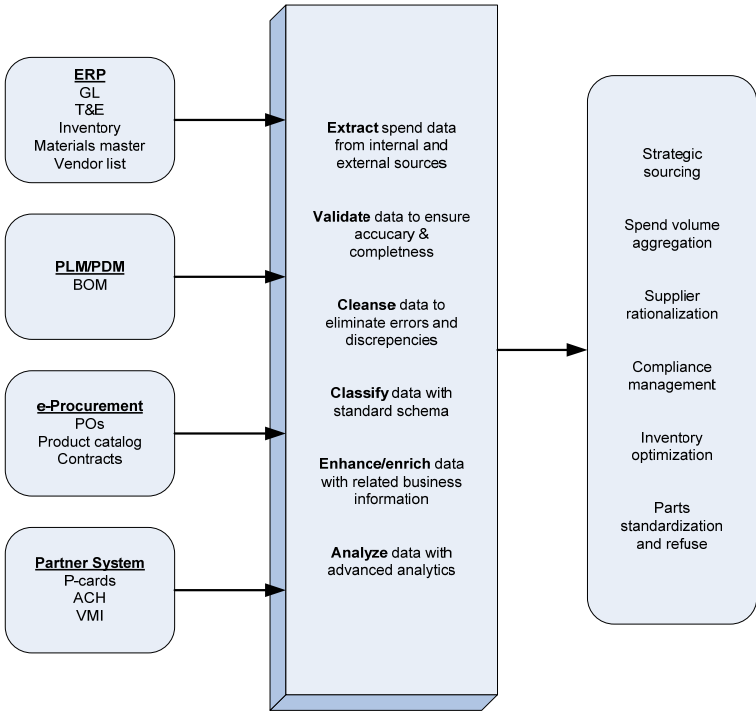


Figure 4.2 – Spend Analysis framework³⁸

³⁸ Aberdeen Group (2004) *Best Practices in Spending Analysis*.

The “aha” moment does not come from running numerous of static reports one by one. Instead, it comes from when having a procurement-centric view of the data and is sliced and diced to sort out spend patterns (by supplier, by commodity, by buyer, etcetera) simultaneously. This four attributes forms the foundation of effective spending analysis data management and spending analysis programs, the approach is shown in figure 4.2.

4.6 Spend Visibility

A company can achieve clear value in basing purchasing on accurate and complete information. It also qualifies for a full range of benefits, such as increasing in sourcing and improving supplier management.³⁹ “Accurate spend data is equally critical to other business objectives, including compliance management, inventory management, budgeting and planning, and product development and management”⁴⁰.

Spend visibility: Analysis of past spend by supplier, organization, commodity and other common dimensions to identify future sourcing opportunities, leverage spend in negotiations and track compliance issues. Table 4.1 shows different improvement areas and possible cost reduction a company could achieve with spend visibility and spend analysis.

Improvement Area	Performance Impact
Material / Services Costs	Reduce costs 2-12% through informed strategic sourcing strategies
Contract Compliance	Improve compliance 55%. Save 7% through use of contract pricing.

Table 4.1 – Benefits of Spend Data Management⁴¹

In recent years spend visibility has been a subject of great interest and many solution has emerged that deliver with consistency and accuracy. This is recognized as a necessary part of ongoing spend management program and the best entry point for those who are new to spend management.⁴²

Visibility in the spend management area refers to a buying company’s ability to get a comprehensive view of the metrics that drive improved cost savings, process efficiency and supply-chain performance. Spend visibility specifically enables analysis of past spend for planning directions and monitoring for compliance issues. Visibility should not simply show what been purchased from whom, but should extend from that and to get maximum value.⁴³

Traditionally numerous challenges prevented effective visibility into spend, processes and performance. From aggregating necessary data to enriching it and turn it into a usable form. That decision makers can make spend-focused analysis of the aggregated data. It is improving solutions that have overcome these challenges and options now range from fully managed services to self-

³⁹ Ariba (2005) *Spend management visibility*.
⁴⁰ Aberdeen Group (2004) *Best practices in spending analysis*.
⁴¹ Ibid
⁴² Ariba (2005) *Spend Management Visibility*.
⁴³ Ibid

service behind-the-firewall software tools run by a company's own visibility team. Each approach has both advantages and disadvantages. To optimize success companies should prioritize its goals and honestly assess its culture and capabilities.⁴⁴

4.7 Spend leakage and compliance multiplier

In this area savings are possible in some of the more common commodities and the obvious questions are where these savings comes from.⁴⁵

- Strategic sourcing includes identifying strategic vendors and moving toward vendor consolidation for purpose of volume discounts and higher quality
- Reducing maverick spend through preferred suppliers and better processes
- Avoiding spend leakage by monitoring compliance to negotiated terms

The last component is more important than the other because if proper controls are not implemented, any negotiation savings that can be captured in the contracts might leak out. All these three components need to be iterated into continuous cycle, which can be called spend management program. A program that been well executed can, over a time, deliver continuous savings in all major categories. According to analysts, spend leakage out from procurement controls can range from 2 to 17%.⁴⁶

4.7.1 Contract Compliance

The single biggest source of spend leakage occurs in contract compliance, especially in direct material, and many companies have only ad hoc processes to monitor contract compliance.⁴⁷

Use of expired contracts and multiple contracts with different prices is the most common situations. Because of contract expirations are not monitored, many contracts renew with the same price performance levels. 18% of purchases made by an average company are not contract compliant. Further more than 50% of potential rebates and discounts are not captured by an average company, PO prices are rarely checked against the contract for volume discounts; restrictions on delivery dates, penalties on late deliveries, product returns, warranties, and pass-through costs are very rarely monitored and enforced.⁴⁸

Therefore, contract compliance represents the single biggest source of savings that a company can realize of procurement compliance. Many companies talks today about 4-way payment compliance – between invoices, POs, receiving and contracts – as a way to ensure that payments are consistent with contracts.⁴⁹

⁴⁴ Ariba (2005) *Spend Management Visibility*.

⁴⁵ Rudzki, Smock, Katzorke and Stewart (2005) *Straight to the Bottom Line*.

⁴⁶ Ibid

⁴⁷ Ibid

⁴⁸ Chechetts and Bartolini (2006) *Source-To-Settle: Compliance Clues for the CFO*.

⁴⁹ Rudzki, Smock, Katzorke and Stewart (2005) *Straight to the Bottom Line*.

4.7.2 Vendor Compliance⁵⁰

One time vendors are vendors that are not frequently used. Company will be using those vendors very rarely, maybe once in a life time. SAP is giving a special category for those types of vendors. Normal vendors will have separate Master Data which will have their address, country, bank account, terms of payment and payment methods.

Use of unapproved vendors, one-time vendors, or insufficient assessment of new vendors and having lack of monitoring of vendor performance are fairly common.

4.7.3 Summary of Compliance⁵¹

Spend analysis and compliance is really two sides of the same coin. Many companies perform well with identifying opportunities and acting on them, therefore it is surprising that many of the companies do a poor job with ensuring that the negotiated terms are being withheld. A large portion of spend leaking out comes from poor contract and supplier compliance that are not monitored. Almost half of these noncompliance transactions can be identified through transactional data mining. To perform such transactional audits a spend analysis application can and should be used, not only to identify important opportunities, but also to ensure that the controls are working properly to prevent spend leakage.

4.8 Sustainable Purchasing Transformation

Over the last years purchasing has developed and become more and more strategic to the company. World trade barrier does not exist, low-cost countries are increasing their manufacturing rapidly and costumers expect lower prices. Companies that have implemented a best practice purchasing function will emerge as winners.⁵²

First and foremost, the purchasing function must focus on the big picture, the day when the purchaser's work consisted with hard days of negotiations are gone. Today the modern purchaser knows that time spent in analysis, base-lining and sourcing strategy pays off in the negotiation phase of the strategic sourcing process. With modern tools and processes, the purchasing function will produce better results with less effort to the negotiations. Then when the contract is signed, it is important that the purchasing function ensure that the contracts are implemented and exposed to all affected people in the company. This transformation is shown in figure 4.3.⁵³

⁵⁰ Rudzki, Smock, Katzorke and Stewart (2005) *Straight to the Bottom Line*.

⁵¹ Ibid

⁵² Bohlin et al (2008) *Purchasing Transformation*. p.VIII

⁵³ Bohlin et al (2008) *Purchasing Transformation* . p. IX

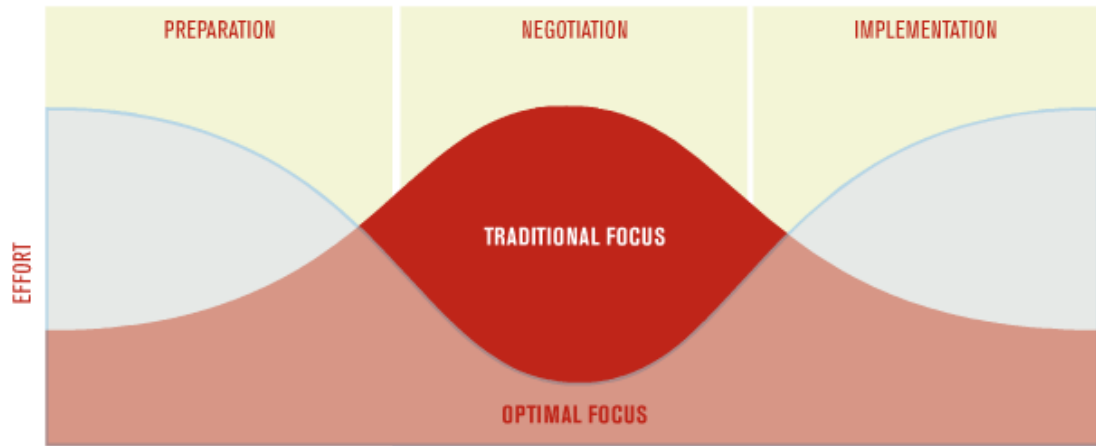


Figure 4.3 - New optimal focus in the sourcing process⁵⁴

⁵⁴ Bohlin et al (2008) *Purchasing Transformation* . p. IX

5 Empirical Framework

In this part of the study the empirical data will be presented. Information has been collected through interviews, surveys and EMP internal data sources.

5.1 Three Approaches to Spend Analysis

From three of the most common approaches to spend analysis, two have been used at EMP to extract data and analyze it.

The first approach being used is the reports of transaction system (ERP and Procurement systems) Data have been collected from various parts of the company to receive a complete picture of EMP's spend in Sweden. Data have been aggregated through Quick Value Procurement (QVP) to obtain data from purchase orders that has been ordered in EMP's eProcurement system EBX. The financial department in Lund has aggregated data from outsourcing projects globally and corporate expenses. To achieve more detailed information in the purchase orders and on one-time vendors, Ericsson department Operational Sourcing/Material Management has aggregated data from SAP and forwarded it to the purchasing department in Lund.

Data from the first approach could not cover EMP's purchase orders worldwide. This lead to the second approach, manual analyze of purchase orders. All purchase order numbers worldwide for EMP was collected and consolidated in excel, this sheet was sent to a hired consult that aggregated the POs from EMP's ERP systems.

Last approach, automated spend analysis is not available at ST-Ericsson and could thereby not be used to aggregate and analyze data.

5.2 What to look for in a spend analysis solution

Interviews have been conducted over phone and e-mail to the two world-leading suppliers, Zycus and Emptoris, of automated spend analysis tool and face to face with Qlikview. Answers are presented in Appendix 1.

5.2.1 Which company should look into an automated spend analysis tool

In the joint venture ST-Ericsson uses ST purchasing tools, which means that the whole organization will only use one ERP system. According to business complexity, ST and ST-Ericsson differ from each other. ST develops products from many different industries and markets while ST-Ericsson develops products for many markets but only for one industry. The companies' locations are shown in figure 5.1.

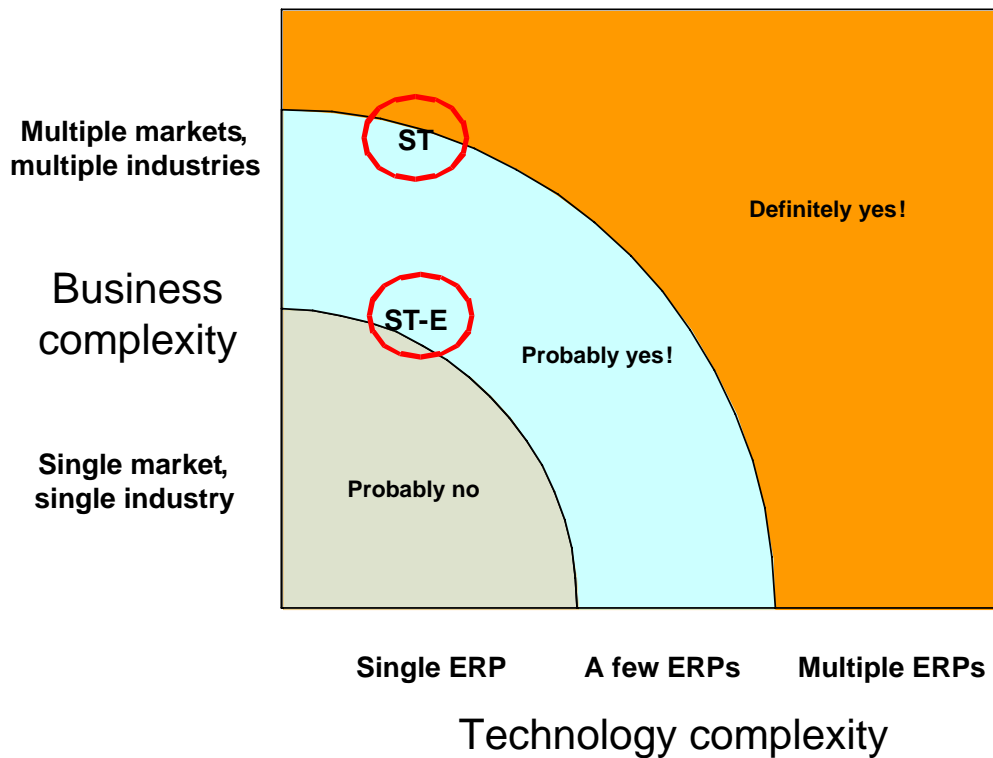


Figure 5.1 - Who needs automated spend analysis, ST-Ericsson and ST position

5.3 Spend Under Management

The fundamental rule for spend under management is to start with the largest commodities and place it under active management. The single largest commodity in EMP is external competences and this commodity has been under active management for a long time.

In indirect material external competences and Test, Manufacturing and Industrial are the only commodities that have been under active management at EMP's site in Lund. All other commodities have been under management from a central position at Ericsson in Kista. When examining the data an example in the commodity group IS/IT and commodity IT accessories. Same products have been purchased from different suppliers and with different prices.

5.4 Commodity Classification

EMP has used Ericsson classification schema which consist of two levels of commodities and material groups. The first level in the schema is the commodity group which consists of eighteen categories in total, eleven in indirect material and the remaining seven is direct material. Beneath each commodity group different commodities are assigned to achieve a more specific classification. The vendors are assigned in advance to one commodity and it does not matter what has been purchased from the supplier. It is still connected to the predefined commodity. In table 5.1 an example is shown on how the commodity schema is designed.

Commodity Group	Commodity	Vendors
IS/IT	Communication Infrastructure	↓
	IT Accessories	
	IT Hardware	
	IT Services	
	R&D Application Development Tools and Maintenance Services	
	Software	
	WAN	
	Voice	

Table 5.1- Commodity Classification for IS/IT at EMP

When a product is purchased in the purchasing system it is assigned in a certain material group. The same product from a different supplier can however contain different material groups. A specific product can be associated up to three different material groups.

ST does not have any commodity schema. All products are instead connected to different material groups. Example of the most frequently used groups are displayed in table 5.2

SAP Code Material group	Description
ADVERT	Advertising services and material
BOOKMA	Books, magazines
FACCAP	Building and Facilities: Capital investment
COMHAR	Computer Hardware
COMSOF	Computer Software
FACCON	Building and Facilities: Consumables
CENGIN	Consulting and engineering services
ELTROC	Electronic components
FEETAX	Fees and Taxes
FOODDR	Food and Drink
FRETR	Freight & Transport
LEGAL	Legal advocates, fees
MAICOM	Mail and telecom
MAINTE	Maintenance service
MEASURE	Measurement tools and services

Table 5.2 - Material groups ST

5.5 ETLA

At EMP in Lund data has been aggregated through a tool called QVP, which stand for Quick Value Procurement. It is used within sourcing for third-party spend analysis.

The information from QVP can be divided into two different categories:

- Vendor spend information
- Vendor commodity information

The input for the system and both categories are posted external vendor invoices and credit notes. Data from invoices and credit notes are retrieved from SAP, Scala and other ERP systems on a monthly basis. To secure that QVP contains only external vendor spend data, employee costs, VAT as well as transactions in the company are excluded by QVP filtering funnel. This funnel is based on Global standards for invoices/credit note entry into Accounts payable sub ledger.⁵⁵

This process is the only method for the purchasing department at EMP to aggregate data from any sort of system. When looking at the QVP process from an ETLA perspective it only meets some of the requirements from the extract approach.

To obtain more detailed information on what EMP is spending, for example POs, Ericsson in Kista had to extract relevant data from SAP, as said above. This process is not standardized and takes long time to perform. The spend data is in deficient state extracted to excel and takes time to process into valuable information. Even if the data includes more information than QVP it should contain more.

To achieve the whole picture of EMP's spend, the financial department at EMP contributed with data from outsourcing projects and corporate cost. The quality of this data, as all other data, is oriented for the financial department and needs to be enriched if valuable analysis can be conducted. With this data an almost complete spend picture for EMP Sweden was created, shown in figure 5.6.

Despite all efforts EMP's global spend could not be obtained but with help from consultants this problem could finally be solved. This data serves, as all other data, for the finance department and are not designed for spend analysis.

In figure 5.3 top 5 commodities by spend are shown via a one-dimensional pie chart to illustrate which commodities holds most of EMP's spend. These commodities represent where cost savings are most likely to be found and also obtaining a good overview of the company's spending.

⁵⁵ Ericsson Internal, 2009-05-10

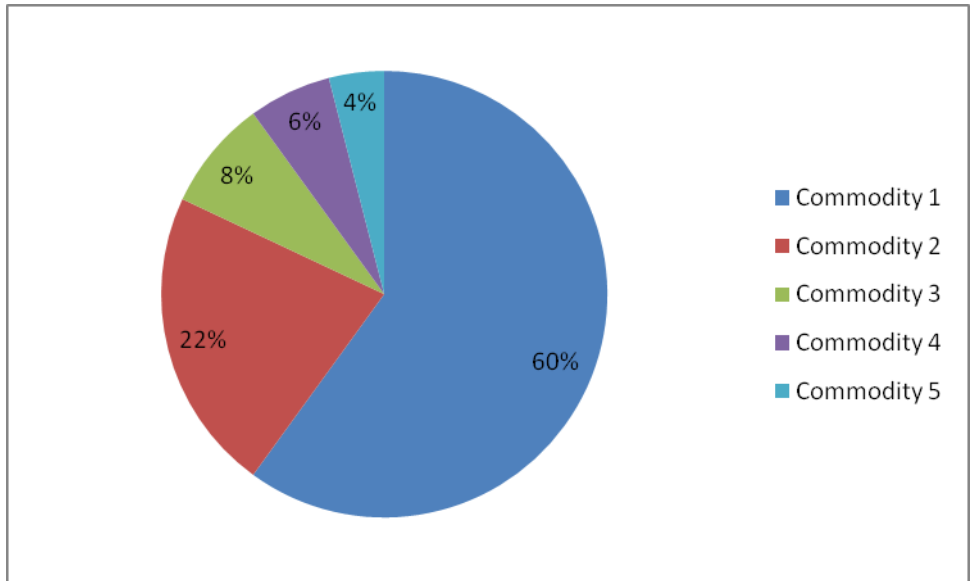


Figure 5.2 Top 5 Commodities at EMP

In figure 5.4 shows how EMP’s spend is located at around the world. At first when EMP’s global spend could not be aggregated and consolidated. EMP’s spend from Sweden was extrapolated with 25 percent to get an assumption what EMP’s global spend was.

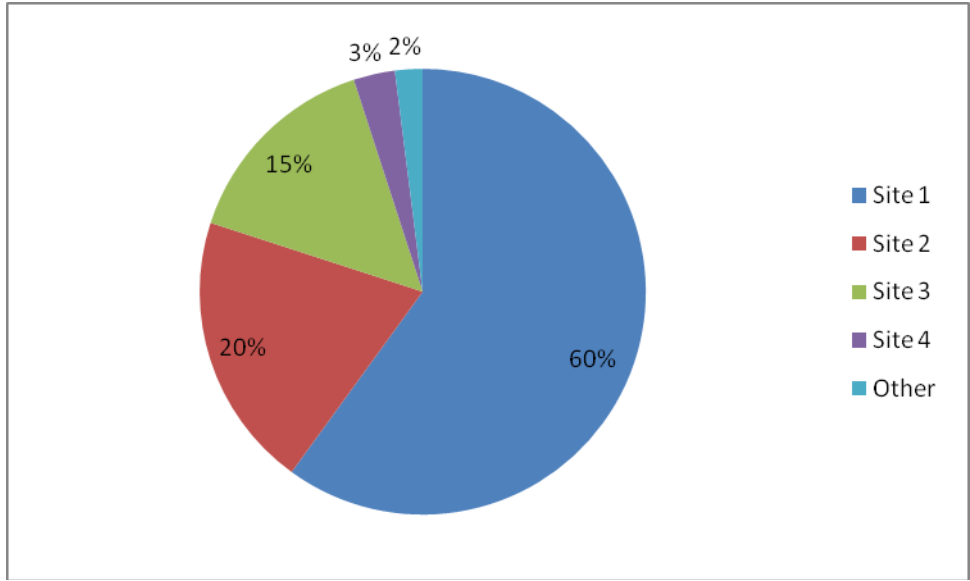


Figure 5.3 – EMP’s Global Spend

Figure 5.5 shows top four commodities and how many suppliers EMP has purchased from in these categories. First color represents the top ten suppliers with most spend in each commodity and should be as high as possible. Next color is represent next ten supplier with most spend and then is the remainders. Last color refers to one-time vendors which should be as low as possible or rather none.

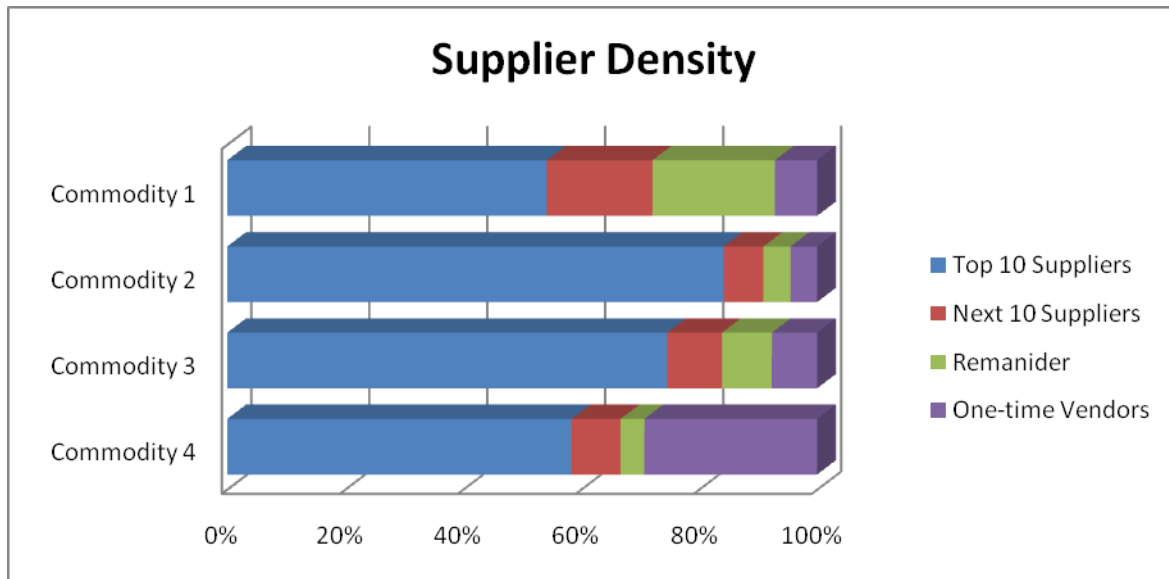


Figure 5.4 - Supplier density in EMP

ST purchasing department hold no spend analysis tool. Extract and reporting is conducted from SAP. Embedded standards reports and “list display” from SAP composes the basis reporting functionality at ST. Reporting from SAP are finance-centric and serves as the foundation to financial reporting in the company.

5.6 Spend Visibility

In previous chapter different methods are described to extract and consolidate 100% of EMP spend. All of these methods took a great deal of time and in the end 100% of the company’s spend could not be obtained and consolidated.

The problem was the legal business and interlink between EMP and its parent company Ericsson. Some of EMP’s spend had the same company code as Ericsson. In this amount of spend, EMP’s part could not be distinguished from Ericsson and with the lack of a complete spend picture for EMP, the ongoing joint venture sufficed a great deal of time.

On February 1st 2009 EMP was no longer a business unit in Ericsson, it had now become the joint venture company ST-Ericsson. The transformation made it possible to extract complete and accurate spend for the company and analyzed it. Only orders purchased in EBX could be extracted, still not Travel & Expenses and wild invoices

In ST-Ericsson both PO orders and travel and expenses is consolidated in SAP. PO orders are available for key users in SAP to extract data and load in excel. Travel and expenses is linked to SAP through an IT application. Reports from travel and expenses executes only for financial reports, with STs Policy that all purchase below 200 USD can be purchased with credit card and report it with an expense report.

5.7 Spend Leakage and Compliance Multiplier

Controls in the procurement process is the foundation to achieve improved compliance and in the end save money from monitoring contracts and one-time vendors. Figure 5.6 show different controls at EMP.

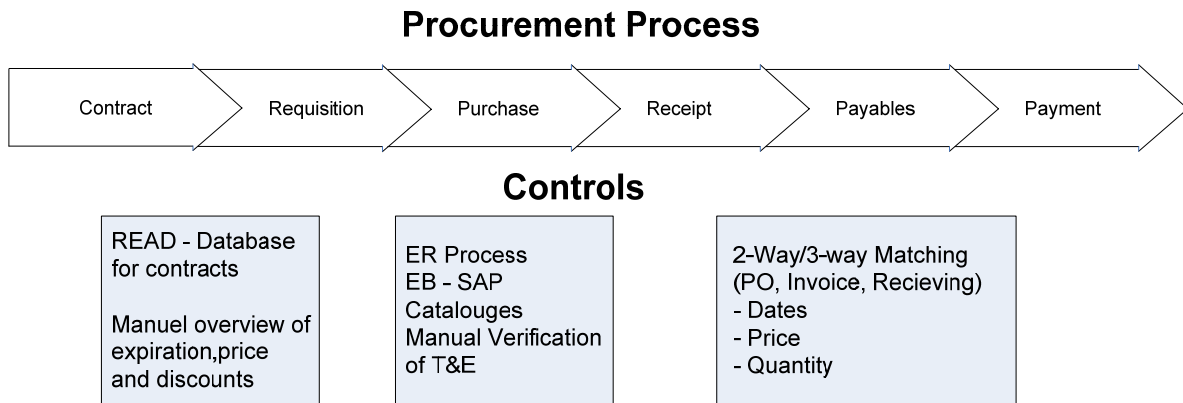


Figure 5.5 - Controls in the purchasing process at EMP

5.7.1 Contract Compliance

Contract compliance at EMP occurs in different parts of the purchase process. Beginning with the single largest commodity; external competences, EMP has developed a process ER (Expenditure Request) for all hiring of consultants, training etcetera. This request must be approved by finance, line managers and assistant who also controls that all information in the request is correct.

Compliance in Ericsson eProcurement system EB is also high. Products are purchased from web-catalogues in SAP at predefined vendors, products and prices. The invoice matches automatically with the purchase order and if something is out of place an error message occurs. The system is no longer available and is replaced with SAP. The new system is also equipped with catalogues and works almost as EB.

To obtain overview of expiration and discounts etcetera contracts are stored in database (READ). ST system (SDM) is of similar sort but with automatic updates of contract's expiration.

5.7.2 Vendor Compliance

In EMP procurement system EB three different color codes are available for every purchase order. The first color code is green and it occurs if a product is purchased from both an existing supplier and existing product. Next code a purchase order could obtain is yellow. This occurs when a product is purchased from an existing supplier, but with free text entered on the purchased item. Last code is red, same as one-time vendor which occurs if a product is purchased from a nonexistent supplier in EB. In table 5.3 both red orders in Lund and globally is presented. These numbers are not fully reliable because of uncertainty in expenses reports and wild invoices⁵⁶.

⁵⁶ Orders without a PO number

	Global		Lund	
2008	Purchase Orders	Amount (USD)	Purchase Orders	Amount (USD)
Red orders EB	xxx	xxx	xxx	xxx
Total orders EB	xxx	xxx	xxx	xxx
Red orders/Total orders	~3%	~8%	~2%	~9%

Table 5.3 - Red orders EMP

To control one-time vendor, red orders, a meeting with Ericsson occurred on a monthly basis, this in order to extract the red orders and to call the responsible person to discuss why a one-time vendor was used. The cause for this action was to prevent this behavior from happening again.

5.8 Sustainable Purchasing Transformation

STs way of working differs from EMP in purchasing. The self service tool (EB) at EMP closes down and is now performed in the business system SAP. Only key users as assistant are authorized to conduct purchasing from now on and a standardized way for end users is developed to request their purchase demand was created, the purchase request process. This was completed to avoid lots of paperwork and have effective way of ordering products for all employees.

To have a best in class purchasing function new tools needs to be implemented at ST-Ericsson. Although with ST IT environment for purchasing an easier way to extract reports is implemented and spend data does contain more and better information. The information from reporting in SAP is structured for finance and not for purchasers to do analysis and prepare for negotiations or sourcing events.

6 Analysis

The chapter contains analysis of the empirical study, based on the theoretical framework. This includes discussions from the empirical findings and suggestions in the area of spend analysis.

6.1 Three Approaches to Spend Analysis

Spend analysis performed at ST-Ericsson represented more attempts to extract all EMP's spend data, consolidate and validate it, rather than do advanced spend analysis on the data.

The most common approach used in the master thesis is the first approach to spend analysis, reports withdrawn from various transaction systems. Problems regarding the approach are many and important to emphasize. To extract all data from numerous systems, different departments in the organizations needed to be contacted, which was a very time consuming and rigid way of working. The aggregated data was not cleansed or enriched in any way, resulting in poor and incomplete data that the organization could not rely on. The approach must be conducted in all sites around the world, resulting in a tremendous work every time this needs to be conducted. The approach could be used by smaller firms with lack of budget, but not by a multinational organization located all over the world with a goal to achieve spend visibility and conduct analysis on the data.

The other approach used in the study, is manual analysis of purchase orders and invoices. Consultants were hired to conduct this approach on EMP's world-wide purchase orders. To achieve full visibility this approach should include, not only the purchase orders but also all invoices and receipts world-wide. To execute a project like this, resources and cost would be extensive but could lead to achieve full visibility into EMP's spend. This approach is profitable when a one-time snapshot is needed, but when spend analysis should be executed on a regular basis, this approach is not recommended and not for ST-Ericsson.

To conduct good spend analysis at ST-Ericsson a spend analysis tool needs to be implemented. It is a long process to implement this tool and the company needs to understand the benefits of this kind of tool to achieve as much as possible from it.

ST and spend analysis consist of reports from SAP and Excel documents. These reports are developed for the financial department and not for the procurement department. ST-Ericsson has to set going a project soon as possible to validate and implement a spend analysis tool for the whole organization, ST included, this in order to extract accurate data from the entire enterprise and conduct analysis for sourcing activities and supplier rationalization.

6.2 What to look for in a spend analysis solution

Looking at a spend analysis tool for the company, the supplier of a tool is divided into two different sorts of spend analysis tool. The first sort is a fully-automated spend analysis tool and is one brick in the suppliers supply management solutions. Suppliers included in this category are the two largest suppliers in this area, Emptoris and Zycus. These suppliers offer an extensive supply management solution which includes, except a spend analysis tool, sourcing and contract management.

Implementation with this sort of tool takes up to 14 weeks to accomplish and many hours of consultants support.

In the other category is Qlikview located. Their spend analysis tool is designed in a different way than in the other group. Qlikviews tool is only used for analysis and uploads data automatically in the tool where analysis can be conducted later on. One of Qlikviews strongest attributes is the powerful platform, which Qlikview is based on, to conduct all the analysis in a quick and easy way. People from ST-Ericsson are responsible for create reports and analysis that are important for the company. Consultants from Qlikview are acting more like supervisors and as a helping hand. The other benefit of this tool is the fast start-up, on only a couple of day notice this system could be up and running. It takes a little more amount of time for the company to achieve clarity in what should be measured and to create reports and enrichment documents that are used in the tool.

6.2.1 Which company should look into an automated spend analysis tool?

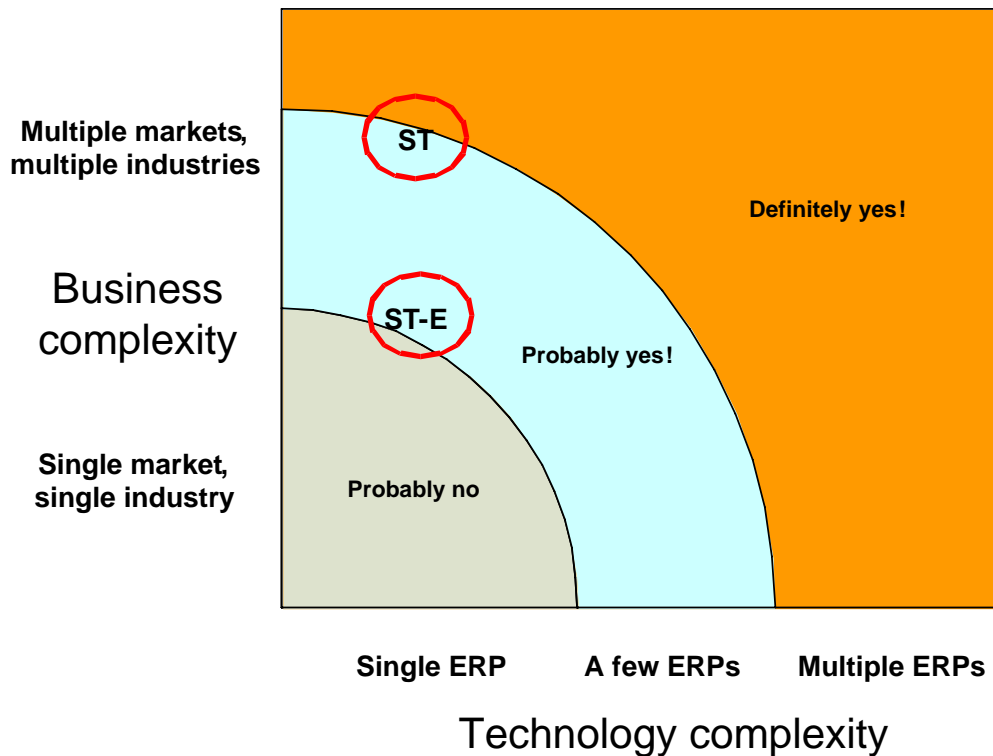


Figure 6.1 - Who needs automated spend analysis, ST-Ericsson and ST position

From figure 6.1 both ST and ST-Ericsson position are shown in “who needs an automated spend analysis” to understand if the company should look into this sort of tool. ST position is higher in business complexity than ST-Ericsson because of diversity in multiple industries.

In the figure ST balance between definitely yes and probably yes, meaning that the company should look into and would certainly profit on implementing an automated spend analysis tool. In ST-Ericsson case it is more evident, just in the field of probably yes, if the company should implement a tool. But with so many sites around the world, extracting and consolidating in Excel is not possible, a tool needs to be deployed to collect data and perform spend analysis.

6.3 Spend Under Management

To actively perform spend under management data needs to be extracted and consolidated fast. It is very important that the data is accurate and contains enough information to carry out analysis that can be deployed in various proposals for improvements, as reduction of one-time vendor.

Problems with overlapping catalogues in SAP, a present problem at EMP, are not going to appear in the closets future for ST-Ericsson. Catalogue setup is restricted to a few vendors and only one in each category.

Figure 6.2 shows an opportunity identification model that can be deployed to different commodities and in this way improve commodities in supplier rationalization etcetera. For the opportunity generation, focus is on the commodities with the highest potential. These commodities have three different characteristics:

1. Commodities that ST-Ericsson know sufficiently about to get started with the brainstorm
2. Commodities for which ST-Ericsson believe that there is an significant outstanding potential
3. Commodities for which ST-Ericsson have freedom to act

1			2			3	
Commodity	Spend (MSEK)	Number of suppliers	Opportunity/Risk	Potential Saving (%)	Potential Saving (MSEK)	Prioritization	Rationale for prioritization
External competences	500	400	Consolidate volumes across markets world wide	2-4%	10-20	High	High cost savings
IS/IT	1700	1000	Implement usage of one vendor in all Europe	15%	45	High	



Figure 6.2 - Opportunity identification in commodity

6.4 Commodity Classification

ST does not apply commodity classification on purchased material. Products are instead classified to a specific material group in SAP. This material group is also coarse scaled and should be evolved with subcategories to achieve deeper classification.

EMP has commodity classification and at a first look it seems good, but it only has two different levels of commodity and are used entirely incorrect. Instead of classify a specific product to a specific commodity when it is purchased, EMP has predefined vendors to a specific commodity regardless what has been purchased from the vendor. This incorrect classifications leads to incorrect spend data and instead of obtaining a good spend picture it becomes more a disadvantage for the company. More detailed information in purchase orders received from Ericsson, which was extracted from SAP. In SAP every purchase order links to a material group, achieving divisions of related purchased material. Unfortunately this classification did not classify same products purchased from different supplier in same material group, making analysis difficult to perform.

In the new company a new classification schema needs to be defined. People in charge of commodities should be able to create new classifications and develop them over time. ST-Ericsson could use Ericsson old classification schema and adjust it to fit ST-Ericsson standards. New subcategories within commodities with much spend and many categories for purchased material should be prioritized.

6.5 ETLA

EMP's old systems for extracting data are long gone and a relief for the company. Starting with QVP that extracted data from EMP's eProcurement system and showed vendor commodity information had huge shortcomings. The extracted data contains no information what has been purchased and the system classifies vendors incorrectly in the classifications schema. Only category vendor spend information gives a good spend picture of EMP in Lund. On the negative side the tool only extract data from the eProcurement system, which does not include for example consultants at outsourcing projects.

To achieve a better spend picture different departments was contacted, from Ericsson spend data including more information on purchased item. With this information spend analysis could be conducted to identify weaknesses in EMP purchasing pattern. This process is time consuming and the received data is first in need of an extensive cleansing in Excel, to make it understandable. Also more enrichment of the data is desirable to perform valuable analysis, both data cleansing (making supplier and commodity fields consistent) and enrichment (combination of data classification and supplier enrichment). Data from the consultants helped with PO worldwide and helped understand EMP spend on a global view. To have consults extracting and transforming data is not an alternative for any company in the long run. It is too costly, time consuming and cannot count as a sustainable method.

A repeatable extracting process for ST-Ericsson must be implemented and this worldwide at every site, data should also be transformed (cleansed and enriched) before loaded into a spend analysis application where it can be analyzed. First step is to locate all spend data in SAP that is needed for analysis and extracting it (shown in appendix 2 how to extract data from both purchase orders), ST-Ericsson shall conduct this in all their sites and send the extracted data to ST-Ericsson in Lund.

Transform and load into a spend analysis application as Qlikview performs automatically from a different sources. Enriching data with parent company and commodity classification conducts while

data is loading into the tool. This sort of enrichment is programmed at ST-Ericsson to achieve more complete data that can be analyzed at an aggregated and a detailed transaction level in the tool.

If an automated spend analysis tool from example Emptoris is implemented the whole ETL process conducts automatically. All of the enterprise spend is aggregated from dozens of systems, also from different geographies, currencies and languages. The tool achieve accurate categorization of all types of spend (indirect, direct and MRO) and categorize spend to a taxonomy. All performed automatically from domain-rich knowledge bases and in real-time point-of-entry. In the analysis tool instantaneously slice, dice spend and drill down to transaction and line item details to identify greater savings opportunities with multi-dimensional analysis.

To answer and empower common business questions quickly, reports conducted in the spend analysis tool plays a vital part. The exact reports available are subject to data availability and typically include these reports that are presents below. For a more detailed report list see appendix 3.

- Top Suppliers
- Top Business Units
- Top commodities/material groups
- Top Spend
- Spend v/s commodity/material group
- Spend v/s Supplier
- Supplier v/s commodity/material group
- Supplier v/s Business Unit
- Supplier v/s Time
- Business Units v/s Time
- Commodity/material group v/s Time
- Similar reports across any dimension / field which can be used for reporting and is available in your data

From figure 5.5 supplier density is presented in EMP's spend and reveals the fact that commodity 1 and commodity 4 are the most fragmented commodities. Because of the high level of the commodity classification EMP has performed really well in supplier rationalization. One-time vendors in the two categories are more worrying and should be dealt with straight away.

6.6 Spend Visibility

Problems with spend visibility is that spend occurs in many different systems and behind legal entities. Resources needs to be deployed to achieve a complete spend picture of a company, which should in fact be obvious for all companies worldwide. No effort has ever been conducted at EMP in the area of spend visibility and the result has caused problems in the ongoing joint venture. Problems to achieve a complete spend picture of EMP worldwide derived from the inadequate ability to achieve full spend visibility.

As said above spend visibility does not comes for free. It is an ongoing process, which should be prioritized by every enterprise. First issue to find a solution for is aggregating data from all ST-Ericsson sites, a positive point of view is that all sites have identical business system and all data is located in SAP. Similar processes for aggregating data can be conducted in all sites. It is crucial to extract all data that is important for spend analysis, including purchase orders, expenses from travel and expenses and wild invoices.

Analysis of spend data should be performed in one site for ST-Ericsson (Lund, Sweden), where spend data is consolidated and analyzed. The ability and permission to send spend data from all sites should not be a problem. But ST-Ericsson should also collect all pro forma data from EMP and ST-NXP Wireless and analyze it to see where opportunities can be found. Collecting all data from the two companies can be a problem and at EMP it is impossible to separate their part from wild invoices and travel and expenses from Ericsson.

Spend data should often include these different dimensions:

- Vendor
- Commodity
- Time
- Geography
- General ledger
- Cost center
- Preferred supplier status
- Supplier diversity status
- Spend range
- On/off contract

6.7 Spend Leakage and Compliance Multiplier

Controls at ST-Ericsson are shown in figure 6.3 and one that should be taken into concern if it could be implemented. With today’s processes ST-Ericsson perform really well in this category but should focus on reduce one-time vendors. Accomplish this and more spend will be connected to preferred suppliers and reducing spend.

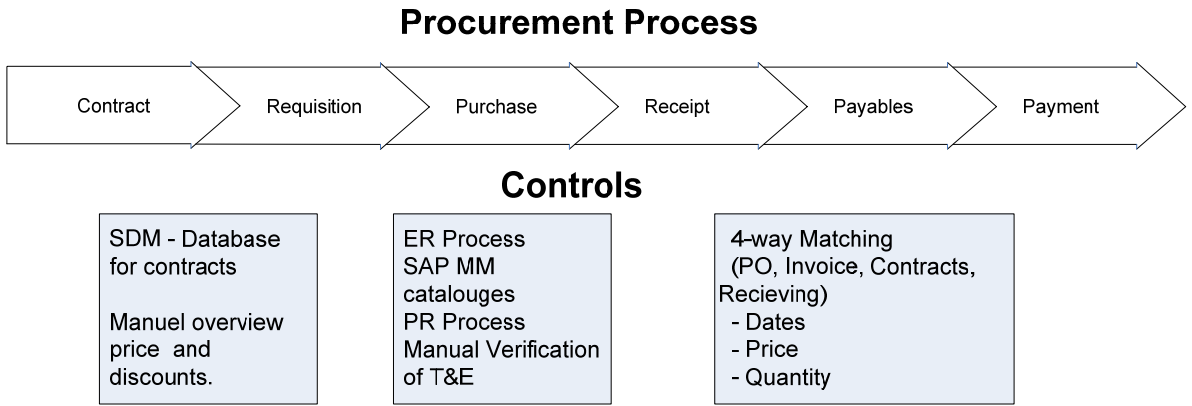


Figure 6.3 - Controls in STE

6.7.1 Contract Compliance

To reduce expenses/costs in spend under management the largest commodity should first be under management, the same applies for contract compliance. As said before EMP largest commodity in spend is external competences and contract compliance works really well in this commodity. In the ER process the order is reviewed and compared against existing contract with the vendor before an order of a consultant can be conducted. This process is also used for training and for orders with high

spends. The ER process will be used in the new company ST-Ericsson, and continue achieve good contract compliance.

Database for contracts needs to be used as soon as possible, to contain contracts in a database for overview in different purchasing situations. The 3 way-matching should be upgraded to a 4-way matching, including contracts to ensure that payments are consistent with them. This way the company could reduce spend leakage. In the spend analysis tool different KPIs should be build up to measure supplier performance and find leakage in negotiated terms.

6.7.2 Vendor Compliance

In EMP all personal was able to purchase products in EBX, sometimes one-time vendor occurred and was dealt with directly. Still a lot of spend was associated to one-time vendors and was not working in an optimal way. The goal is always to have zero spend in this category and companies should strive to get there. In ST-Ericsson only selected users (requisitioners) are able to place orders in SAP. With this setup it is easier to monitor that all purchase orders are purchased from an existing supplier and to avoid one-time vendors.

All personnel are free to purchase products, if the product is not available in the predefined catalogues in SAP, below 200 US dollar with credit card. This purchasing behavior should be under constant monitoring and analyzed to set up new vendor catalogues in SAP with products purchased with credit card to minimize spend in this category.

Wild invoices needs to be dealt with directly and due to this EMP's part needs to be analyzed. Unfortunately is this impossible because EMP's part could not be separated from Ericsson. To prevent people from conduct this sort of purchasing, data (including who purchased it) must be available for extracting. Due to this the right person can be contacted and secure that this will not happen again.

6.8 Sustainable Purchasing Transformation

To ensure that ST-Ericsson will have a good working purchasing department, new processes are implemented. To become more of a best in class purchasing organizations a spend analysis tool and proper processes for extracting data needs to be implemented. This to achieve spend visibility throughout the company and perform valuable spend analysis reports that supports the organization. Also to identify and explore all opportunities for ST-Ericsson and parent pooling to drive further synergies between ST-Ericsson and parent companies.

Avoiding people running around with papers the purchase request web form procedure was created. With the purchase request procedure ST-Ericsson achieved an easy and effective method for employees to request products. The process will eventually be implemented in different ST-Ericsson sites around the globe.

7 Conclusion

In this chapter the conclusion will be described. The conclusion reflects the collected empirical material and the analysis. Recommendations that have been found in the study will be described.

In today hard business climates, with big cost savings and small margins, it is important to understand where money can be saved in the enterprise. It is now time for ST-Ericsson to develop new processes and implement relevant tools to obtain a better purchasing process. The identification of weaknesses in spend analysis and achieving full spend visibility worldwide came under this overall project. This study resulted in guidance to achieve spend visibility and recommendations for implementing a spend analysis tool.

The purpose with this master thesis was to create a foundation of spend analysis knowledge at the company and how this can be used at the purchasing department at ST-Ericsson. The study clarified weaknesses and gaps how the function works today in this area and recommendations how spend analysis can be conducted at the company.

Spend Visibility

To secure spend visibility at ST-Ericsson, new processes must be created to assure that all spend in the company is collected. All data must be extracted worldwide from ST-Ericsson ERP system, this means that the process for extracting data can be the same for all sites around the world. The severe part is to ensure that all data is collected, POs, expense reports and wild invoices.

ETLA process

ST-Ericsson uses only one ERP system, which makes it easier to develop an ETLA process worldwide. The process should be easy and repeatable because it has to be conducted once a month, to be able to conduct up to date spends analysis. First extracting data from the ERP systems and sends to one site, where the data is loaded in a spend analysis tool. When the data is loaded into the spend analysis tool enrichment and classifications is being performed. Enrichment should contain, making supplier spelling correct and commodity fields consistent, parent supplier and commodity classification. When all this is executed, analysis of all company spend can be performed.

Commodity classification

Classification of commodities consists of material groups in SAP, when a product is purchased it are allocated to specific material group. Problem with the material groups is that they are too few groups and does not include any subcategories. New material groups should be developed or a standard taxonomy as the UNSPSC classification should be implemented. Taxonomies are important in spend analysis, because it determines how easily a company can search and discover opportunities in spend transactions.

Spend analysis tool

During this study two different sorts of spend analysis tools have been analyzed. Pros and cons for the tools are presented and a recommendation with tool ST-Ericsson should use. Table 7.1 shows pros and cons for the tools.

	Automated Spend Analysis Tool	QlikView
Pros	<ul style="list-style-type: none"> • Integrated with management suite • Auto-classification and enrichment • Integration ready with all major ERPs and data warehouses 	<ul style="list-style-type: none"> • Fast implementation • Low consultants costs • Easy to use and develop • Competences in STE • More flexible with no predefined rules
Cons	<ul style="list-style-type: none"> • Long implementation time • High consultant cost • Low flexibility 	<ul style="list-style-type: none"> • Not integrated with sourcing tool

Tabell 7.1 Pros and cons spend analysis tools

The author recommends ST-Ericsson to implement and use Qlikview`s spend analysis tool. First employees at ST-Ericsson should arrange workshop with affected persons to sort out what different measurements are important to the company. This will start the buildup of the scripts that is being used in the tool. In order to use the data in Qlikview`s application, reports and objects must be created by the staff. This should be developed during autumn 2009 in order to obtain the benefits of the spend analysis tool as soon as possible.

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Verbal Sources

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Tordenmalm Mikael, Purchasing Project Office, ST-Ericsson

Unelind Peter, Head of Purchasing, ST-Ericsson

World Wide Webb

Emptoris web page <www.emptoris.com> 2009-04-20

QlikView web page <www.qlikview.com> 2009-05-11

ST-Ericsson web page <www.stericsson.com> 2009-04-10

UNSPSC web page <www.unspsc.org> 2009-03-11

Web seminars <www.procuri.com> 2009-04-22

Zycus web page <www.zycus.com> 2009-04-22

Appendix 1 what to look for in a spend analysis solution

	Emptoris	Zycus	QlikView
Ability to cleanse, normalize, and categorize spend data from a variety of sources	Emptoris Spend Analysis is designed to accept and aggregate spend data from any and all enterprise applications and has done so from , corporate purchasing cards, SAP, other accounts payable and purchase order feeds, MRO feeds, and travel and expense (T&E) systems, among others. With data collection complete, the solution's cleansing of data begins and consists of three steps. Through this process, data is normalized to make it comparable across multiple dimensions like vendor, geography, business unit, material master item, UNSPSC, unit of measure, etc.	Zycus solution accepts data from multiple source systems in cryptic, multilingual, abbreviations and cleanse and normalize the spend data onto a common taxonomy such as UNSPSC, eClass or custom category codes. We would require the customer to provide us data in flat file or excel sheet for processing of data.	QlikView is designed so that the entire application (data model included) is held in RAM – this is what makes it uniquely efficient compared to traditional OLAP cube-based applications. It creates an in-memory data model as it loads data from a data source, enabling it to access millions of cells of data and still respond to queries in less than a second. High-speed associations occur as the user clicks in the various sheet objects and the display is updated immediately. QlikView loads data directly from most data sources.
Efficiency of analysis engine – how much data can it handle, how quickly can it generate results, what level of accuracy?	With data collection complete, the solution's cleansing of data begins and consists of three steps. Through this process, data is normalized to make it comparable across multiple dimensions like vendor, geography, business unit, material master item, UNSPSC, unit of measure, etc. Within a spend cube. For example a spend cube with 10,000 transactions and 10 dimensions could	Zycus analytical tool has an unique concept of cubes which allows 25Million lines of data to be accessed without any delays. We can commit concurrent users of up to 200 users on the same cube, same button click at the same second. Accuracy is on classification of data (which is the core of spend analysis). Zycus recommends and commit accuracy of 80%	QlikView is able to analyze massive amounts of data at unprecedented speed because of its in-memory data model design. As a result of this design, users get sub-second response times on queries and calculations and the ability to process massive datasets; companies can deploy to large user populations quickly and affordably. QlikView can handle billions of unique values in a given field. RAM is the only factor that limits the

	have 100,000 nodes	spend accuracy	size of an application.
Structure of analysis engine: -Rules-based engines work best on direct and indirect materials -Neural network engines are best for services	Spend Data Manager uses a combination of auto-classification (i.e. machine-learning, artificial intelligence), rules-based categorization, and item-level enrichment from external sources to classify spend data by category.	Zycus uses a concept of "Artificial intelligence (AI)" for classification of spend data. The engine can be a fusion of rules or pure AI model for classification of spend data. Over 80% of Zycus customers choose us for both direct and indirect classification	QlikView was built with a simple architectural premise – all data should be held in memory, and all calculations should be performed when requested and not prior. QlikTech’s goal is to deliver powerful analytic and reporting solutions in a quarter of the time, at half the cost, and with twice the value of competing OLAP cube based products
In-house software or outsource service	Emptoris can offer both SaaS and client-hosted (BTF) deployments for Emptoris Spend Analysis Viewer - the majority of our clients (~90%) have Emptoris host their spend analysis solution.	Zycus offers a spend visibility solution (Data classification and Analytics) as a SaaS or hosted or outsource service mode. Our project implementation takes up to 12 weeks at maximum, with week 14 being the end user training on opportunity or savings identification.	Qlikview offers both in-house and outsourcing services in extracting data and analyzing it
Experience in analyzing spend in your industry	Customers across all various industries, both in telecom and high tech manufacturer. Cleansed and analyzed spend from more than 25 different systems, covering more than 23 million transactions and \$50 billion in spend, with more than 325,000 vendors, and across more than 30 countries	Have customer across all verticals from high tech, manufacturing, telecom and wireless and many other. Our in house developed technology best feature is to adapt to a new customer or spend pattern and deliver consistent results. This is reason for a quick implementation cycle.	Costumers deployed in telecom and related industries.
Integration with sourcing tools	Emptoris Spend Analysis Viewer is one module in the Emptoris suite, and as such can be deployed in either standalone or integrated modes, for example Spend and Sourcing modules are	Zycus iAnalyse (spend analysis) is integrated with other modules such as iSource (eSourcing application) and iContract (Contract management system). The integration	No, but easy to extract data to a esourcing tool.

	typically deployed together.	capability of Zycus helps us to flip identified events to sourcing events and then to sign contracts. Once the contract are signed to a compliance tracker to ensure there is no savings leakage on a monthly or more frequent basis.	
Portfolio of analytical reports and data views	See Appendix 3	We are also flexible to create any new KPI (Key performance indicator report) you have specific for your need during the analytical set up. Standard reports: Top supplier; Top Business Units; Top Suppliers Top Categories; Top Spend; Spend v/s Category; Spend v/s Supplier	Charts, graphs, and tables of all types in QlikView are multidimensional analysis. That is, they show one or more measures (e.g., metrics, KPIs, expressions, etc.) across one or more dimensions (example: total sales by region). The major difference is that these calculations are performed as the user clicks and never prior.
If you are a multinational company, language and currency support	The aggregation, cleansing, and normalization process is language-agnostic and can be run on data of all languages, including 32-bit languages; the solution's Unicode/UTF8 support allows double-byte character such as Chinese, Japanese etc to be displayed to the end-user.	Provide support in English and other languages through a translator. Our solution can interface and understand different currency. For invoicing and license purposes we will use Euro as our base currency.	Can be developed when loading in the tool, no predefined solution

Appendix 2 ST PO list display

The screenshot shows the SAP Easy Access menu for user Christine Multigner. The menu is organized into several categories:

- Favorites**
 - User menu for Christine Multigner
 - STM - STMMicroelectronics menu
 - Logistics
 - Finance
 - Information Systems
 - STM development
 - STM report tree
 - Finance
 - Logistics
 - Global Sourcing & Purchasing
 - STM - ZMMR0504 - Purchase requisition analysis
 - STM - ZMMR0631 - Cycle Time Requisition / Order
 - STM - ZMMR0576 - Open Purchase Orders
 - STM - ZMMR0613 - Cycle Time Lis Analysis
 - STM - ZMMR0615 - PO display list** (highlighted)
 - STM - ZMMR0646 - Modified into records
 - STM - ZMMR0670 - PO count and PR backlog
 - STM - ZMMR0671 - Report PO price vs IR price
 - STM - ZMMR0676 - Statistics on document exchanges
 - STM - ZMMR_CS_1 - Cost Saving - Non Compliant entries
 - STM - ZMMR_CS_2 - Saving Reporting Tool
 - STM - ZMMR0678 - Consignment Stock Withdrawals
 - STM - ZMMR0689 - ePO purchase document approval status (Buyers' report)
 - Logistics
 - Finance
 - General Report Selection
 - Executive Information System
 - Audit Info System
 - Tools
 - Display PR/PO Attachments

The top of the screen shows the SAP logo and the user's name 'euvec2'. The bottom of the screen shows the Windows taskbar with the Start button, system tray, and the time '19:18'.

Appendix 3 Top reports for spend analysis

Commodity

- Top 3 categories spend over time
- Top 10 categories spend over time
- Supplier fragmentation - suppliers comprising top 3 categories
- Supplier fragmentation - suppliers comprising top 10 categories
- Top 3 categories suppliers fragmentation over time
- Top 10 categories supplier fragmentation over time
- Spend by Business Units for top 10 categories
- Spend by Cost Centre for top 10 categories
- Spend by Buyer for top 10 categories
- Spend by Geography for top 10 categories

Supplier

- Spend by Suppliers by Category
- Spend by Business Unit by Suppliers
- Categories associated with top 3 suppliers (category fragmentation)
- Categories associated with top 10 suppliers (category fragmentation)
- Transaction count per Supplier over time
- Suppliers by Region
- Total Spend by top 100 Supplier over time
- Unknown supplier spend by commodity

Cost Centre

- Multiple Cost Centres buying from the same Supplier
- Spend by Category
- Spend by Business Unit
- Top 3 Cost Centres spend over time
- Suppliers comprising top 3 Cost Centres
- Categories comprising top 3 Cost Centres
- Supplier-Category fragmentation in top 3 Cost Centres

Business Unit

- Multiple Business Units Buying with the Same Supplier
- Spend by Business Unit by Category Overview
- Spend by Business Unit by Cost Centre
- Spend Associated with top 3 Business Units over time
- Suppliers associated with top 3 Business Units
- Categories comprising top 3 Business Units
- Supplier-Category fragmentation in top 3 Business Units

Region

- Spend by Region over time
- By Region by Category
- By Region by Supplier
- By Region by Cost Centre
- Supplier fragmentation in top 3 regions
- Supplier-Category fragmentation in top 3 regions

Buyer

- Buyer Spend by Supplier
- Buyer Spend by Category
- Buyer Spend by Business Unit
- Buyer Spend by Cost Centre
- Buyer Spend by Region
- Buyer Count of transactions over time
- Buyer Count of transactions per supplier
- Buyer Count of transactions per category
- Top 3 buyers spend over time
- Top 3 buyers spend by supplier
- Top 3 buyers spend by category