

Designing a set of assessment criteria for following up supplier performance

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<p>This Bachelor's thesis discusses the concept of supplier management, in particular the role of monitoring and measuring supplier performance. The objective of the study was to provide the commissioning company Hairmail Oy with initial measurement criteria and a rating scale in order to monitor and assess the performance of current suppliers.</p> <p>This report includes a theory section and an empirical section that deals with the case company. The theory section discusses supplier management, followed by the concept of supplier performance measurement and descriptions of different measurement techniques and assessment methods used in evaluating supplier performance. Furthermore, the vendor rating system and rating measurement criteria are described in detail. The overall project design and the process of project planning and implementation are presented in the empirical part.</p> <p>This study is based on a literature review and qualitative research. First, the literature review was conducted to find out what kind of methods and techniques are used in supplier assessment. Second, personal interviews and face-to-face meetings were carried out with the management and purchasing personnel of the company to obtain information needed for designing measurement criteria and the rating scale. Three key representatives of the company were interviewed.</p> <p>Based on the analysis of the data, gained by interviewing the company representatives, the most important performance indicators were identified. This information was used for designing initial measurement criteria to be adopted for use by the company. The study shows that implementing vendor rating tools will provide the case organization with overall control of the supplier base and establish continuous review standards for the vendors; this, in turn, ensures the continuous improvement of supplier performance.</p>	
Keywords Supplier performance evaluation, vendor rating, measurement criteria	

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1 Introduction

This thesis was commissioned by the enterprise in which a work placement was completed. As a result of this project, a supplier rating tool was created.

This chapter provides background information on the thesis topic and presents the case company. The objective of the study, the project tasks and key theoretical concepts are also presented in this chapter.

1.1 Background of the topic

Based on the lectures of the specialisation courses on Supply Chain Management (SCM), different articles, case studies and reports I have read, the following conclusion can be made. In contrast with the earlier times, when supply chain was mainly considered as an opportunity to reduce costs, today it is mostly seen as a mechanism for creating and delivering value. And this, in turn, enables companies to differentiate themselves and gain competitive advantage. The main idea of today's supply chain is that companies compete as a supply chain and not as an individual business. Nowadays, business is more demand-driven and not forecast-driven as it was before. The trend of today's supply chain management is about managing relationships with key suppliers, key distributors and key customers in order to make supply chain more flexible. (The Supply Chain Resource Cooperative 2011a; The Supply Chain Resource Cooperative 2005b; The Supply Chain Resource Cooperative 2011c.)

Increasing price sensitivity and market transparency are the key reasons of diminishing customer loyalty. Increasing volatility, poor forecast accuracy and commoditization are ones of the key challenges in managing today's supply chains.

Natural and man-made disasters are another hot issue in SCM. The progressive trend of bringing production closer to home is taking place. The reason is better control and faster response. It is expected that new international customers and customised products will be the source of business growth in the next few years, which means supply chains will be-

come more complex. In order to build sustainable competitive advantage, all members of the supply chain should work in close collaboration, where information sharing plays very important role. Therefore, creating a collaborative partnership with suppliers is becoming more and more important. (The Supply Chain Resource Cooperative 2011d.)

1.2 Profile of the case company

Hairmail Oy is a Finnish wholesaler of professional beauty supplies and salon furniture. It was established in 1993 by Asko Toivola, who is the CEO of the company up till now. The product range consists of high quality hair and beauty products, salon tools and salon furniture for professionals in the beauty industry. In addition to Finnish customers, product offerings are also available for customers in Sweden and Estonia. The head office and the central warehouse are located in Vantaa. There are five pick-up stores in Finland and one shop in Estonia. The company employs approximately 40 full-time workers. Purchasing from Hairmail can be done in several ways: in stores, by phone, by e-mail and by fax. Customer magazines and product catalogues are part of the company's marketing strategy. The customer magazine is published 12 times per year and the product catalogue is published every 1½ year.

The **mission** of the company is to be an unprejudiced expert and a business partner, which provides profitable, extensive and reliable ways and resources for making weekdays beautiful.

The **vision** is to be the most desired partner in the beauty industry. The aim is to be an insightful expert and easy-going business partner. Success has been achieved by providing the growing clientele with wide range of top quality products in a profitable and agile manner.

1.3 Thesis topic and the project tasks

The company's supplier base is diverse. There are total of 82 suppliers from 12 different countries all over the world, but their performance has never been monitored before.

Now the company would like to start measuring and monitoring supplier performance in order to cut costs and bring more customer value. Thus, my thesis topic has been defined as “Designing a set of assessment criteria for following up supplier performance”.

The thesis is product-oriented. The objective of this project was to create a supplier rating system that fits the company’s own business needs. The tasks of the thesis project mainly consist of the following: sorting all the information related to the current suppliers and goods purchased from them; identifying problems related to cooperation with suppliers and designing measurement criteria and rating scale according to the company’s needs. These main tasks include the subtasks that are presented in the chapter 3 and in the attachment 1.

1.4 Demarcation

The objective of the thesis project is to design a supplier rating system in order to measure the performance of approved suppliers. The system will support supplier relationship management and assist in supplier development. Therefore, the theoretical concepts directly related to supplier management are in main focus. In order to achieve the project goal, research on the following theoretical concepts was conducted:

- Supplier performance management.
- Supplier performance measurement.
- Measurement techniques and assessment methods.
- Supplier performance rating.

The purpose of the supplier performance measurement is to reduce costs, mitigate risks and drive continuous improvement. Based on objective performance measurement and feedback, the commissioning company and its suppliers can work together effectively on problem solving and improvements.

1.5 International aspect

Hairmail is a wholesale distributor operating in the beauty industry. The main office is situated in Vantaa, Finland. The clientele base is represented by customers from Finland, Sweden and Estonia. Moreover, one of the upcoming projects is entering new European markets. The thesis topic is directly related to my specialization, in particular to supplier management. The commissioning company is sourcing from almost all over the world. The supplier base is quite diverse and consists of 82 suppliers from 12 different countries. However, the performance of these suppliers has never been monitored. Therefore, the goal of the project was to create a supplier rating tool. Hairmail will use this tool for monitoring and measuring supplier performance.

1.6 Anticipated benefits to stakeholders

By deploying the supplier rating system, the case organization will improve its overall cost position and customer service. Nowadays, more and more firms are becoming dependent on their suppliers. It is important to position a company as a good business partner with the best development potential, because the best customers get most of the suppliers' resources. One of the steps, in order to promote a company as an attractive business partner to the strategic suppliers, is to provide them with a continuous feedback on their performance. Moreover, the feedback has to be discussed with the suppliers regularly. These actions stimulate continuous performance improvement and prevent performance "slippage". Furthermore, supplier performance measurement can lead to cost reduction and improved customer service.

As the thesis author, I will also benefit from this project. Supplier management is among my key professional interests. After the graduation I would like to work in a procurement department. Thus, taking part in this project will provide me with the following benefits:

- Deeper understanding of the topic in focus.
- Getting real-life experience in the field of professional specialization.
- Ability to apply my skills and knowledge in a real business project.
- Getting new contacts to my professional network.

1.7 Key concepts

The key concepts that I consider important and essential to answer in my thesis are presented below.

Lysons and Farrington (2012, 7) defined **supplier management** as “the aspect of procurement concerned with rationalising the supplier base and selecting, coordinating, appraising the performance of and developing the potential of suppliers and building long-term collaborative relationships”.

Roylance (2008, 65) defined **supplier evaluation** as the process of evaluating and approving potential suppliers by quantitative assessment. According to Gordon (2008, 2), this process can be also applied to current suppliers in order to measure and monitor their performance.

“A **Supplier rating system** (sometimes called vendor rating) complements the evaluation and accreditation system in that it measures the performance of approved suppliers on an ongoing basis and supplies meaningful feedback in order to improve performance.” (Roylance, 2008, 71.)

Award schemes – used for recognition of the supplier’s effort and achievements. The award is usually represented by a certificate. (Roylance 2008, 73.)

2 Supplier management

The key theoretical concepts that cover the thesis topic are presented and discussed in this chapter. The concept of supplier management is defined in the beginning of this chapter followed by the definition of supplier performance management. Then, the reasons and the benefits of assessing supplier performance are explored. Next, different supplier measurement techniques and assessment methods used in supplier performance measurement are presented.

The role of supplier performance rating is also discussed in this chapter. It is used for measuring and reporting the performance of approved suppliers in order to improve their performance, thus it suits the best all the needs and requirements of the commissioning company. Some examples of supplier measurement criteria used for the evaluation of supplier performance are provided at the end of the chapter.

2.1 The concept of supplier management

Lysons and Farrington (2012, 7) defined supplier management as “The aspect of procurement concerned with rationalising the supplier base and selecting, coordinating, appraising the performance of and developing the potential of suppliers and building long-term collaborative relationships.” As we can see from this definition, monitoring and measuring supplier performance is only one of the activities included in supplier management. In confirmation of this point of view, I can add here that Handfield, Monczka, Giunipero and Patterson (2009, 308) consider evaluation, measurement and analysis of supplier performance as an important part of supplier management.

2.2 What is supplier performance management

Gordon (2008, 4) defines supplier performance management as the process of evaluating, measuring and monitoring supplier performance and suppliers’ business processes and practices in order to cut down cost, reduce risks and create incentives for improvement.

The main objective of the supplier assessment is to reduce purchase risk and maximize the overall value of the purchaser. It typically involves evaluating, at a minimum, supplier quality, cost competitiveness, potential delivery performance and technological capability. Some of the other criteria used in the preliminary evaluation of suppliers include financial risk analysis, evaluation of previous performance, and evaluation of supplier provided information. (Monczka, Trent, & Handfield 1998.)

Nowadays we can see increased dependence on suppliers. Companies seek for strategic and long-term relationships with the best-in-class suppliers in order to satisfy growing customer needs and as a result to remain competitive in the condition of tough global competition.

According to Weele (2010, 354-355), supplier assessment can be done at four different levels such as:

- Product level – based on improving the product quality.
- Process level – production process is the subject for investigation.
- Quality assurance system level – entire quality organization is in the main focus.
- Company level – at this stage financial aspects are also taken into consideration.

2.3 Supplier performance measurement

Supplier performance measurement is an important process. This is a continuous process in distinction to supplier evaluation and selection. Effective methods and systems are needed in order to record, evaluate and develop supplier performance.

Deciding on what to measure and how to weight each measurement criterion is a crucial part in designing supplier measurement system. There are two approaches to supplier evaluation: quantitative and qualitative. According to Lysons and Farrington (2012, 376), price, quality and delivery are the traditional quantitative variables. Handfield et al (2009, 309) see delivery, quality and cost reduction as the main categories for quantitative variables. As for the qualitative variables, the authors discuss different factors that can be as-

sessed. Handfield et al (2009, 309) give examples of some of the service factors, where Lysons and Farrington (2012, 376) point out such factors as intercompany communication and levels of trust. All these factors are presented in more detail in the table 1.

Table 1. Examples of the qualitative factors

Author	Handfield, Monczka, Giunipero and Patterson	Lysons and Farrington
Qualitative factor	Problem resolution ability Technical ability Ongoing progress reporting Corrective action response Supplier cost-reduction ideas Supplier new-product support Buyer/seller compatibility	Intercompany communication High levels of trust

All authors see the qualitative factor as the object of largely subjective assessment. Nevertheless, these factors are playing an important role in the process of measuring and assessing supplier performance, and a buyer can still give a score to each of them.

2.4 The benefits of monitoring and measuring supplier performance

Evaluation of purchasing performance plays an important role in supplier performance management. Measuring supplier performance can prevent problems in the future and promote improvement. Few authors underline supplier performance improvement as one of the reasons for the evaluation of supplier performance. (Lysons & Farrington 2012, 375; Gordon, 2005, 20.) Other benefits are presented in the table 2.

Table 2. The benefits of supplier performance evaluation

Author	Gordon	Lysons and Farrington	Handfield, Monczka, Giunipero and Patterson
Benefits	Uncovering and removing hidden waste and cost drivers in the supply chain	Stimulates continuous performance improvement and prevents performance “slip-page”	Performance data assist in identifying areas for improvement
	Decreased order cycle time	Assistance in decision making regarding: <ul style="list-style-type: none"> • supplier list • placement of the specific purchase order • distribution of the spend for an item among several suppliers in order to manage risks 	Assistance in making sourcing decisions
	Decreased inventory level		
	Impact on decision making that affects enterprise.		

As we can see from the table above, all authors came to the conclusion, that supplier performance evaluation has a great impact on decision making in a company.

It makes no difference what business you are in, suppliers and vendors play a key role in your company's success. Having a formalized system in place to track and evaluate supplier and vendor performance is essential to the smooth operation and profitability of your company. (Brown 2010.)

2.5 Supplier measurement techniques and assessment methods

According to Handfield et al. (2009, 311) there are three measurement techniques in total:

- Categorical system.
- Weighted-point system.
- Cost-based system.

Categorical system is the most subjective and, thus, the least reliable. Nevertheless, it is the easiest in comparison to two others. It is a low-cost system that is easy to implement. Therefore, it is mostly used by small firms and the firms in the process of developing an evaluation system.

The second technique, *weighted-point*, weighs and quantifies scores in all categories. It is more reliable and allows supplier ranking. Moreover, quantitative and qualitative factors can be combined in this system. In order to use the system, the key performance indicators for supplier performance evaluation have to be carefully selected. In addition, people involved in the process have to decide on the weight of each performance category.

The last approach, *cost-based*, is the most advanced and least subjective. The idea of this system is to calculate the total cost of doing business with a supplier. The additional costs (the costs for each non-performance) must be calculated every time supplier does not perform as expected; this is, basically, the main challenge in using cost-based system.

Total cost index is calculated for each item provided by a supplier. The formula for the calculation of supplier performance index (SPI) is provided below.

$$SPI = \frac{\text{Total Purchases} + \text{Nonperformance Costs}}{\text{Total purchases}}$$

Using this approach may reveal that doing business with suppliers with the lowest unit price is not necessarily cheap. Such information can be used for

- justifying why supplier with the high unit price is preferred
- identifying improvement opportunities in case of non-performance
- identifying long-term sources of supply.

Other models and techniques are also available for supplier measurement. Total Cost of Ownership, weighted linear model, matrix method and linear programming models are some of them. Total Cost of Ownership (TCO) is the most common approach among the listed ones. Even though there are some similarities with the cost-based approach, TCO is more comprehensive system, since it considers all the costs associated with quality, delivery and service. The disadvantage of the system is that its implementation and maintaining is quite complex. (The Supply Chain Resource Cooperative 2011e.)

There are five supplier assessment methods that consist of spreadsheets, qualitative assessment, vendor rating, supplier audits and cost modelling. The first method, spreadsheet, is used for assessing quotations; the second is for well-known suppliers; vendor rating is used for assessing qualitative data; supplier audit is based on investigation of a production process and quality organization. The last approach is the most detailed, the estimation of a supplier's unit cost is in focus. Cost modelling demands close relationship and trust between buyer and supplier (Weele 2010, 355-356).

2.6 Supplier performance rating

The purpose of the supplier rating system is to measure and report performance of approved suppliers in order to improve their performance. Such variables as delivery, quality, and price are commonly used for this purpose. The rating can be subjective and quantitative. Quantitative measures are usually easy to define and track in comparison to subjective measures since the real data on actual performance already exists. Nevertheless, this type of rating has the following disadvantages:

- The cost of collecting data might be high.
- Ratings are not necessarily always scientifically accurate.
- Sometimes supplier performance is affected by outside factors.

The subjective rating is considered difficult as it relies on the expertise of the individuals who judge supplier performance. All subjective appraisals can be lost once the buyer decides to leave (Lysons and Gillingham, 2003, 339). The activity of comparison a supplier's performance with a performance on a previous order or another supplier's performance is also known as vendor rating. The aim of vendor rating system is to give suppliers different types of status according to their performance level.

The process of vendor rating begins with the identification of strategically matching suppliers. The next step is to determine the critical factors that will be used for measuring supplier performance. The variables are considered critical if they can add value by decreasing the costs or improving customer service, or the combination of both. After the variables are determined, each supplier is judged on each factor. The ranking could be numeric or a Likert-scale. Each rating criterion should be weighted according to the importance of the overall vendor rating (eNotes community 2013). The rating system can be effective only if it is consistent, measurable and objective. Last but not least, the rating system must be open to all. A buyer has to be ready to discuss with a supplier the reasons behind his evaluation. The results have to be reported and discussed on a regular face-to-face basis, usually every three months. In some cases a meeting has to be arranged immediately and in some cases only two meetings in a year is enough. A buyer and a supplier

have to work together in order to eliminate any defects that have been revealed during the process of evaluation. For new suppliers it is good to organize reporting meetings every month. The next action that plays an important role in supplier evaluation process is to recognize and point out the achievements of the best suppliers in the portfolio. The award may be represented by three types of certificate: gold, silver and bronze. New suppliers may be nominated for a “best new supplier of the year” award certificate (Roylance 2008, 71-72).

2.7 Rating measurement criteria

According to Roylance (2008, 72) any rating system is based on three essential dimensions: price, quality and service. The maximum score is 100 points and they can be allocated in different ways depending on a product group. The reason is that for some products quality is much more important than the price and vice versa. Examples of the criteria commonly used in supplier rating are presented below.

Price

- Competitive pricing. The prices should be comparable to other suppliers of similar products.
- Price stability. Prices should be stable over time.
- Advanced notice of price changes. The supplier should inform in advance about price changes.
- Discounts and payment terms offered.

Quality

- Durability
- Reliability
- Quality. The replacement time should be reasonable.
- On-time delivery. Are the products/services delivered on the promised date?
- Complaint handling. The vendor should respond in a timely manner to any complaint.

- Compliance with purchase order. The supplier should fulfil purchased order requirements and conditions.

Service

- Technical support. In addition to technical documentation a supplier should also provide maintenance, repair and installation services.
- Emergency support. The emergency support for replacement or repair of defective products should be provided.
- Responsiveness. The supplier should respond in a timely manner.
- Flexibility
- Communication efficiency. Are the communication methods efficient enough?

Based on the information provided in the article of eNotes community (eNotes community 2013), delivery is the fourth independent factor to measure. It may include the following measurement criteria:

- Time. Does the actual delivery date correspond to the promised one?
- Quantity. The supplier should deliver the right products in the right quantity.
- Lead time. The average delivery time should be comparable to other vendors supplying similar products.
- Packaging. Is the packaging is suitable, undamaged, properly marked?
- Documentation. The documents such as packing lists and invoices should contain correct material codes and purchase order numbers.
- Emergency delivery. Does the supplier provide emergency delivery?

Furthermore, in comparison to Roylance, who sees on-time delivery as a part of quality dimension, other authors such as Lysons and Gillingham (2003, 339), Handfield et al. (2009, 309) also point out delivery performance as an independent, fourth factor to measure. In this factor the discrepancy between the promised delivery date and the actual date the material is received can be measured. Below is the formula used for this purpose.

$$\frac{\textit{number of late deliveries}}{\textit{number of total deliveries}} * 100$$

3 Project planning and implementation

This chapter contains the information about the project planning and implementation process, the research methods used for data collection and decision analysis.

3.1 Overall project design

A literature review was conducted by gathering and analysing the information available in print or published on the Internet. Since the thesis is product-oriented, I decided to make a research on supplier measurement approaches and performance criteria that can be used for the evaluation of supplier performance. In addition to literature review, a qualitative research has been implemented. I collected the data by conducting personal interviews, participating in face-to-face discussions and team meetings. Interviews and face-to-face meetings were carried out with the manager and purchasing personnel, who are the supply chain management professionals with sufficient experience and skills. For example, the manager has previously got a great experience in supplier performance measurement while working for a well-known international company. All three interviewees were involved in the development of the supplier measurement tool; therefore they provided valuable information on the supplier base, current challenges and areas for improvement. I consider the respondents not only as the source of needed information, but also as purchasing professionals who are able to assist me in my tasks and evaluate the outcome of my work at the end. Based on the research results and following analysis of the collected data, the initial set of key performance indicators for the evaluation of supplier performance has been designed.

3.2 Project implementation

The project has been started from the kick-off meeting. During this meeting the main tasks and the subtasks of the project have been discussed and the deadlines were set. Designing assessment criteria and a rating scale for monitoring supplier performance were

the main tasks of the project. These two major tasks have been split into numerous small ones. The small tasks have been grouped into three sets based on weekly workload.

The first set of my tasks included the following:

- to sort out all the suppliers on the assumption of the volume of purchases
- to sort out all the goods that had been purchased from each supplier during the past year
- to clarify the number of product titles that company had been purchasing from each supplier during the last year

These project tasks have been completed by sorting out the information provided by the manager and the purchasing personnel. I received a few Excel files containing the information on products purchased from each supplier during the last fiscal year. As a result of completing the first set of the tasks, the main suppliers and the volume of the products purchased during the last year have been clarified. All the suppliers have been allocated to three major groups:

- A category suppliers
- B category suppliers
- C-H category suppliers.

Each supplier was allocated to the certain category on the assumption of the total value of the products supplied during the last fiscal year. In addition, all the goods purchased have been categorized according to the appropriate product group, such as professional cosmetics, hair cutting tools, salon furniture and other.

The set number two comprised the following tasks:

- to implement theory research on assessment approaches and measurement techniques
- to find out what kind of problems the purchasing personnel encounter with suppliers by conducting personal interviews

- to design measurement criteria according to the company's own needs
- to develop rating scale for supplier evaluation.

The main emphasis was put on this part of the project tasks. Interviews, team meetings with the company representatives and face-to-face discussions with the manager were the main working methods at this phase. Semi-structured interviews have been carried out with two buyers. In order to conduct the interviews, I prepared the interview guide – a list of questions on specific topics to be covered. There were no restrictions on how the respondents can reply on the questions asked.

As a result of the implemented research, important information needed for designing measurement criteria has been gathered and analysed. The following complications in the buyer-supplier cooperation have been detected:

- discrepancies in agreed and actual delivery time
- missing order confirmation
- some quality issues
- incomplete packing lists (some essential information is missing)
- late bills.

Based on the analysis of the collected data I designed and proposed the essential measurement criteria.

The tasks from the last set consist in the following:

- to make a suggestion upon supplier evaluation in future
- to design a set of criteria for future evaluation.

At this stage, the information gathered during the interviews, face-to-face discussions and team meetings have been used for designing assessment criteria for future use. These criteria are presented in the subchapter 4.2.

3.3 Decision analysis

Two research methods have been used for the purpose of completing the project: literature review and qualitative research. I interviewed the purchasing personnel, set up team meetings and face-to-face discussions with the supply chain manager. I chose these people because they are professionals in the field with solid experience in supplier performance measurement. Moreover, the respondents were involved in the process of creating supplier evaluation system. These people are aware of current challenges related to the purchasing performance in the organization and know the best what exactly is needed for the future development of the company. The key theoretical concepts and results of the qualitative research have been applied for creating the supplier measurement tool. I decided to concentrate on the essential issues while designing the measurement criteria, since it will be the first time for the company to measure the performance of their suppliers. The most significant cost drivers caused by supplier performance have been taken into consideration in order to decide what to measure. Below is the opinion of the professionals in support to my decisions:

Think about what makes sense, not just what can be measured. To determine what to measure, consider the item you are buying, look for its significant cost components and then identify ways in which the supplier's performance is driving those costs up or down. Develop metrics that are understandable and few in number. Too many metrics can contribute to confusion and create paralysis. (Supplier selection and management report 2003, 12-13.)

The rating scale and the weighting of each category have been discussed with all three persons involved in the process during the team meetings. I have designed and suggested measurement criteria, metrics and formulas essential to start with. The criteria weightings have been mostly defined by the buyers and later on approved by the manager. Later on, I presented the finalized outcome of my work to the team members involved in the project. The proposed rating tool has been approved by the supply chain manager.

4 Outcome: the supplier rating tool

As a result of the project work, measurement criteria and the rating scale for monitoring supplier performance have been designed. According to the manager's plan, launching of the project is scheduled for the summer 2013. The guide for using the scoring criteria is available for the case company in the form of a separate PDF file.

4.1 Criteria for supplier performance evaluation

The supplier rating tool was designed in order to measure supplier performance with respect to four key criteria. These criteria are:

- delivery
- service/responsiveness
- quality
- price.

The technique used in the rating tool is weighted-point. The maximum number of the points earned in all measurement criteria is 100 for each supplier. The weighting for each criterion is shown in the figure 1.

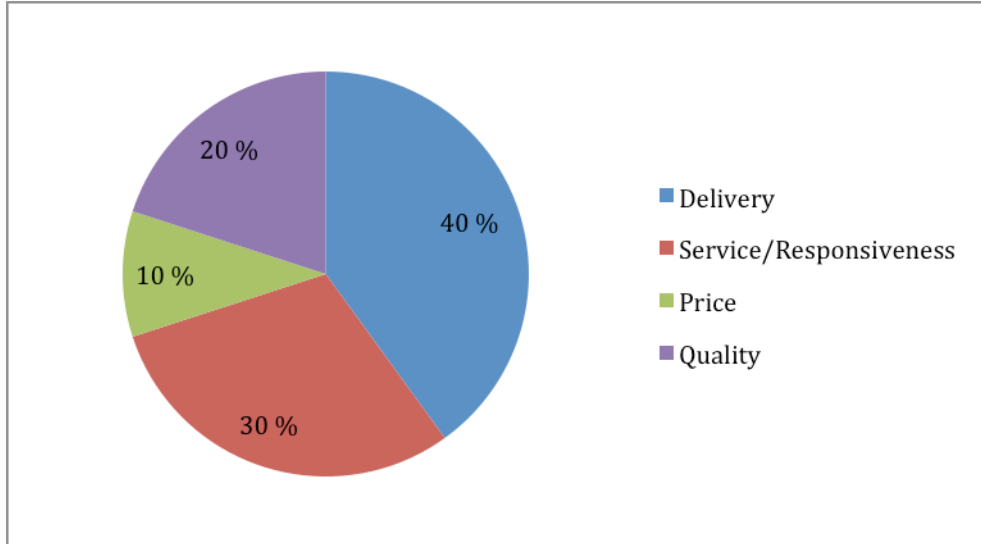


Figure 1. Weighted performance criteria

Detailed description of all four criteria, rating scale for each of the measurement metric and the supplier performance levels are described later in this chapter.

The maximum number of points to be gained in the **Delivery** criterion is 40. Two metrics are measured in this criterion: on time line count and documentation. On time line count metric is the comparison of the promised delivery date and the actual delivery date. The acceptance tolerance is up to three days early/late. Below is the formula used for the calculation.

$$\text{On Time Line Count} = \frac{\text{number of order lines shipped within time tolerance}}{\text{total number of order lines}} * 100$$

The maximum number of points gained in on time line count metric is 30. The principle of the points' allocation is shown in the table 3.

Table 3. Allocation of the points

On time line count %	Points
97 – 100	30
93 – 97	24
89 – 93	18
85 – 89	12
80 – 85	6
0 – 80	0

Documentation criteria accounts for 10 point maximum and based on the evaluation question. The question is the following: “Packing lists are correct – with proper purchase order (PO) number and correct material code”. The score is based on six evaluation sub-criteria, which are presented in the table 4.

Table 4. Documentation sub-criteria

Documentation sub-criteria	Points
All suppliers packing slips always contain correct PO numbers and correct material code.	10
Almost all supplier packing slips contain correct PO numbers and correct material code.	8
Most of supplier slips contain correct PO numbers and correct material code.	6
Several supplier slips DO NOT contain correct PO numbers and correct material code.	4
Most of supplier slips DO NOT contain correct PO numbers and correct material code.	2
Hardly any of supplier packing slips contain correct PO numbers and correct material code.	0

The maximum score that can be reached in the **Service/Responsiveness** section is 30. Ratings are determined on the basis of the following metrics: on time order confirmation and on time response to quality issues. 20 points out of 30 go to the first metric and the remaining 10 to the second one. The points are allocated as follows (see table 5 and 6).

Table 5. Point allocation for on time order confirmation

On time confirmation 24/48 h	20 points
Late confirmation 48/96h	10 points
Too late confirmation or no confirmation at all	0 points

On time order confirmation for Finland is within 24 hours, for other countries – 48 hours. Late confirmation is within 48 hours for Finnish suppliers and 96 hours for all other suppliers.

Table 6. Point allocation for on time response to quality issue

On time response (within 24h)	10 points
Late response (within 48h)	5 points
Too late response/no response	0 points

Quality criterion accounts for 20 points maximum. Rejected part per million (RPPM) is calculated in this section using the following formula:

$$RPPM = \frac{\text{the amount of non-conforming goods}}{\text{the total amount of goods received in a given fiscal month}} * 1000000$$

The score allocation is presented in the table 7.

Table 7. Score allocation for quality criterion

RPPM Rating	Score
0-25	20
26-35	17.5
36-45	15
46-55	12.5
56-65	10
66-75	7.5
76-85	5
86-95	2.5
96-100	0

The points related to the **Price** criterion are based on the evaluating question. The maximum score to be reached is 10 points. The question and the allocation of the points are shown in the table 8.

Evaluating question: supplier's invoices are correct and punctual.

Table 8. Allocation of points in price criterion

All supplier invoices contain correct purchase order (PO) numbers, correct prices and sent promptly.	10
Almost all supplier invoices contain correct PO numbers, correct prices and sent promptly.	8
Most of supplier invoices contain correct PO numbers, correct prices and sent promptly.	6
Several supplier invoices DO NOT contain correct PO numbers and correct prices. Invoices are NOT sent promptly.	4
Most of supplier invoices DO NOT contain correct PO numbers and correct prices. Invoices are NOT sent promptly.	2
Hardly any of supplier invoices contain correct PO numbers and correct prices. Invoices are NOT sent promptly.	0

In order to provide the company with the ability to easily see which suppliers are performing well and which require improvement, three supplier performance levels have been defined. Each performance level is based on the sum of the points received in all performance categories. Requirements for performance levels differ for the suppliers from different categories. The score requirements for category A suppliers differ from the score requirements for the category B and C – H suppliers. These levels are shown in the table 9.

Table 9. Performance levels

Suppliers	Points		
	Preferred	Adequate	Unsatisfactory
A	95-100	80-94	<80
B	85-100	70-84	<70
C-H	80-100	65-79	<65

The sum of the points within green colour is dedicated for excellently performing suppliers. If the total sum of the points received by a supplier belongs to the yellow column, this means that some correction actions have to be made in order to improve the performance. The red colour dedicated for suppliers with poor performance. In this case some of them can be eliminated.

4.2 Recommendations for the evaluation of supplier performance in future

The measurement criteria presented above are the vital ones, they mean the most to the commissioning company. They are considered as the essential metrics for the starting point. Hairmail has never been monitoring the performance of their suppliers before. Therefore, it has been decided not to use every metric available, but rather to concentrate on the vital ones at the beginning. Thus, the initial set of measurement criteria comprises four different dimensions with the most important metrics. These metrics have been determined while making the analysis of the information gained via cooperation with the company representatives. Nevertheless, the rest criteria that seem useful are recommended for later use. Based on the discussions with the supply chain manager and the analysis of the conducted interviews with the company representatives, the following metrics are recommended to include to the monitoring process in the future:

- Supplier lead time variability. The average between the supplier's forecasted lead time and the actual lead time for each order.
- Competitive pricing. To compare the prices of current suppliers with the prices of other vendors in the industry.
- Price stability. To see how often the prices are changed and to find out the reasons behind.

The necessity of managing supplier lead time has been revealed in the discussions with the manager and the purchasing personnel. Therefore, measuring supplier lead time variations is crucial. It can have a significant impact on the company's bottom line. Reducing lead times can help the company to reduce costs associated with the purchasing. This metric is usually measured once a year, but can be measured over any time period. Shipping invoices and customs declarations are common data sources used in measuring supplier lead time.

The formula used for measuring the level of variability in supplier lead time is provided below (USAID deliver project 2010, 20).

$$\frac{\text{forecasted lead time} - \text{actual lead time}}{\text{actual lead time}} * 100$$

Competitive pricing measures the unit cost per item charged by a supplier as a percentage of the average international unit price. The lower the percentage of the average international price paid, the more the cost savings and vice versa. The data required include the supplier invoices and the information on the average international unit costs for items purchased (USAID deliver project 2010, 13).

The following formula can be used for this purpose:

$$\frac{\text{average unit cost of item}}{\text{average international unit cost of item}} * 100$$

Price stability metric can be based on the following evaluation question: “Prices are stable over specific period of time”. This question may consist of several sub questions. The points can be allocated in respect to the level of price stability. The example is presented in the table below (see table 10).

Table 10. Allocation of points in price stability metric

Prices are stable over time	xxx points
Prices are slightly changing; the reason is given	xx points
Prices are changing rapidly; no reason is given	x points

5 Discussion and evaluation

5.1 Summary of the results

The product of this thesis is presented by the guide for using supplier measurement tool. This guide is meant for use by the purchasing personnel in the commissioning company. The theoretical research and semi-structured interviews have been conducted in order to develop the rating tool.

Supplier performance is rated on four key criteria. These criteria are:

- delivery
- service/responsiveness
- quality
- price

Each scorecard category consists of one or more metrics used for the measurement of supplier performance. The detailed information on the measurement factors and scoring metrics can be found in the table 11. Each metric accounts for certain number of points and overall supplier score is calculated. The maximum score is 100 points for each supplier.

Table 11. Measurement criteria and metrics

Scorecard Category	Metrics	Points
Delivery	1. On time line count	30
	2. Documentation (packing slips)	10
Service/Responsiveness	1. On time order confirmation	20
	2. On time response	10
Quality	1. RPPM (rejected parts per million)	20
Price	1. Supplier's invoices	10

The technique used in the rating tool is weighted-point, which allows supplier ranking. The major benefit is that quantitative and qualitative factors can be combined in this system. The people involved in the process decided on the weight of each performance category. As a result **Delivery** has a weighting of 40%; **Service/Responsiveness** – 30%; **Quality** accounted for 20% and the last category **Price** for 10% (see figure 2).

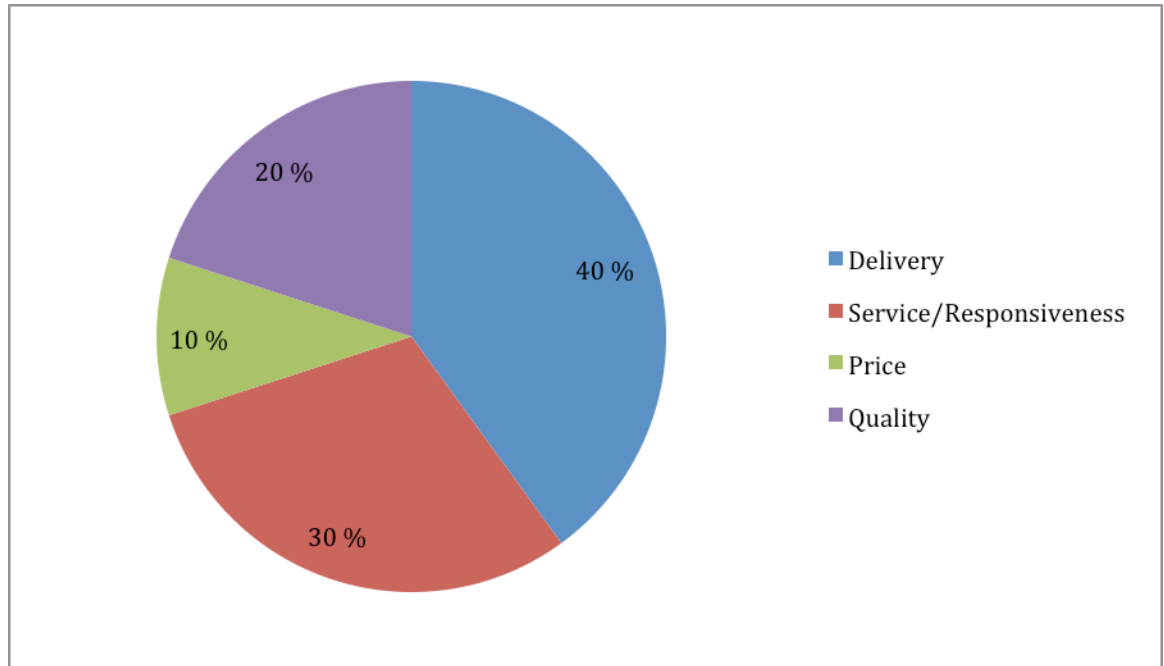


Figure 2. Weighted performance criteria

The total score received in all performance criteria is between 0 and 100 points. Based on the sum of the total points received by each category supplier, three performance levels have been defined. This was made in order to provide the company with the ability to easily see which suppliers are performing well and which require improvement. Evaluation criteria, metrics, rating scale and performance levels are explained and shown in more detail in the chapter 4.

5.2 Validity and reliability

As stated by Bryman and Bell (2003, 33) reliability and validity are important criteria for the evaluation of business and management research.

Reliability is concerned with the question of whether the results of the study are repeatable.

...

A further and in many ways the most important criterion of research is validity. Validity is concerned with the integrity of the conclusions that are generated from a piece of research. (Bryman & Bell 2003, 33.)

Three company representatives have been involved in the process of designing the rating tool for supplier performance measurement. Interviews, face-to-face discussions and team meetings have been carried out with two buyers and the supply chain manager of the company. All three respondents are considered as a valuable and reliable source of information required for the project implementation. As the company insiders and the experts in supplier management, the interviewees know the best about the current challenges and the areas for improvement in the organization. Furthermore, they took part in the project and influenced the outcome of the project. The rating scale and the weightings of each category have been discussed with purchasing personnel involved in the process. The criteria weightings have been mostly defined by the buyers and later on approved by the supply chain manager. The proposed measurement variables have been carefully selected according to the company's own needs and requirements. Only the most important key performance indicators and significant cost drivers have been taken into consideration in order to decide what to measure, since supplier performance has never been monitored in the company before.

Think about what makes sense, not just what can be measured. To determine what to measure, consider the item you are buying, look for its significant cost components and then identify ways in which the supplier's performance is driving those costs up or down. Develop metrics that are understandable and few in number. Too many metrics can contribute to confusion and create paralysis. (Supplier selection and management report 2003, 12-13.)

Theory research assisted me in choosing appropriate measurement technique and assessment method. Weighted-point technique in the combination with vendor rating method has been chosen for the purpose of designing measurement criteria. The technique and the method used serve the best the needs of the commissioning company.

A weighted-point system weighs and qualifies scores across different performance categories.

...

Weighted-point systems are also flexible – users can change the weights assigned to each performance category or the performance categories themselves, depending on what is most important to the buying organization. (Handfield 2009, 312.)

Lysons and Gillingham (2003, 339) state that the purpose of supplier rating system is to measure and report the performance of approved suppliers in order to improve their performance. Thus, vendor rating method serves the best the company's own needs.

The positive feedback from the commissioning company (attachment 2) proved the validity of the project outcome. The supply chain manager approved the rating tool and found it beneficial and useful. According to the manager's plans, the purchasing personnel will start using it in summer 2013.

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Attachments

Attachment 1. Overlay matrix

Project objective	Project tasks	Purpose	Output
To assess suppliers performance	To sort out all the suppliers on the assumption of the volume of purchases	To see the purchase volume for each supplier	The list of suppliers based on the purchasing volume (from highest to the lowest)
	To sort out all the goods that had been purchased from each supplier	To see what have been purchased from each supplier	The list of product titles for each supplier
	To clarify the number of product titles that company had been purchasing from each supplier during the last year	To allocate all suppliers to three major groups: <ul style="list-style-type: none"> – A category suppliers – B category suppliers – C-H category suppliers. 	Number of product titles purchased from each supplier
	To implement theory research on assessment approaches and measurement techniques.	To find out what kind of methods and techniques are commonly used in supplier performance measurement	Assessment methods; measurement techniques; rating criteria
	To find out what kind of supplier problems the buyers encounter at the moment	To detect the areas for improvement	List of possible performance criteria
	To design a set of criteria for supplier evaluation by implementing literature review and qualitative research	To get started with monitoring supplier performance	Set of initial assessment criteria
	To develop rating scale for supplier evaluation	To measure performance criteria	Rating scale
	To make a suggestion upon supplier evaluation in future	For further supplier development	Recommendations
	To design a set of criteria for future evaluation	For further supplier development	The list of additional assessment criteria

Attachment 2. Commissioning party feedback



Degree Programme in International Business
Pasila Campus

Thesis author/s	Kateryna Bulavina
Thesis title	Designing a set of assessment criteria for following up supplier performance
Commissioning company or organisation	Hairmail Oy
Commissioning party's contact person and contact information	Pekka Heija, Vice President, logistics and purchasing gsm + 358 (40) 673 6756 tel + 358 (0)925 385 801
Thesis advisor at HAAGA-HELIA	Sirkka Hoikkala
Advisor's e-mail address	sirkka.hoikkala@liiketalousopisto.fi

1. Have you made use of the thesis results in some way? If yes, how?

Not yet, because our ERP system doesn't support measurements yet.

2. How do you plan to make use of the thesis results in your future operations?

We will implement a supplier performance process as soon as our ERP-system support measuring. It will be an important part of our vendor management process in future.

3. Please estimate how useful the thesis is for you:

Not useful at all ☐ ☐ ☐ ☒ ☐ Very useful

4. Please estimate how useful the thesis is for your field of business (e.g. it generated an innovation, operating practice, product or new information):

Not useful at all ☐ ☐ ☐ ☒ ☐ Very useful

5. Please give free feedback about the thesis process:

We want support this kind of things and help young people build their own career.

6. Other feedback to the student or HAAGA-HELIA:

The student is able to work very independent way and can find out all the most important information itself.

Measuring Supplier Performance

Supplier Rating Tool



Guide to Key Performance Indicators

May 2013

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1 Introduction

Supplier performance management is the process of evaluating, measuring and monitoring supplier performance and suppliers' business processes and practices in order to cut down cost, reduce risk, and create incentives for improvement. Evaluation of purchasing performance plays an important role in supplier performance management. Measuring supplier performance can prevent problems in the future and promote improvement. The purpose of supplier rating system is to measure and report the performance of approved suppliers in order to improve their performance. Such variables as delivery, quality, and price are commonly used for this purpose.

The supplier rating tool was designed to provide the company with the ability to measure performance of current suppliers with respect to four key criteria such as:

1. delivery
2. service/responsiveness
3. quality
4. price.

The technique used in the rating tool is weighted-point. The maximum number of the points earned in all measurement criteria is 100 for each supplier. The weighting for each criterion is shown in the figure 1.

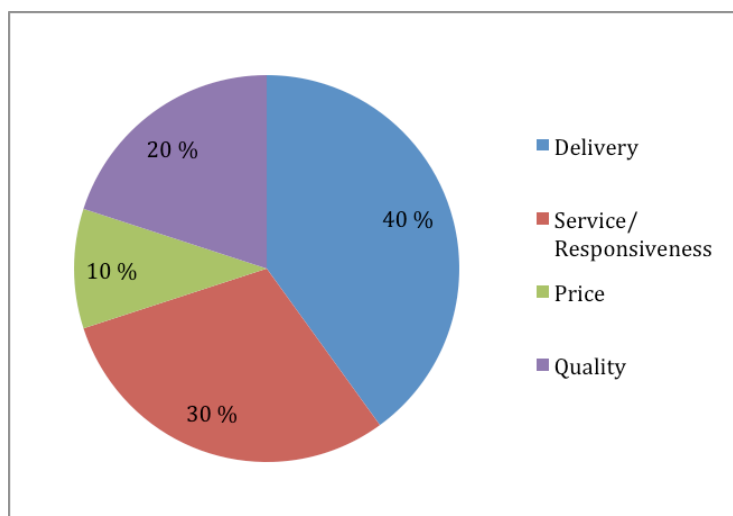


Figure 1. Weighted performance criteria

Each scorecard category consists of 1-2 metrics used for the measurement of supplier performance. The detailed information on the measurement factors and scoring metrics can be seen in the table below (see table 1). Each metric accounts for certain number of points and overall supplier score is calculated. The maximum score is 100 points for each supplier.

Table 1. Measurement criteria and metrics

Scorecard Category	Metrics	Points
Delivery	1. On time line count	30
	2. Documentation (packing slips)	10
Service/Responsiveness	1. On time order confirmation	20
	2. On time response	10
Quality	1. RPPM (rejected parts per million)	20
Price	1. Supplier's invoices	10

2 Scoring Criteria – Delivery

The maximum number of points to be gained in the **Delivery** criterion is 40. Two metrics are measured in this criterion: *on time line count* and *documentation*. On time line count metric is the comparison of the promised delivery date and the actual delivery date. The acceptance tolerance is up to three days early/late. Below is the formula used for the calculation.

$$\text{On Time Line Count} = \frac{\text{number of order lines shipped within time tolerance}}{\text{total number of order lines}} * 100$$

The maximum number of points gained in on time line count metric is 30. The principle of the points' allocation is shown in the table 2.

Table 2. Allocation of the points

On time line count %	Points
97 – 100	30
93 – 97	24
89 – 93	18
85 – 89	12
80 – 85	6
0 – 80	0

Documentation criteria accounts for 10 point maximum and based on the evaluation question. The question is the following: “Packing lists are correct- with proper purchase order number and correct material code”. The score is based on six evaluation sub criteria, which are presented in the table 3.

Table 3. Documentation sub criteria

Documentation sub criteria	Points
All suppliers packing slips always contain correct PO numbers and correct material code	10
Almost all supplier packing slips contain correct PO numbers and correct material code	8
Most of supplier slips contain correct PO numbers and correct material code.	6
Several supplier slips DO NOT contain correct PO numbers and correct material code	4
Most of supplier slips DO NOT contain correct PO numbers and correct material code	2
Hardly any of supplier packing slips contain correct PO numbers and correct material code.	0

3 Scoring Criteria – Service/Responsiveness

The maximum score that can be reached in the **Service/Responsiveness** section is 30. Ratings are determined on the basis of the following metrics: *on time order confirmation* and *on time response to quality issues*. 20 points out of 30 go to the first metric and the remaining 10 to the second one. The points are allocated as follows (see table 4 and 5).

Table 4. Point allocation for on time order confirmation

On time confirmation 24/48 h	20 points
Late confirmation 48/96h	10 points
Too late confirmation or no confirmation at all	0 points

On time order confirmation for Finland is within 24 hours, for all other counties 48 hours. Late confirmation is within 48 hours for Finnish suppliers and 96 hours for all other suppliers.

Table 5. Point allocation for on time response to quality issue

On time response (within 24h)	10 points
Late response (within 48h)	5 points
Too late response/ No response	0 points

4 Scoring Criteria – Quality

Quality criterion accounts for 20 points maximum. Rejected part per million (RPPM) is calculated in this section using the following formula

$$RPPM = \frac{\text{the amount of non-conforming goods}}{\text{the total amount of goods received in a given fiscal month}} * 1000000$$

The score allocation is presented in the table 6.

Table 6. Score allocation for quality criterion

RPPM Rating	Score
0-25	20
26-35	17.5
36-45	15
46-55	12.5
56-65	10
66-75	7.5
76-85	5
86-95	2.5
96-100	0

5 Scoring Criteria – Price

The points related to price criterion are based on the evaluating question. The maximum score to be reached is 10 points. The question and the allocation of the points are shown below in the table 7. Evaluating question: supplier's invoices are correct and punctual.

Table 7. Allocation of points in price criterion

All supplier invoices contain correct purchase order (PO) numbers, correct prices and sent promptly	10
Almost all supplier invoices contain correct PO numbers, correct prices and sent promptly	8
Most of supplier invoices contain correct PO numbers, correct prices and sent promptly	6
Several supplier invoices DO NOT contain correct PO numbers and correct prices. Invoices are NOT sent promptly	4
Most of supplier invoices DO NOT contain correct PO numbers and correct prices. Invoices are NOT sent promptly	2
Hardly any of supplier invoices contain correct PO numbers and correct prices. Invoices are NOT sent promptly	0

6 Performance Levels

In order to provide the company with the ability to easily see which suppliers are performing well and which require improvement, three supplier performance levels have been defined. Each performance level is based on the sum of the points received in all performance categories. Requirements for performance levels differ for the suppliers from different categories. The score requirements for category A suppliers differ from the score requirements for the category B and C – H suppliers. These levels are shown in the table 8.

Table 8. Performance levels

Suppliers	Points		
	Preferred	Adequate	Unsatisfactory
A	95-100	80-94	<80
B	85-100	70-84	<70
C-H	80-100	65-79	<65

The sum of the points within green colour is dedicated for excellently performing suppliers. If the total sum of the points received by a supplier belongs to the yellow column, this means that some correction actions have to be made in order to improve the performance. The red colour dedicated for suppliers with poor performance. In this case some of the suppliers can be eliminated.

7 Recommendations for the evaluation of supplier performance in future

The measurement criteria presented above are the vital ones. They are considered as the essential metrics for the starting point. The organization has been never monitoring the performance of their suppliers before. Therefore, it has been decided not to use every metric available, but rather to concentrate on the vital ones at the beginning. Thus, the initial set of measurement criteria comprises four different dimensions with the most important metrics. The most important metrics have been determined while making the analysis of the information gained via cooperation with the company representatives. Nevertheless, the following metrics are recommended to include to the monitoring process in the future:

- Supplier lead time variability. The average between the supplier's forecasted lead time and the actual lead time for each order.
- Competitive pricing. To compare the prices of current suppliers with the prices of other vendors in the industry.
- Price stability. To see how often the prices are changed and to find out the reasons behind.

The need to manage **Supplier Lead Time** has been revealed in the discussions with the manager and the buyers. Therefore, measuring supplier lead time variations is crucial. It can have a significant impact on the company's bottom line. Reducing lead times can help the company to reduce the costs associated with the purchasing. This metric is usually measured once a year, but can be measured over any time period. Shipping invoices and customs declarations are commonly used data sources used in measuring supplier lead time. The formula used for measuring the level of variability in supplier lead time is provided below.

$$\frac{\text{forecasted lead time} - \text{actual lead time}}{\text{actual lead time}} * 100$$

Competitive Pricing measures the unit cost per item charged by a supplier as a percentage of the average international unit price. The lower the percentage of the average international price paid, the more the cost savings and vice versa. The data required include the supplier invoices and the information on the average international unit costs for items purchased.

The following formula can be used for this purpose

$$\frac{\text{average unit cost of item}}{\text{average international unit cost of item}} * 100$$

Price Stability metric can be based on the following evaluation question: “Prices are stable over specific period of time”. This question may consist of several sub questions. The points can be allocated in respect to the level of price stability. The example is presented in the table below (see table 9).

Table 9. Allocation of points in price stability metric

Prices are stable over time	xxx points
Prices are slightly changing; the reason is given	xx points
Prices are changing rapidly; no reason is given	x points