‘Getting it measured’;

Design of a vendor rating system at ATAG Nederland B.V.

Sander Tijhuis
15 May 2008

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Preface

In front of you lies a copy of the master thesis 'Getting it measured'; ***Design of a vendor rating system at ATAG Nederland B.V***. This report is part of the final stage of the study Business Administration (track Innovation Management) at the Faculty Management & Governance from the University of Twente. It describes a research carried out at ATAG Nederland B.V. with the main topic of supplier performance measurement.

A known phrase comes from Garvin (1993), who stated in the Harvard Business Review: ***"If you cannot measure it, you cannot manage it"*** This indirectly implies that "If you can measure it, you can manage it". This is off course a little bit overstated, but it seems to be the underlying motivation for many organisations to start with performance measurement. This was also the case when I started my research project in September 2007 at ATAG Nederland B.V. The Quality Assurance department of the organisation lacked a suitable method that measures on a regular basis the performance of suppliers in order to ensure high quality products. The graduation assignment contributed to the design of such a supplier monitoring system or a vendor rating system.

At this moment when my graduation assignment is finished, I want to thank multiple persons. First of all I want to thank Onno Wessels, manager Quality Assurance of ATAG Nederland B.V., for giving me the opportunity to carry out this graduation assignment and for the support during the completion of the research. Next to it I want to thank Rick Middel and Fredo Schotanus for their support from the University of Twente. Their valuable feedback and advice during the research assisted me to focus on the right direction and in the achievement of a rewarding academic level.

The completion of this research could not have been carried out without the support of various persons who have directly or indirectly contributed to a successful completion of this graduation assignment. These persons are:

- Ben Hofenk on behalf of top management of ATAG.
- Henk Diepenveen, Henk van de Mee & Bas Jansen on behalf of the Purchase department of ATAG.
- Jeroen van Benthem, business analyst of ATAG.
- Gerard Jansen on behalf of the Product Development department of ATAG.
- Manuela Walter on behalf of the Logistics department of ATAG.
- All the employees of the Quality Assurance department of ATAG, who have contributed to an informative but also a pleasant time.
- The suppliers of ATAG Nederland B.V. who have contributed to the research.
- Sjoerd Messersmid, student Business Administration, for his critical feedback and optimistic comments during the research.
- Lastly I want to express my gratitude to my family and friends for their support during my graduation, but also during the duration of my study.

Without their valuable information and advices it was not possible to carry out this graduation assignment.

Sander Tijhuis
15 May 2008

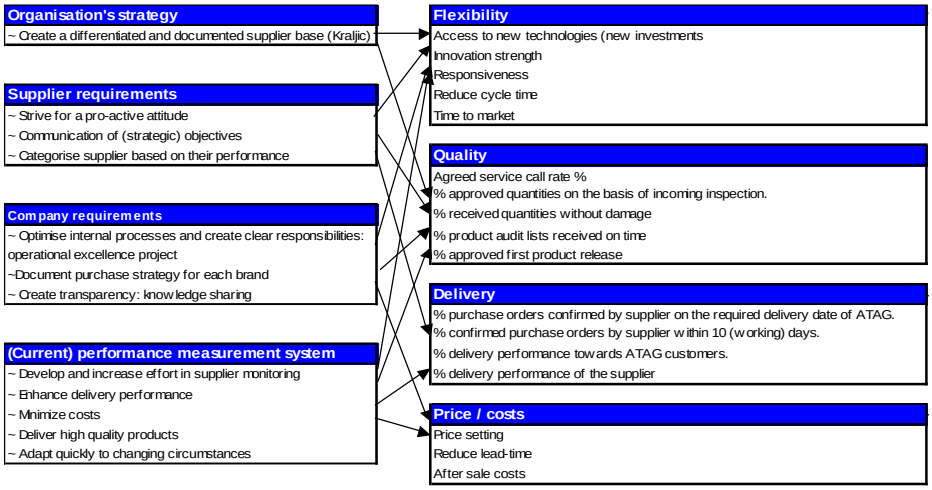
Universiteit Twente
de ondernemende universiteit

ATAG

Management Summary

ATAG Nederland B.V. is an organisation that is focused on the design, purchase, warehouse, sale, distribution and service of kitchen appliances. The organisation is characterised by its production-independent approach. The production function is completely outsourced, which makes the organisation highly dependent on the performance of suppliers in order to deliver high quality products. Supplier performance measurement or vendor rating is therefore a wanted method for improving customer satisfaction. Therefore the following research question is formulated and answered during the research: ***How should a vendor rating system that enables ATAG to monitor the performance of its suppliers be modelled, in order to control and improve the process and product quality?***

The research made a distinction between the IST- and SOLL situation. The IST situation is described by an analysis of the current methods for supplier monitoring within ATAG. The SOLL situation is illustrated by a literature review and the desired needs of ATAG regarding supplier monitoring.
The current supplier monitoring system of ATAG consists of 2 methods: the Supplier Assessment Questionnaires (SAQ 1&2) and the call rate technique. Although these methods are a good initiative, some bottlenecks have to be over won. First of all there is no procedure for sharing the outcomes of the SAQ's to all relevant actors, which hinders follow-up actions. Secondly the SAQ 2 lacks commitment of employees because of perception differences. Thereby the method is not completely objective, because of missing weighting factors. Thirdly, the call rate technique is a well-developed method, but remains a management control system and therefore the overall objective should not be dominated by discussion on detail level.
The literature review has shown that it is hard to prescribe a best-practice to design a vendor rating system. Each organisation has its own characteristics in terms of demands and pre-requisites. However, the design of a vendor rating system will be more successful when an organisation takes in account certain design elements: Organisation's strategy, current performance measurement system, company requirements, and supplier requirements. By the application of in-depth interviews and study of internal documents, an overview according the design elements of the needs of ATAG is presented:



The vendor rating system for ATAG
This overview formed subsequently the basis for the design of a vendor rating system. An essential element of the design was the determination of KPI and criteria. This process is carried out by an analysis of the added value and feasibility of the proposed KPI and criteria. Besides these aspects, issues like responsibility, calculation method and frequency of measuring are considered (see following table). The KPI 'flexibility' is not included, because the criteria are too qualitative and focused on the strategic long-term. For the remaining KPI and criteria, specific vendor rating cards were designed. With the assistance of these cards the vendor scores are calculated on a monthly basis, based on provided data of the responsible employees / departments. These scores are subsequently translated into an overall supplier performance diagram, which gives a clear management overview for each supplier separately.

	Include in VR system Y/N or Half (H)	Remarks	Responsibility	Calculation	Frequency of measuring
Quality performance					
Agreed service call rate %	Y	* Actual overview of call rate % required (overview is recently set up)	* call rates are calculated by QA deparment * Updating overview purchase department	Net call rate percentage (See appendix IX)	Quarter of a year
% approved quantities on the basis of incoming inspection % received quantities without damage	H	* Only 1 incoming goods inspector * Target setting difficult * Substitute by Q-index	* QA department * Incoming goods inspector (QA)	Internal calculation method available	Monthly
% product audit lists received on time	N	* No formal procedures available for supplier * No direct link with quality of products			
% approved first product release	Y	* New criterion * Clear agreements nescessary regarding calculation and target setting	* Incoming goods inspector (QA)	Percentage of products that is approved.	Monthly
Delivery performance					
% purchase orders confirmed by supplier on the required delivery date of ATAG.	Y	* Measure is available	* Logistics department	Calculation in Diver (computer software)	Monthly
% confirmed by supplier within 10 (working) days.	Y	* Consider the period of 10 working days	* Logistics department	Calculation in Diver (computer software)	Monthly
% delivery performance towards ATAG customers.	H	* Supplier cannot (always) be held responsible for bad performance, only internal use.	* Logistics department	Calculation in Diver (computer software)	Monthly
% delivery performance of the supplier	Y	* Measure is available	Logistics department	Calculation in Diver (computer software)	Monthly
Costs / Price					
Price setting	Y	* Requires an objective-manufacturing price or reference price through benchmarking. * Requires knowledge sharing	* Purchaser * Product category manager	Market price is reference, judgement based on insights from purchaser and product category manager.	Yearly
After sale costs	Y	* New criterion * Attention for calculation method	* Service / QA department	After sales index	Monthly
Lead time	Y	* New criterion * Multiple product groups have different lead - times, consequences for target setting.	* Product category manager	Determination based on historical experience, figures available in ERP system.	Quarter of a year

In order to improve and refine the preliminary design, the following recommendations are formulated:

- Be alert with the use of outcomes of the vendor rating system towards suppliers.

It is important to consider that a vendor rating system is not 'a judgment tool'. The reliability and validity of the criteria need to be on a high level before any form of bonuses can be assigned to suppliers.

- Create and maintain a comprehensive system that does not lose the overall goal of vendor rating.

In order to prevent many discussions about figures and numbers, the complexity of the system and the outcomes should be minimized. This implies that the vendor scores should be well founded with valid arguments and communicated in a comprehensive way in order to create a win-win situation.

- Create clear responsibilities and commitment.

On of the biggest challenges for succeeding the in vendor rating is that the responsible persons deliver the required data. Continuous feedback of results and evaluation of the system is therefore essential.

- Knowledge sharing and continuous improvement

The creation of figures and numbers should not become an objective. A very important aspect in order to achieve continuous improvement is knowledge sharing. In order to stimulate this, the following recommendations are formulated:

- ***Organise every quarter of a year a 'supplier meeting'.***

This meeting should be attended by participants from each relevant department of ATAG (purchase, QA, product development, product management, logistics etc) Discussions on individual supplier level should be prevented.

- ***Develop 'supplier roadmaps' for each supplier.***

Create for each supplier an individual file that administrates all relevant activities and communication between ATAG and supplier. The big advantage of such a 'supplier roadmap' is that purchasers can quickly and easily assess the required information during negotiations with suppliers.

Ø Be aware of pitfalls

The vendor rating system as presented in this research is not 'finished'. ATAG should be aware of certain pitfalls and considerations with respect to the selected KPI and criteria. Since multiple criteria are not measured yet, targets and calculation methods are in the development stage, periodical assessment of KPI and criteria is necessary in order to improve the system and control the quality of products and processes.

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1. Introduction

In this first chapter the context of the research is outlined. § 1.1 describes the organisation in which the graduation assignment is carried out. Relevant business developments are examined in § 1.1.1. The final section of this chapter (§1.1.2) gives an overview of the Quality Assurance department that has initiated the research problem.

1.1 Company description: ATAG Nederland B.V.

ATAG Nederland B.V. (ATAG) is a leading and market focused organisation that is part of Home Products Benelux B.V. (Appendix I). The history of ATAG begins in the 19th century, since ATAG is originated from three different organisations; ATAG, ETNA & Pelgrim. Appendix II gives a complete overview of the history of ATAG.

ATAG has formulated the following mission: ***"Innovative, ambitious, professional and reliable Partner for the complete range of kitchen appliances for industry, retail and consumer".*** As can be seen from this mission, ATAG does not focus solely on the sale of kitchen appliances, but also desires to be a reliable partner for its customers. The vision of the organisation can be described as***: "By means of effective use of our brands, innovative capacity and efficient organisation, obtain and maintain a profitable number one position in all relevant market segments"***. To achieve this vision, ATAG's strategy is focused on clear differentiation within all relevant market segments. With thorough customer knowledge, value added concepts and products.

ATAG is founded in 2000 by an alliance of three former competitors (ATAG, ETNA and Pelgrim). Nowadays ATAG is with over 350 employees an important player in the Benelux. The activities of the organisation range from design, purchase, warehouse, sale, distribution and service of kitchen appliances. As can be seen from these activities, ATAG does not produce or assemble products, which mean high dependency on suppliers. Among other things, over capacity of suppliers makes outsourcing of the production function advantageous. Moreover by outsourcing the production, ATAG focuses on knowledge development (Product Development). This has as a consequence that the generation of sales is strongly dependent on the performance level of and collaboration with suppliers. The extent of collaboration differs per brand and product group. ATAG is collaborating with approximately 45 suppliers, spread out over 13 countries. The extent of collaboration is dependent on different development processes that can be categorised in the following three categories:

- 'Off-the-shelve': suppliers deliver a existing product,
- 'Partners': suppliers work in close collaboration with ATAG to deliver new products,
- 'Jobbers': suppliers produce the exact products according the specifications requirements of ATAG.

The product assortment compromises of 3 brands, each with its own positioning and identity:

ATAG ATAG is placed in the top level segment of the market. These products are of high-quality in both design, appearance as specifications.	ATAG
ETNA ETNA offers innovative products within the lower-middle segment of kitchen appliances.	ETNA
Pelgrim The assortment of Pelgrim is focused on the middle segment within the kitchen market. These products offer a well balance in price and quality and are more focused on design in comparison with ETNA products.	Pelgrim

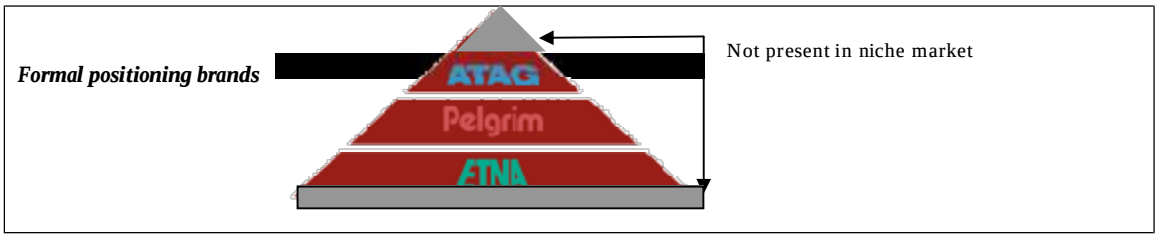


Table 1. Brands of ATAG

The three brands have the same products groups: cookers, build-in ovens, refrigerators, microwaves, cooker hoods and dishwashers. Besides these product groups a part of the assortment consist of American model refrigerators, free-standing cookers and cranes. With the total product folio of ATAG, 95% of the market demand in the Benelux is served.
The Dutch market is characterised by approximately 200.000 build-in kitchens, with a mean value of 9200 euro[1]. 85 % of ATAG's turnover is earned within this market and the remaining 15 % by the sale of free-standing kitchen appliances. ATAG sales its products through different channels:

- Kitchen wholesaler specialists (ATAG and Pelgrim)
- Kitchen retail (primarily ETNA and Pelgrim)
- Institutional projects in close collaboration with housing corporations (primarily ATAG)
- Export (approximately 5 % of the total sales)

1.1.1 Business developments

As described previously, ATAG collaborates with suppliers. Because of the increasing competition and the upcoming "popularity" of low wage countries, the location of production facilities has changed. Nowadays many suppliers of ATAG are located in the South-East of Europe and Asia. Experiences from the past have showed that these countries in general have a lower quality perception in comparison with that of ATAG. As a consequence ATAG has to put much effort in maintaining and securing an acceptable quality level of products and processes. After all, decreasing product quality and inferior business processes have a negative influence on the after sale costs of ATAG.
An other recent initiated development is the expansion of the geographic sales market. At first the focus of ATAG was on the market of the Benelux with three brands of build-in appliances. But the growth and success of ATAG, valuable sources and brand history has led to an increased demand for free-standing appliances. Therefore a subdivision of strategy is made regarding the market within and outside the Benelux. The strategy for products within the Benelux is focused on:

- Ø Build-in and free-standing products
- Ø Three brands: ATAG, Pelgrim and ETNA
- Ø All distribution channels

The strategy for products outside the Benelux (export) is on the other hand focused on:

- Ø Build-in products
- Ø One brand: ATAG (top segment).
- Ø One distribution channel: Kitchen wholesaler specialists

1.1.2 Quality Assurance

The graduation assignment is initiated by the Quality Assurance (QA) department. QA is the department within ATAG that is occupied with all the aspects of supplier management. As shown in appendix III ATAG consists of three main processes: marketing, operations and sales. QA is responsible for the support of all processes with respect to quality aspects. The department carries out supplier and product audits and establishes the requirements for products and packaging. Moreover QA monitors supplier

[1] [1] National Kitchen Research 2005, Report 02-2005, AMWEKO BV Marketing Services / Kitchen monitor 2003 / 2004 USP Marketing Consultancy BV

performance regarding any non-conformance identified during the audits. With the help of incoming inspections QA reports any non-conformances to the purchase department.
To give an overview of the (main) activities during the product development process on strategic level, Figure 1 is presented. This figure shows that the activities of QA concentrate especially on the phase's specification, monitoring and evaluation.

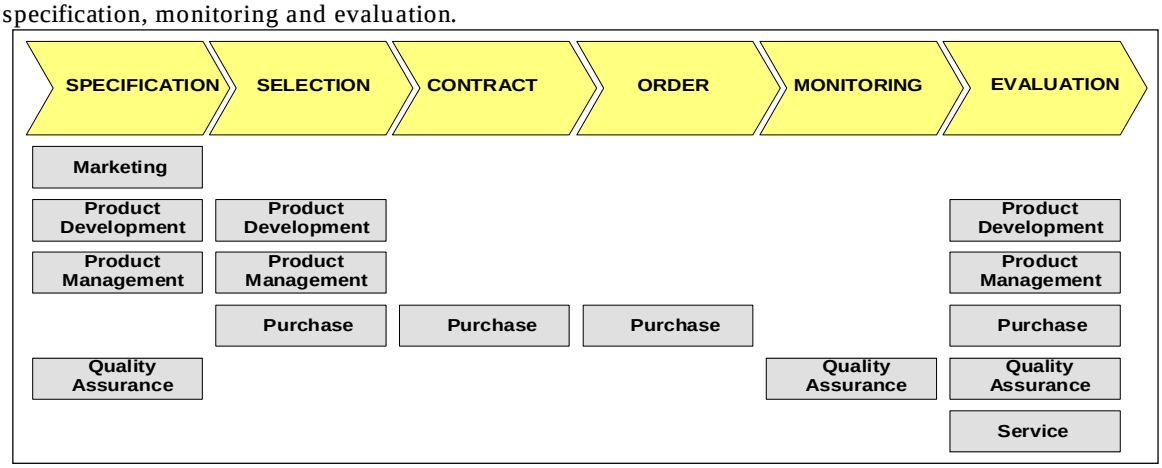


Figure 1 Phases in product development process

QA comprises of approximately 15 employees who carry out the following roles; overall manager quality assurance, supplier quality engineers, quality engineers, incoming goods inspector and a business analyst. See appendix IV for a complete overview of the structure of the QA department.
Although the QA department initiates this graduation assignment, other departments are also involved in the process of supply chain collaboration and performance (supplier guideline, 2007). Product management is responsible for the composition, revision and management of the product ranges. They remain the contact for the supplier in respect of any functional and / or technical product modification. Secondly purchasing has an important role. They source new products worldwide, negotiates contracts and prices, draw up the purchase agreement in consultation with the supplier, lay down such agreements as the duration of the collaboration, the supply quality, payment terms delivery times and batch sizes. Purchasing is the central contact point for the supplier. Thirdly product development is responsible for the design and specifications of products. Lastly logistics; Logistics coordinates the operational order process of the final product, the transportation of goods from the supplier to Duiven and is contact point in respect of any deviation from orders already registered.

Concluding, ATAG is an organisation continuously engaged in change. The dynamic environment both within and outside the supply chain makes it necessary to adapt the organisation to ever changing developments. As described, ATAG collaborates intensively with suppliers and is dependent on their output. But how can ATAG monitor and continually improve the performance of its suppliers? The next chapter will further elaborate with respect to the research problem.

2. Research design

2.1 Introduction

The last decade ATAG has experienced considerable growth. During that period the organisation was primarily focused on generating as much sales as possible. This focus caused, among other things, difficulties with respect to the controllability of internal processes. The organisation stays behind in integrating and sharing information, which causes a poor overview of the performance of suppliers. Limited procedures are set up that describe how to assess supplier performance and this has a negative influence on the process of securing the quality of products and processes. There are for example no formal agreements with respect to the regularity of performed audits or management does currently not have the possibility to request an up to date overview of the supplier performance. Besides these insufficiently developed procedures, the increasing focus to suppliers in low wage countries increases the risks for quality problems and the necessity to monitor supplier performance.

As a result ATAG is not able to monitor accurately the product and process quality of its suppliers, which has a negative influence on the after sale costs of the organisation. After all poor quality causes considerable costs for rectifying products or maintenance costs made by mechanics. According to ATAG, quality costs can be summarised in 4 categories. To illustrate which consequences poor quality can have, these categories can be described as (Van Weele, 1997):

- Prevention costs; Prevention costs are costs that are made to prevent failures during the product development process.
- Assessment costs; Assessment costs are costs that are made to recognise timely if materials, systems, products or processes have the desired quality.
- Internal failure costs; Internal failure costs are costs that are caused by inferior quality of products before they arrive at the customer. For example repair costs in the warehouse of ATAG.
- External failure costs; External failure costs are costs after the products are delivered to the customer. Cost incurred during after sales is an example of this category.

2.2 Importance of supplier monitoring for ATAG

Why is it important for ATAG to have an objective and on regular bases insight in supplier performance? First of all the dynamic market where the organisation is active in plays an important role. The market is characterised by the fact that the division between supplier, competitor and potential new adopters is marginal. For example, suppliers produce for competitors or could become potential competitors in the future (when suppliers decide to pass over to ATAG). Accurate and objective insight in supplier performance enables ATAG to assess its suppliers and improve the decision-making process with respect to the supplier relation.

Secondly the business model of ATAG causes high dependency on suppliers. This high dependency is caused by the fact that the activities of ATAG are focused on design, purchase, warehouse, sale, distribution and service of kitchen appliances, with no own in-house production or assembly facilities. As a consequence, ATAG is highly dependent on the performance of its suppliers for securing high quality products. The dynamic market and business model of ATAG are thus relevant characteristics which demand for an objective and regular insight in supplier performance.

2.2.1 Current issues with respect to supplier monitoring

The product development process described in appendix V assists ATAG during the decision making process with respect to supplier selection and monitoring. In short, this means that for a (desired) product, collaboration with suppliers is required. To monitor suppliers ATAG has developed two Supplier Assessment Questionnaires (SAQ 1 & SAQ 2). SAQ 1 is a questionnaire that provides data which enables ATAG to make a preliminary assessment of a (potential) supplier. The questionnaire gives ATAG a static overview of the performance of (new) suppliers on a broad scope and is send to and filled in by the supplier. The results of this questionnaire are the basis for a potential audit of one of the supplier quality engineers. SAQ 2 comprises of scores on ten different parameters that indicates strong or weak facets of a certain supplier. Currently the parameters are not weighted and there isn't made a distinction between the three brands. These three brands are different positioned in the market and this implies that each brand has different performance level standards. Thereby it is not always clear for supplier quality engineers to fill in the (complete) questionnaire, because the questionnaire contains detailed aspects that

not always can be recognised in practice at each individual supplier. This has a negative influence on the objectivity of the questionnaire.
With data available from SAQ 1 & 2, ATAG has started with collecting data regarding the performance of current suppliers. This monitoring of suppliers is called ***vendor rating*** and has as a goal to improve the integral performance of the supply chain by collecting systematically data concerning the suppliers' performance.

2.2.2 Need of ATAG

Top management of ATAG sees the importance of controlling the processes regarding supplier monitoring. As described above, the business model of ATAG requires close collaboration with suppliers and thus is supplier monitoring essential. The organisation desires to have a regular and objective overview of its suppliers in order to keep control of supplier performance and maintain control over the after sale costs. An important reason to measure the suppliers' performance is to detect (quality) problems in an early stage of the production development process and improve the integral performance of the supply chain. To achieve better insight of the suppliers' performance, there is a need to create an overview of performance measures on specific selected parameters. These specific parameters or key performance indicators (KPI) are in the current situation not selected. An important step therefore will be to translate strategic objectives into KPI on which suppliers will be monitored. Input will be necessary from different functions within ATAG and because these parameters are of importance for multiple departments, a cross-functional perspective is relevant.
The challenge of this graduation assignment is thus to design a system that enables the organisation to monitor the performance of suppliers on specific KPI. Therefore it is essential to develop (and implement) a vendor rating system to improve the supply chain performance and thus be able to undertake emerging improvement opportunities regarding the product and process quality.

2.3 Research objective

From the discussion above the following research objective can be formulated:

The objective of the research is to gain insight in ATAG's supplier monitoring, in order to design a vendor rating system that measures supplier performance as a basis for corrective and preventive actions regarding the product and process quality.

The central research question of the assignment can be formulated as:

How should a vendor rating system that enables ATAG to monitor the performance of its suppliers be modelled, in order to control and improve the process and product quality?

In this research with vendor rating is defined as: ***A performance measurement system that measures on regular intervals supplier performance on specific KPI as a basis for corrective and preventive actions regarding the product and process quality.***

The following research questions will contribute to answering the central research question:

I. What is the current status of monitoring suppliers within ATAG?
II. How should, according to literature, a vendor rating system be designed?
III. Based on the design process, what are the needs of ATAG with respect to supplier monitoring that forms the basis for the determination of KPI and criteria?
IV. What is the outcome of the comparison between the current status of supplier monitoring of ATAG and the literature review linked with the needs of ATAG?

The steps that are followed in this research make a distinction between the current and desired situation with respect to supplier monitoring. This process can be described as a so-called IST-SOLL analysis.
The IST-situation describes the current performance measurement system of ATAG and the external perspective of suppliers with respect to supplier monitoring. The SOLL situation consists out of 2 parts. First of all it is important to study the literature with respect to vendor rating, but especially the design of a vendor rating system. Secondly it is important to determine the needs of ATAG, or the ambition level.

Combined these two aspects give insight in which KPI and criteria should be selected. Comparison of the IST and SOLL situation leads to a "road to SOLL". During this step the actual KPI and criteria of the vendor rating system are determined. Thereby a first design of a vendor rating system is presented which is able to measure the performance of suppliers at regular intervals on selected KPI and criteria. The graduation assignment concludes with the main findings of the research and recommendations for further sophistication and implementation of the vendor rating system. Figure 2 illustrates the research steps within this research. The way of visualising is derived from Doorewaard & Verschuren (2003) and shows in a structured way the relation between the research steps and research questions.

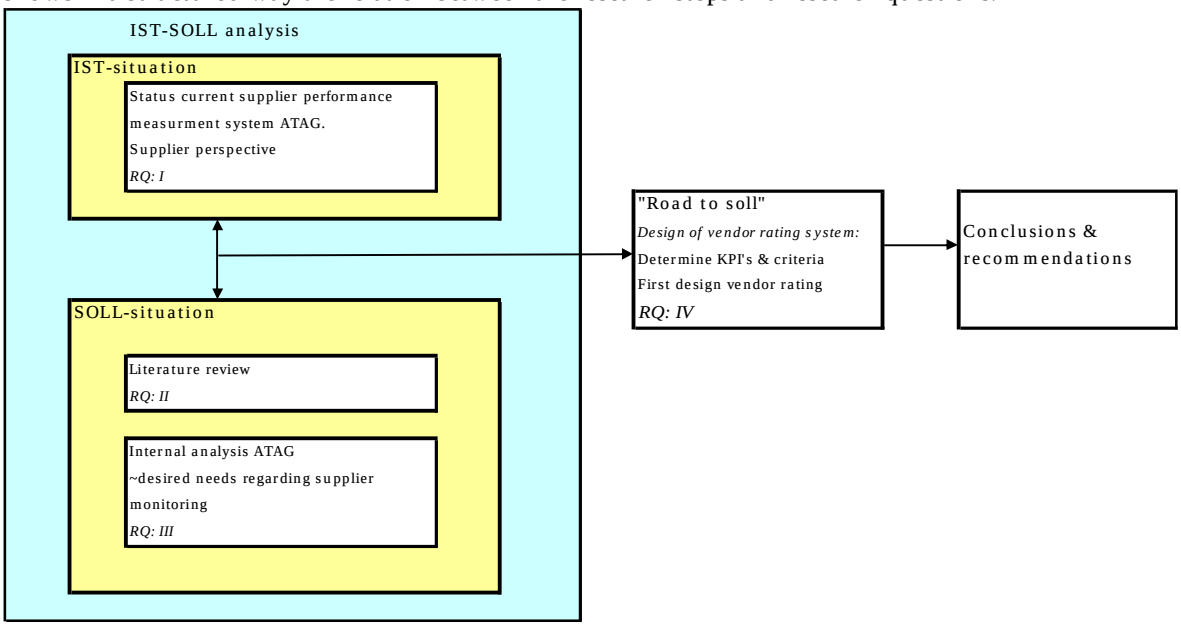


Figure 2 Research steps

2.4 Research Methodology

The purpose of a research design is to structure the research process (Doorewaard & Verschuren, 2003). An important part of this research design is the research strategy, which gives direction to the research. Vennix (2001) distinguishes three types of empirical research strategies; a case study, a survey and an experiment. Roozenburg & Eekels (2003) propose besides these research strategy's the so-called design focused research strategy.

The characteristics of this research show the most similarities with a case study and with elements of the design focused research. This has consequences for how the research process is structured. The graduation assignment is focused on 1 element, namely the organisation ATAG. This element is investigated through the application and research on multiple variables and methods (will be described in § 2.4.1). These characteristics have many similarities with the definition of a case study of Yin (1989, p.23).

The design focused research strategy of Roozenburg & Eekels (2003) is used for structuring the design of a 'new product' and designing a vendor rating system can be considered as designing a 'new product'. According to the authors the objective of this strategy is to solve a 'practical problem' by preparing an intervention for a problematic situation. This intervention is carried out by going through several design steps and attempts to solve the discrepancy between the desired and current situation. Because the cycle is intended for designing a 'real' product, not all the phases are significant for this research. The phases that do give valuable insights with respect to this research are the simulation and evaluation phase. The simulation phase forms a preliminary picture of the characteristics of the design and can be compared with a test phase of the vendor rating system that addresses the question: What is the behaviour of the design under realistic circumstances? This test phase results in an amount of conditions under which the vendor rating system eventually becomes operational. Subsequently an ongoing evaluation phase of the vendor rating system should ensure the continuity of the system.

2.4.1 Evidence building

The research design is the framework that gives direction to the research. Subsequently it is important to determine how, when and which data should be gathered in order to be able to answer the research questions. This paragraph therefore describes for each research question which data gathering methods are used and how these methods have contributed to answering the central research question. During all phases mainly qualitative data is gathered and analysed (Trochim, W.M.K, 2002) as is tried to get an in-depth understanding of the ATAG's supplier monitoring and vendor rating literature.

Research question I: Current status of monitoring suppliers within ATAG

The research is characterised by the fact that it is conducted on behalf of a principal. This means that the motive for this graduation assignment is based on a practical problem. The context of the research is strongly determined by managers and policy makers of ATAG. Therefore it is relevant to gain insight in how the current situation regarding supplier monitoring is arranged.

For determination of the current status of supplier monitoring, insights from the practical field are used. Interviews, observation during (management) meetings, exploration of documents and web-sites have contributed to an overview of the current situation with respect to supplier monitoring. Therefore several internal documents and reports with respect to supplier monitoring are studied. Besides face-to-face interviews, some information is gathered without the setting of an interview. This is done in order to entirely understand the process of supplier monitoring in the daily practice. Some elements will not reveal themselves in the setting of a structured interview. This method can be described as 'walking the floor' and consists of talking to employees and observe behavior (e.g. during meetings or discussions).

In order to gain insight in the perspective of the supplier a short questionnaire is sent to suppliers (see appendix VIII). This questionnaire is designed on qualitative insights from the theory and consists out of 6 questions. The topics of the questions are: relation between ATAG and supplier, the added value of a vendor rating system, process of selection of vendor rating KPI and criteria, communication and perception of current performance measurement system. Because the questionnaire is focused on the opinion of the suppliers, open questions are formulated. According to Vennix (2000) open questions are more suitable when asking someone to his or her opinion. Because the respondent has the possibility to give his or her exact opinion, the validity of the answers is higher. This is confirmed by Malhotra & Birks (2003) who describe qualitative research as ***"encapsulate the behaviour, experiences and feelings of respondents in their own terms and context".*** The reason for gaining insight in suppliers' perspective is to determine an additional view of a vendor rating system 'in the eyes' of the supplier. Suppliers could have a different perception with respect to supplier monitoring and more specifically of the criteria (KPI) that are to be measured. Insight in the suppliers' perspective contributed to a more complete overview of other stakeholders involved in designing a vendor rating system instead of exclusively intern insights from ATAG. 15 Suppliers and operation- or quality managers are selected from the supplier base on recommendation of the purchase department and sent a questionnaire. 8 Suppliers have actually filled in and returned the questionnaire. The reason that not the entire supplier base (45 suppliers) of ATAG is sent a questionnaire is based on the nature and topic of the graduation assignment. Not every supplier of ATAG will have the required knowledge to answer the questions, because they are too small in size or do not give attention to the subject. Another reason that a relatively small number of suppliers will be sufficient is that the questionnaire has as objective to inventorise the suppliers' perspective in addition to the internal insights from ATAG.

Research question II: Design of a vendor rating system according to literature.

The graduation assignment explores the domain of vendor rating. Therefore relevant literature is explored to find out whether, how, which and why vendor rating systems exists in order to determine an appropriate 'action plan' for designing a vendor rating system.

Verschuren & Doorewaard (2003) describe desk research as an appropriate method for studying literature. Desk research is characterised by:

- Use of existing material;
- No direct contact with research object;
- Use of material from a different perspective in comparison with the original purpose.

These characteristics show similarities with this graduation assignment. For the literature review existing sources of material are used. Moreover the research is carried out independently from the research object

(ATAG Nederland b.v.). Finally the material is not used for scientific purposes (original purpose), but to contribute to the solution of a specific practical problem.
The authors differentiate literature in: books, articles, papers etc. Obviously it is impossible to study all the literature within in the scope of the research project. Therefore an effective search method like the systematic literature research is applied (Verschuren & Doorewaard, 2003). A systematic literature review can be defined as: "***The process of systematically locating, appraising and synthesizing evidence from scientific studies in order to obtain a reliable overview***" (Glasziou, 2001). The method consist of several steps which are: (1) choice of search engines, (2) choice of keywords, (3) define selection criteria, (4) define prioritization criteria, (5) evaluation and synthesize results. First of all search engines are selected (J-Store, Web-science etc.) With the assistance of search engines specific journals focused on the research topic are selected. Examples of these journals are Journal of Purchasing, International Journal of Purchasing & Materials Management & Supply Management or International Journal of Operations & Production Management. Secondly, key words (vendor rating, performance measurement, supplier monitoring, strategic purchasing and supply chain performance) are selected to restrict the amount of outcomes. By clearly defining criteria (3), the selection of papers is improved, whereby this selection of the papers is based on inspection of titles and abstracts. Prioritization criteria (4) can be applied if the time available is not sufficient to read all the relevant papers. Focus on quality rather than on quantity is recommended and a method that can be used to achieve this goal is to use Journal ranking. Finally the outcomes are evaluated on the content.

Research question III: Based on the design process, what are the needs of ATAG with respect to supplier monitoring that forms the basis for the determination of KPI and criteria?
A relevant part of the design of a vendor rating system is the determination of the KPI and criteria. Before addressing the question which KPI and criteria are relevant, the needs of ATAG with respect to supplier monitoring has to be determined. To do this, the Michigan State University (MSU) model (Monczka, 1999) is applied. § 5.1 discusses this method in detail. With the help of this model the desired situation (and indirect the current situation) with respect to supplier monitoring is determined. Comparison between the current- and desired perspective of ATAG forms subsequently the basis for the determination of the KPI and criteria that should be included in a vendor rating system.
In order to gain insight in the needs of ATAG regarding supplier monitoring related activities, 6 interviews are conducted. Vennix (2001, p.143) makes a distinction between respondents (give information about themselves), informants (give information about others or objects), carriers of information (important with observation) and experts. During the research the informant is especially relevant. An informant is relatively close positioned to the research. A crucial phase within the research is to determine the KPI and criteria for the vendor rating system. To identify these KPI and criteria input from multiple informants is essential. This cross-functional approach is necessary, because of the integral character of a vendor rating system. Since a vendor rating system is a relevant part of the purchase function, it is important to achieve an objective insight in the current and desired situation with respect to the purchase performance of ATAG. Individual interviews with the 3 purchasers are conducted. A vendor rating system is a tool that is based on the input of multiple insights. Therefore not solely purchasers are relevant for designing a vendor rating system. To get a clear overview of the expectations and strategy in the organisation of ATAG, other disciplines are questioned. For this reason interviews are performed with a department manager of product management, a business analyst and with the operations director, because they have their own motives and interests in relation to supplier monitoring. These interviews are also partly conducted according the MSU model, but because this model is primarily focused on purchase issues also other subjects are included. For a description of the interview guides is referred to appendix XI.

Research question IV: What is the outcome of the comparison between the current status of supplier monitoring of ATAG and the literature review linked with the needs of ATAG?
Before the design of a vendor rating system can be completed, an analysis of the discrepancy between the IST- and SOLL situation is necessary. This is carried out by a content analysis of the data collected during the research. Wester (1991) states that a content analysis is a continuing interaction between theory, observation and analysis. The theory that is gathered during the research is repeatedly tested against findings from the practical field. As can be seen in figure 3 (the research steps) the research is based on multiple sources of information. By using multiple reference points the researcher is able to better

describe the research topic. This complete view enhances the delivery of more valid results. This is called 'triangulation' (Vennix, 2001). According to Yin (2003) this way of investigating increases the overall quality, because the multiple sources of evidence essentially provide multiple measures of the same phenomenon and thus increase the validity of the research. The sources of information in this research were:

- Theory: (systematic) literature review
- Feel of the field:
  - Internally ATAG: (orientation and guided) interviews, documents, reports etc.
  - Externally of ATAG: Perspective from the supplier (questionnaire).

The main objective of this graduation assignment is to design a vendor rating system. Nevertheless, a well-developed design is not a guarantee for a successful and valuable system. Therefore a test phase of the vendor rating system is crucial. As described in § 2.4 Roozenburg & Eekels (2003) mention the simulation phase. According to these authors many persons think of simulation in terms of computer systems that imitates complex behaviour. Nevertheless, simulation does not always imply a computer model but can also take the form of a diagram, material model or even a verbal description of the behaviour of a system. The purpose of this simulation phase is to come to a preliminary overview of the behaviour of the developed vendor rating system. This overview forms subsequently the basis for an ongoing evaluation process. Moreover, the evaluation process compares the design of the vendor rating system with the research objective. Since this research is restricted by the availability of time, these 2 phases (test & evaluation) are not part of the graduation assignment. The research on the other hand gives recommendations with respect to future challenges for ATAG and the implementation of the vendor rating system.

To give an overview of the structure of the research, Figure 3 shows the chapters and the corresponding topics and research questions.

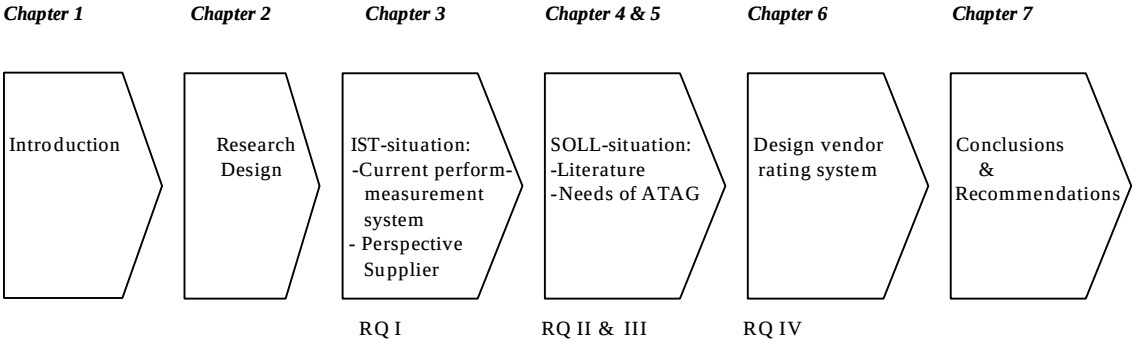


Figure 3 Overview of chapters

3. ATAG's initiatives for supplier monitoring

ATAG is constantly striving to improve the various processes in the supply chain. After all, the supply chain is as strong as its weakest link (Coyle et al., 2003). This makes continuous improvement programmes for both ATAG and its suppliers important. This chapter will explore the situation within ATAG with respect to supplier monitoring. To answer the research question: ***"What is the current status of monitoring suppliers within ATAG?"*** the current performance system of ATAG is explored. This means that relevant aspects of the current supplier monitoring system of the organisation are described. § 3.1 starts with the description of the current Supplier Assessment Questionnaires (SAQ) and explain the purpose, content and difficulties of each method. § 3.2 describes a relevant method of ATAG, the call rate technique. Subsequently § 3.3 focuses on the role and attitude of the supplier with respect to supplier monitoring based on the outcomes of the questionnaire (Appendix VIII).

3.1. Supplier Assessment Questionnaire (SAQ)

As described in chapter 1, the current methods for supplier monitoring consist of the SAQ method. The following paragraphs describe each method and how they are perceived by the organisation. The SAQ 1 is a questionnaire that is filled in by the supplier and provides ATAG with general information about the organisation. The SAQ 2 on the other hand is a rating system that is completed by a supplier quality engineer of ATAG and rates the performance of the supplier on specific topics.

3.1.1 SAQ 1

ATAG has recently started a quality improvement programme to control processes and reduce costs. With the guidance of the SAQ 1 ATAG aims to improve the cooperation with its suppliers in order to achieve better products in terms of quality, price and other services.

The SAQ 1 is a questionnaire which is sent to suppliers in order to make a preliminary assessment. This questionnaire is designed on the basis of the ISO9001:2000 standard, whereby each chapter refers to parts of the ISO9001:2000 standard. The subjects which are part of the questionnaire are: finance, innovation, insurance, logistics, environment, certificates, responsibility authority and communication, management review, resource management, product-related requirements, design and development, purchasing, verification of purchased products, production control, control of inspection measuring and test equipment, measurement and analysis, internal and product audit, control of non-conforming products, after sales service and improvement. For each of these subjects are questions developed.

The experiences with SAQ 1 of ATAG are moderate positive. Suppliers are in general willingness to fill in and return the questionnaire. The information coming from this questionnaire is the basis for a (potential) audit. Nevertheless the SAQ 1 is not conducted on a structural basis. This has as a consequence that some suppliers have been audited years ago and that this data is probably outdated. Besides not each employee of ATAG does know where to find the results of the questionnaire or has the feeling that it does not have any added value. Appendix VI shows a part of the questionnaire. The next section describes the SAQ 2 method.

3.1.2 SAQ 2

ATAG desires an excellent supply base that contributes to the achievement of ATAG's main business objectives. In order to establish such a supply base and a preferred position with suppliers, the performance of supplier should be measured at regular intervals and reported back to those suppliers as a basis for further improvement programs (a vendor rating system). This supplier rating system enables ATAG to assess the performance of its supplier in a standardized way (see appendix VII). A supplier quality engineer of ATAG visits suppliers and assesses the facilities on the following points:

1. Financial strength, experience
2. Management commitment to excellence
3. Design / technology strength
4. Quality capability
5. Cost competitiveness
6. Service / flexibility
7. Manufacturing skills

8. Cycle time concentration
9. Extension of partnership to sub-suppliers
10. Employee participative climate

This rating is performed independently from the view of the supplier, after the supplier quality engineer has returned from the visit. The first experiences with the application of the SAQ 2 have showed certain problems.
During interviews came forward that perception differences exist in the organisation with respect to the additional value and use of this tool. These different perspectives lead to various interpretations of the application of the SAQ method. A frequently heard remark is: "***It is difficult to fill in the SAQ 2, because the questions do not refer to the practical situation at the suppliers' production facility***." As a consequence the results could give a distort image of a suppliers' performance, because of missing values. Moreover employees find it difficult to answer the questionnaire objectively. "***When does a supplier score a 6 and what is the difference between the score of a 6 and a 7***"? Though, this is not the most important consequence. Even more important is that employees within ATAG create a different value judgment with respect to this method. Some employees judge the SAQ method as useful, others as a necessity initiated from management level and again others as a purely theoretical initiative. As a result there is a varying degree of commitment and perception towards the value of this method. Another aspect that contributes to a negative attitude regarding the current performance measurement system is the fact that employees experience that the results of the SAQ method are not sufficiently shared. This can for example be concluded from the following statement: ***"ATAG has a poor knowledge sharing system. This seems to be essential for an effective organisation. We get for example no feedback or information about the already conducted SAQ's."*** Besides a lack of knowledge sharing, results are often administered without further improvement action plan.
This increasing negative attitude and the practical issues with respect to the SAQ 2 method was the reason for the manager quality assurance to adjust the SAQ 2. This 'renewed' tool is developed to audit current and new suppliers. First of all the name SAQ 2 changed, because it presumed a wrong interpretation. The SAQ 2 is namely not a questionnaire, but a method to assess the performance of a supplier at a given point in time and therefore the SAQ 2 is recently changed into a 'supplier profile'. This new 'supplier profile' shows more similarities with the characteristics of supplier auditing (see table 4, § 4.4.1). The method is for example focused on new and current suppliers, measures performance on many aspects and the criteria are mainly qualitative.

3.2 Call rate technique

The market for kitchen appliances is continuously changing. Speed and quality are essential to maintain and improve the position of ATAG. Together with suppliers, ATAG must meet customer requirements. The SAQ method as described above focuses on getting an insight in the performance of the supplier by assessing how the processes are organised on various topics. The call rate technique is on the other hand primarily focused on the product quality.
Simply stated, a call rate is the percentage of the number of service visits of ATAG divided by the number of sold products. For an illustration of the calculation method is referred to appendix IX. In this way ATAG provides the supplier on a quarterly base with actual information on the functioning of products that have been sold in the Benelux. These findings are based on analysis of data that are registered by ATAG's field service technicians in the Netherlands. Every service visit to a consumer is coded according to ATAG's Fault Analysis System (FAS) which enables the quality assurance department to calculate call rates of products. In addition to the numerical information, causes of malfunctioning of products and the specific parts involved, are put in a matrix. The FAS method provides insight into the causes of faults and the components concerned. This method makes it possible for ATAG to make a distinction in failures that are to blame to the supplier or not. For example: a malfunctioning door lock of a dishwasher causing leakage is categorised as a 'to blame' fault. On the other hand, when a service engineer of ATAG visits a customer, but has the wrong or no parts at hand it is administered as a 'not to blame' fault. Every quarter of a year ATAG provides suppliers with a service quality report (SQR). This report contains the agreed and measured core figures, such as the difference between the call rate and the standard agreed upon in the purchase agreement. If the deviations established are higher than the agreed standards ATAG will initiate improvement programmes, including the time limit within which the problem should be solved. All

costs incurred by ATAG to resolve non-conformances above the agreed standard will be charged on to the supplier.
The advantage of this method is that it provides suppliers in a relatively early stage with product improvement plans. This could save the supplier time and money (and thus also ATAG) and will eventually result in a higher customer satisfaction. On the other hand a negative consequence of this method is the financial aspect, which could lead to discussion on detail level and prevents the achievement of the overall objective. Since the call rate method affects both ATAG as the supplier, the next paragraph will elaborate further on the opinion of the supplier with respect to this method.

3.3 Perspective supplier

In order to obtain a complete overview of different stakeholders with respect to a vendor rating system, 15 suppliers are approached to deliver their input. According to Verkaaik (2006) suppliers can propose valuable initiatives, because they know their own processes the best and know what relevant cost drivers are. Therefore they can contribute in a positive way to improve the performance of the supply chain. Below the findings of the 8 returned questionnaires (see appendix VIII) are presented. For each topic the most relevant outcomes are discussed.

Supplier relation

From the perspective of the supplier, it can be stated that they perceive the relation as long term. Most suppliers are collaborating for minimal 5 years with ATAG. This has as a consequence that many improvements in the relation already are initiated in the past: "***During these years we improved the response time and settled a good exchange of information and feedback to the technical/ commercial requests; we are now building a shared action plan to be reviewed regularly by all relevant people.***" Despite the fact that multiple suppliers are stating that the relation between ATAG and them can be described as professional and long term, the attitude towards quality issues can be described as re-active and ad hoc: "***Mutually agreed actions plans are determined only in case problems arises***." The challenge is thus to ensure that problems are to be prevented instead of solved. To achieve this it seems important that employees of both ATAG and supplier improve their level of information sharing. In this way problems can be quicker signalised and tackled. Or in terms of a supplier: "***It is important that the people of different departments are aware of a healthy relation and keep in touch with each other to make the relationship stronger."***

Added value of a vendor rating system

With respect to the objective or added value of a vendor rating system, the suppliers are aligned with the vision of ATAG. Suppliers have great interest in how an 'external party' like ATAG perceives and analyses their strengths and weakness by measuring the performance. This view can also be deducted from the following quotation:" ***A modern company needs to have continuous feedback from its customers and partners. A vendor rating system would be very useful to understand if our perceptions of the activities and resources involved versus a customer are equally perceived or that we should take corrective actions."*** Suppliers perceive a vendor rating system as positive, because it provides insight in their own performances and also serves as basis for corrective actions regarding the process and product quality of products in the total supply chain.

Selection of vendor rating criteria

Suppliers have a different view towards the selection of KPI and criteria that should be included in a vendor rating system. Though, all suppliers agree on the fact that product ***quality, delivery times, time to market*** and ***technical call rate percentage*** should be measured by a vendor rating system. Besides these criteria that can be expressed in quantitative figures, various suppliers propose also criteria that can be characterised as qualitative:

- ***Competitor comparison with the own portfolio***
- ***Participation on latest technology***
- ***Design differentiation***
- ***Exchange of information between parties***
- ***ATAG sales monitoring***

With respect to the determination of targets, it can be stated that some suppliers prefer target setting by ATAG and others prefer mutual target setting. "***Targets have to be mutually agreed and each party needs to involve their suppliers/collaborators and all the key figures that are necessary to achieve the objectives.***" This quotation shows that the supplier is aware of the overall objective of a vendor rating system; increasing the performance of the total supply chain. Nevertheless, some suppliers feel that the target with respect to the call rate technique is coming too much from ATAG. In multiple cases the supplier has their own targets regarding for example quality issues; "***Not only should the targets be agreed on together, but even the methodology (formula) I think now the methodology is driven by ATAG only.***" To achieve such a situation, exchange of information between the parties, regular visit and discussion about call rate percentages, quality issues etc is relevant in order to agree on improvement plans and increasing the performance of the total supply chain.

Communication objectives between supplier & ATAG

Regarding the communication of (strategic) objectives of ATAG towards suppliers, there can be identified various perceptions. Some suppliers have limited knowledge about the strategic direction of ATAG. Others are aware of the overall strategic objectives, which includes big organisational- or brand changes or the recently initiated change of the company name. Though, it is important to mention that suppliers wish to have more insight in the strategic objectives of ATAG: "***Sometimes not knowing the precise direction (objective) of ATAG, could raise doubts or questions*** or "t***ime by time we are informed about strategic objectives for which we need to help ATAG and take corrective actions. It would be ideal for us to be aware in advance of possible issues and take preventive actions.***" With respect to the communication of (strategic) objectives between ATAG and suppliers it can be stated that it isn't optimal yet. Keeping the supplier informed about new directions / objectives, shows a form of commitment and increases the relation between both party's.

Perception current performance measurement system

The SAQ method is a tool on which the suppliers do not have much influence and insight. The SAQ 2 is even performed independently of the view of suppliers. The call rate technique on the other hand can have major financial consequences in case of bad performance. Therefore suppliers are directly interested in the call rate percentages.

The outcomes of the questionnaire showed that suppliers are positive about the call rate method of ATAG. This method provides the supplier with useful information about the quality level of their products and subsequently also indirect about their processes. Nevertheless the current performance measurement system gives also room for discussion. Because ATAG is responsible for delivering reliable information about the performance of suppliers, the methodology must be transparent and understandable for suppliers. From remarks of multiple suppliers it seems that they have occasionally difficulties with the interpretation of the call rate information, which leads to discussion of individual figures: ***"Our perception of the call rate technique of ATAG is that it is complicated. We want to be sure that we understand the results correctly before "recognizing" the quality claim. In fact our own data shows sometimes a totally different trend compared to what ATAG has found."*** ATAG organises regularly meetings with suppliers for the call rate analysis. Suppliers perceive this as a good initiative: "***The call rate analysis is good start of an improvement plan, but has to be improved in the future. A better involvement of our employees and direct contacts with ATAG relevant people would avoid delays and improve the efficacy and efficiency***." It can be stated that suppliers assess the call rate technique as a useful system, but that improvements can be made. These improvements should consist out of creating clearance about the used methodology of the call rate technique in order to increase mutual commitment.

In short, what do these insights tell us about the perspective of the supplier with respect to the current status of supplier monitoring and the design of a vendor rating system? In order to create an overview, the following table is presented:

Topics	Perspective suppliers
Supplier relation	Ø Relation between ATAG and suppliers is perceived as long term. Ø Initiatives that contribute to a long-lasting relation have been taken; nevertheless information and knowledge sharing must remain a main point of interest in order to ensure a healthy relation.
Added value vendor rating system	Ø The added value is by suppliers perceived as very positive in order to ensure the product and process quality within the supply chain.
Vendor rating criteria	Ø Proposed vendor rating KPI and criteria: o ***Competitor comparison with the own portfolio*** o ***Participation on latest technology*** o ***Design differentiation*** o ***Exchange of information between the parties*** o ***ATAG sales monitoring*** o ***Time to market: lead time from the moment a new product or a modification is requested up to when it is implemented (produced).*** o ***Quality performance*** o ***Delivery performance*** o ***Call rate percentages*** Ø Target setting should be performed in collaboration between ATAG and supplier.
Communication objectives	Ø Suppliers are informed about strategic objectives, but improvements can be made in order to increase the awareness of the vision of ATAG and prevent a re-active attitude.
Perception current performance measurement system	Ø Suppliers perceive the call rate technique as a positive tool for creating insight in the product quality, but the technique is also experienced as a complicated methodology.

Table 2 Overview perspective suppliers

3.4 Conclusion

In order to answer the question '***What is the current status of monitoring suppliers within ATAG'*** the current initiatives with respect to supplier monitoring are explored. The current initiatives of ATAG can be summarised in the SAQ method and the call rate technique.

With respect to the overall picture of supplier monitoring of ATAG can be concluded that the initiatives are promising. Nevertheless, ATAG should be aware of the basic assumptions of the tools the organisation is currently applying and keep in mind the overall goal of supplier monitoring.

First of all with respect to the SAQ method. In general it can be concluded that the outcomes of the SAQ's are not easily accessible for the entire organisation and that feedback of results can thus be improved. It can be concluded that the suppliers are willing to fill in the SAQ 1. Though, ATAG has not set up any procedures about the frequency suppliers have to up-date their SAQ 1. This leads to a situation in which gathered information can be outdated.

The SAQ 2 on the other hand is encountering more complications. The label SAQ 2 does presuming that it is a questionnaire. This is not the case, because the SAQ 2 is a document that rates the performance of suppliers on different topics filled in by a supplier quality engineer of ATAG. New developments are started to improve the SAQ method by the recently initiated 'supplier profile'. This tool assists ATAG in auditing new and current suppliers. Despite ATAG is satisfied with the content of the SAQ 2, it can be concluded that the questionnaire:

- Ø Gives rise to perception differences.
- Ø Lacks weighting scores for the separate chapters / topics.

The call rate technique is well developed and provides valuable information both for ATAG as the supplier. Though, ATAG has to be aware that the technique remains a management control tool and therefore can lead to discussion of individual figures. This discussion on detail level prevents achieving the overall goal of the method.

From the results of the supplier questionnaire the following conclusions can be drawn:

- Ø Suppliers of ATAG encourage the initiative of extension of the current methods by the design of a vendor rating system.
- Ø In order to come to a mutual beneficial system, information and knowledge sharing between ATAG and suppliers is crucial both on strategic level (objectives) as on operational (technical information) level. Thus attention for communication.
- Ø Suppliers propose both quantitative as qualitative criteria for a vendor rating system.
- Ø Suppliers perceive the call rate technique as a positive tool for creating insight in the product quality, but the technique is also experienced as a complicated methodology.

4. Literature review

4.1 Introduction

To determine the SOLL situation regarding the design process of a vendor rating system, a literature study is carried out. This chapter will therefore explore the literature with respect vendor rating. Before discussing the design process of vendor rating, outsourcing, purchase and its relation with supplier monitoring is highlighted (§4.2 & 4.2.1). Subsequently performance measurement in general is described (§4.3), before the concept of vendor rating is addressed (§4.4). The first issue with respect to vendor rating will be the determination of a definition. This is followed by the design process of a vendor rating system (§4.4.1), the process of determining the criteria (§4.4.2), different techniques to score suppliers (§4.4.3) and finally the difficulties with respect to vendor rating (§4.4.4). The chapter concludes in a (short) overview of the literature findings (§4.5) and in a conclusion in which relevant design elements of a vendor rating system are discussed (§4.6)

4.2 Why performance measurement

There's no denying the trend towards outsourcing. Companies are shifting more and more towards 'core competencies'. The term core competence is coming from Prahalad & Hamel (1990, p.82) and they define the term as:" ***The collective learning in the organisation, especially how to co-ordinate diverse production skills and integrate multiple streams of technologies***".

Purchasing departments have to deal with this trend in outsourcing, but why are organisations shifting towards core competences? Van Weele & Rozemeijer (1996) give three revolutions in the business context that have considerable influence on this trend. The first revolution is globalization. This globalization results from developments such as deregulation in many industries, improved transportation facilities, more sophisticated information and communications technology. The second revolution is the rise of the information society. Nowadays organisations generate growing economic value from using and selling information. This can be traced back to the advanced information systems and improved capabilities for processing of detailed information. The third revolution is the more demanding consumers and continuously changing consumer preferences. Today's customers have a widespread perception of value that includes convenience of purchase, after-sales service, reliability, uniqueness, and so on. Customers tell the manufacturers what they want, when and how.

As companies outsource many of their non-strategic activities and much of their manufacturing, they become dependent on their suppliers (Ogden et. al., 2005). This change in business context has led to a worldwide linking of strategic relationships between organisations. According to De Boer et. al. (2000) organisations become more dependent on suppliers, which has direct and indirect consequences of poor decision-making. This development has subsequently consequences for the performance measurement of suppliers. Supplier selection and monitoring in a global environment should be supported with specific tools that enhance learning and knowledge creation in the supply chain (Murahalidharan & Anantharaman, 2001). Before addressing the question how suppliers can be monitored, it is important to elaborate further on what is meant with purchasing and purchasing decisions.

4.2.1 Changing role of purchasing

Dubois & Wynstra (2005) emphasise the discussion of the increasing importance of the purchase function and the growing strategic orientation towards supplier management and the purchasing process since the last two decades. An important part of their discussion is the way organisations perceive suppliers and the way they can contribute value to the firm. Murahalidharan & Anantharaman (2001) are stating that the purchase environment has become one of the most important elements in surviving within the dynamic international markets. Selecting the right sources and thus suppliers is one of the strategic business processes in today's competitive environment. Therefore purchasing is not purely a tactical function anymore; instead it is now recognized as a strategic function. After all, suppliers have major influence on the success or failure of organisations. Karpak et al. (1999) emphasise therefore that a key issue purchasing must address is effective management of the supplier network, including identification of supplier selection criteria, supplier selection decisions and monitoring of supplier performance.

To gain insight in the changing role of purchasing, it is important to understand what exactly is meant with purchasing. In literature there are given many definitions with respect to purchasing.

- ***"Buying materials of the right quality, in the right quantity, at the right time, at the right price, from the right source"***(Heinritz et al., 1986, p.9)
- ***"The acquisition of needed goods and services at optimum cost from competent, reliable sources"*** (Scheuing, 1989, p. 4-5)
- "***All the activities necessary to acquire goods and services consistent with user requirements"*** (Coyle et al. 2003. p. 119)

It can be concluded that these definitions differ in focus. They range from a strategic to operational focus, but also from objective to activity. In this research the definition from Van Weele (1994, p.9) is adopted. He makes a distinction between the objective of purchasing and the activities that are involved. This underlines the strategic importance of the purchase department, whereby both the strategic as operational objectives are a point of interest.

"***Obtaining from external sources all goods and services which are necessary for running, maintaining and managing the company's primary and support activities at the most favourable conditions."***

This definition of purchase can be further translated into a set of (operational) activities:

- ***Specifying what should be purchased;***
- ***Selection of one or more adequate suppliers;***
- ***Establishing a contract with the supplier (s) after having negotiated the terms;***
- ***Actually ordering the items or services;***
- ***Monitoring the delivery of the items or services ordered;***
- ***Follow-up on the delivery, e.g. taking care of claims, administrative activities etcetera."***

According to Wynstra (1998) it is important to make a distinction between the purchasing function and the purchasing department. The functions, such as those mentioned by Van Weele (1994), are coordinated by a purchase manager, but this does not imply that all these activities have to be carried out by the purchase department. Van Weele (1994) is stating that the scope of the purchasing function is usually much broader than that of the purchasing department. This means that purchasing processes are integrated in the entire organisation, but the purchasing influence goes further than the organisation alone. Coyle et.al. (2003) mention in line with this integral perspective the procurement process. This process links members in the supply chain and assures the quality of suppliers in that chain. The quality of the materials and services that are input, affect the quality of finished products and therefore customers satisfaction. It is therefore essential for buying organisations to monitor the performance of its suppliers. The next section will further focus on the subject of performance measurement.

4.3 Performance measurement

Vendor rating is a form of performance measurement, with the focus that it is aimed at the performance of the supplier. Before addressing the concept of vendor rating the field of performance measurement will be explored.

Performance measurement has been subject for researchers for a considerable period of time. Bourne & Neely (2003) describe how the current management accounting systems have developed in the USA between the 1850s and 1920s. However they also state that between 1925 and 1980 there were no significant developments in management accounting systems and by the 1980s traditional accounting measures were being criticised as inappropriate for managing business of the day. According to Hudson et. al. (2001) these traditional performance measures are financially driven and historically focused. Bourne & Neely also (2003) emphasise the characteristics of these traditional based performance measures as internally focused, backward looking and more concerned with local departmental performance than with the overall health or performance of the business. As a consequence a revolution in the field of performance measurement has occurred and has led to the development of more balanced performance measurement systems. Popular examples of these measurement systems are the balanced scorecard (Kaplan & Norton, 1996); performance measurement questionnaire (Dixon et al., 1990) or the Cambridge performance measurement design process (Neely

et. al., 1995). An overview of Ghalayini & Noble (1996) summarises the distinction between traditional and non-traditional performance measures.

Traditional performance measures	Non-traditional performance measures
Based on outdated traditional accounting system	Based on company strategy
Mainly financial measures	Mainly non-financial measures
Intended for middle and high managers	Intended for all employees
Lagging metrics (weekly or monthly)	On-time metrics
Difficult, confusing and misleading	Simple, accurate and easy to use
Lead to employee frustration	Lead to employee satisfaction
Neglected at the shopfloor	Frequently used at the shopfloor
Have a fixed format	Have no fixed format
Do not vary between locations	Vary between locations
Do not change over time	Change over time as the need change
Intended mainly for monitoring performance	Intended to improve performance
Not applicable for JIT, TQM, CIM etc.	Help in achieving continuous improvement
Hinders continuous improvement	

Table 3 Traditional and non-traditional performance measures (Ghalayini & Noble, 1996)

The discussion above indicates that the meaning of performance measurement is relative broad. Despite both forms of performance measurement (traditional and non-traditional) have their strong and weak aspects; this research focuses further on the non-traditional performance measures. Neely et al. (1995, p. 5-6) propose the following definition for performance measurement:
"***Performance measurement can be defined as the process of quantifying the efficiency and effectiveness of action. A performance measure can be defined as a metric used to quantify the efficiency and/or effectiveness of action. A performance measurement system can be defined as the set of metrics used to quantify both the efficiency and effectiveness of actions***".

These definitions are focused on the efficiency and effectiveness of actions and are therefore considered as theoretical and abstract by nature. In practice performance measurement has a more detailed meaning (Neely, 2002):

- Performance measurement refers to the use of a multi-dimensional set of performance measures, which includes financial and non-financial-, internal and external measures.
- Performance measurement cannot be done in isolation. Strategic orientation is essential. The need to implement measures that reflect and communicate an organisation's strategies has been a consistent message in much of the recent literature on performance measurement.
- Performance measurement has impact on the environment in which it operates. Deciding what to measure, how to measure and which targets will be set, are all actions which influence individuals and groups within the organisation.

This description implies that performance measurement is, besides internally focused, also based on inter-company processes. Therefore supply chain relations are becoming more and more important. It seems obvious that the quality of products and processes of each link in the supply chain has influence on customer satisfaction. Neely (1999) states that business performance measurement is nowadays placed high on the management agenda. This increased attention for business performance measurement has led to different methods for performance measurement. Especially the non-traditional forms of performance measurements are of growing importance. Nevertheless, the difference between these two forms is not always clear. Vendor rating can for example be carried out in both a traditional and non-traditional way. This depends on the requirements of the organisation. Therefore Neely (2003) proposes certain propositions in order to manage performance:

- Describe the value creation process in its context and time.
- Share this model with all relevant actors.
- Identify and select the descriptive indicators both for results and for steps to create the results.
- Document these indicators through an appropriate information system.
- Choose the reference for benchmarking.
- Evaluate the signals and messages coming from each indicator.
- Identify, evaluate, and implement all actions likely to improve the result will be coherent with the strategic intent.

Given these propositions, it can be concluded that performance is not just something one observes and measures. It can be interpreted as an organisation wide technique that has impact from strategic to operational level and involves a complex set of decisions. The next section will further focus on a specific method of performance measurement focused on suppliers, vendor rating.

4.4 Vendor rating

Vendor rating is a specific form of performance measurement. First of all a definition of vendor rating will be given. Subsequently different techniques, difficulties and the design process are discussed.

Definitions

As discussed above vendor rating is a form of performance measurement. But the question remains how vendor rating is defined? Numerous authors give different descriptions of vendor rating:

"***Vendor rating is an integral assessment system that measures orders and deliveries of suppliers. Vendor rating transforms operational information into management information, because data from the vendor rating system is used by the formulation of strategic objectives***" (http://www.vendorrating.net)

Kowsoleea (1998) is stating that: "***Vendor rating has as objective, by systematically collecting data of suppliers achieve to get insight in:***

- ***Objective data with respect to deliveries during evaluation sessions with suppliers***
- ***To verify that current suppliers continually deliver what is agreed and therefore come in consideration for qualification and quality agreements.***
- ***To have a manual for corrective and preventive actions."***

Lamming et. al (1996, p. 174) defines vendor rating as: "***To monitor the performance of a supplier and compare it with the customer's expected levels of performance".***

Taken these definitions together, some aspects stand out. A vendor rating system must be at least objective, based on strategic objectives (KPI) and lead to corrective and preventive actions. Though, one element lacks these definitions. Besides these characteristics vendor rating should be carried out on a regular base. Therefore in this research the following definition of a vendor rating system is used:

A performance measurement system that measures on regular intervals supplier performance on specific key performance indicators as a basis for corrective and preventive actions regarding the product and process quality.

Van Weele (1997) identifies various tools and techniques that can be used for supplier assessment:

- Spreadsheets; used to systematically compare and asses quotations obtained from suppliers.
- Personal assessment; used for suppliers with whom exist close business relationships.
- Vendor rating; Limited to quantitative data. Entails measuring the aspects of price, quality and delivery reliability per supplier.
- Supplier audit; Entails that the supplier is periodically visited by specialists from the customer.

As discussed above, vendor rating is a form of performance measurement and just one method for evaluating suppliers' performance. A vendor rating system is a useful completion to subjective methods as supplier auditing or personal assessment. According to Van Weele (1997) assessments methods can be a compromise of subjective methods (used when companies evaluate suppliers through personal judgments) and objective methods (attempt to quantify the supplier's performance). With respect to vendor rating this is an important distinction, because it is an 'objective method' and is often complemented with 'subjective methods'. Two examples of tools for subjective and objective supplier monitoring are supplier auditing and vendor rating. The table below summarizes the main differences (Van Weele, 1997).

Aspect	*Supplier auditing*	*Vendor rating*
Orientation	Focus on future	Based on historical data
Application	New and current suppliers	Current suppliers
Nature	Mainly qualitative	Mainly quantitative
Scope	Broad, many aspects	Limited, few aspects
Work	Time consuming	Standard data
Data processing	Subjective, manually	Factual, computerized
Relation with suppliers	Co-operation	Based on internal administrative data

Table 4 Overview of differences supplier auditing and vendor rating

4.4.1 Vendor rating design process

In order to design a vendor rating system, it is important to identify the conditions of an effective design process. Without this, there will not be any practical value for the organisation.

The actual measurement of the performance of suppliers can only carried out when the system is implemented. Though, before the implementation a profound design process is essential. An organisation designing a vendor rating system has to consider strategic issues and determine the expectations of multiple stakeholders. From table 4 can be seen that a vendor rating system focuses primarily on current suppliers of an organisation. Therefore it is relevant to get insight in the supplier base of the organisation in order to determine how to approach different suppliers.
According to Gelderman & Van Weele (2002) not all buyer-supplier relationships should be managed in the same way. This has consequences for the way suppliers should be assessed. One could imagine that suppliers who are of great value for an organisation should be approached differently in comparison with suppliers who can be easily substituted. How can organisations get insight in their supplier base in order to have better understanding of the buyer- supplier relation?
The Kraljic matrix is a frequently used tool when assessing the added value of the purchasing of different products or services for the organisation. This matrix assists the organisation in the determination of the right strategy for differentiated suppliers. The general idea is to minimize supply risk and make the most of buying power in order to develop and implement differentiated purchasing strategies (Kraljic, 1983, p.112).

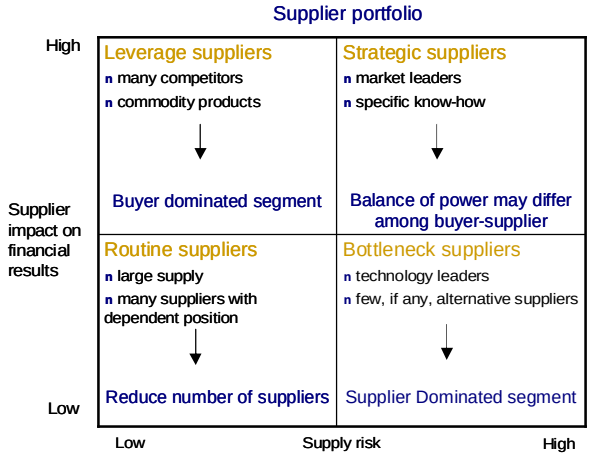


Figure 4 Kraljic matrix (Kraljic, 1983)

Besides the classification of suppliers, it is according to Hudson et. al. (2001) also important to identify the properties of an effective design process. In literature there are a number of characteristics described to design a valid performance measurement system. A comprehensive overview comes from Maskell (1989). He offers the following seven principles of performance measurement system design:

1. The measures should be directly related to the firm's strategy.
2. Non-financial measures should be adopted.

3. It should be recognised that measures vary between locations; one measure is not suitable for all departments or sites.
4. It should be acknowledged that measures change as circumstances do.
5. The measures should be simple and easy to use.
6. The measures should provide fast feedback.
7. The measures should be designed so that they stimulate continuous improvement rather than simply monitor.

These principles for designing a performance measurement system do not result in 1 uniform method for vendor rating. They must be seen as guiding design principles for a performance measurement system in general and could therefore be useful when designing a vendor rating system. The next section discusses the determination of criteria within a vendor rating system.

4.4.2 Criteria for assessing vendors

A relevant step in a vendor rating design procedure is to establish the KPI and criteria to be used for evaluating the vendors. Yahya & Kingsman (1992) describe a systematic procedure to establish rating criteria. This procedure starts with the selection of participants in the design process. Without giving indications about how many participants this should be, the author states that this selection must be based on a cross-functional basis. All the participants are presented a set of potential criteria, together with the factors that might contribute to each criterion. Subsequently every individual is expected to indicate which criteria he or she ought to be relevant. The researcher combines every insight of the participants and constructs a 'master list'. The next step is to organise a meeting where all participants are allowed to discuss and openly criticise each of the criteria proposed. This approach leads to consensus about the criteria to be used in a vendor rating system. Thus some principles seem to be important during the process of determining KPI and criteria: cross-functional approach, create list of potential KPI and criteria, openly discuss and interpret the proposed KPI and criteria.

When evaluating vendors, the most important task for buyers is assessing the key performance indicators in their industry and to translate these dimensions into supplier evaluation criteria (Handfield, 1994). According to Kerklaan (2004) criteria selection starts from the strategic objectives of an organisation. The organisation's strategy forms the basis for the identification of key performance indicators (KPI). These KPI should subsequently be translated into measurable criteria. Many authors are writing about generic terms of quality, time, flexibility or costs. However, these KPI imply different criteria. Below is presented an overview of different propositions of authors (Neely et al. 2005; Coyle et.al. 2003; Sarkis & Talluri, 2002) with respect to criteria that can be applied to measure the performance of suppliers. As can be seen from this overview an organisation can apply many different criteria. But the on the whole the KPI can be categorised under quality, flexibility / time, and costs.

Process measure categories	
Time	Cost
On-time delivery / receipt	Finished goods inventory turns
Order cycle time	Days sales outstanding
Order cycle time variability	Cost to serve
Respons time	Cash-to-cash cycle time
Forecasting / planning cycle time	Total delivered cost
	• Cost of goods
Quality	• Transportation costs
Overall customer satisfaction	• Inventory carrying costs
Processing accuracy	• Material handling costs
Perfect order fulfillment:	All other costs
• On-time delivery	• Information systems
• Complete order	• Administrative
• Accurate product selection	Cost of excess capacity
• Damage-free	Cost of capacity shortfall
• Accurate invoice	
Forecast accuracy	Other / supporting
Planning accuracy	Approval exceptions to standard
• Budgets and operating plans	• Minimum order quantity
Schedule adherence	• Change order timing
	Availability of information

Quality	Time	Flexibility	Cost
Performance	Manufacturing lead time	Material quality	Manufacturing cost
Features	Rate of production introduction	Output quality	Value added
Reliability	Deliver lead time	New product	Selling price
Conformance	Due-date performance	Modify product	Running cost
Technical durability	Frequency of delivery	Deliverability	Service cost
Service ability		Volume	
Aesthetics		Mix	
Perceived quality		Resource mix	
Humanity			
Value			

Strategic performance metrics	
Cost	Time
Low initial price	Delivery speed
Compliance with cost analysis system	Product development time
Cost reduction activities	Partnership formation time
Quality	Flexibility
Conformance quality	Product volumes changes
Quality philosophy	Short setup time
Prompt respons	Conflict resolution
	Service capability

Table 5 Performance KPI and criteria

Since a vendor rating system is an integral tool based on strategic objectives, the determination of these KPI and criteria is crucial. Many stakeholders have their own interests and needs in specific criteria, but as described earlier, too many criteria will lead to an uncontrollable system. Selection of relevant criteria must therefore be carried out carefully. Neely (p. 152, 2002) proposes some questions that have to be addressed for designing a set of performance measures:

- Stakeholder satisfaction – who are key stakeholders and what do they want and need?
- Strategies – what strategies have to be put in place to satisfy the wants and needs of these key stakeholders?
- Processes – what critical processes have to operate and do enhance these processes?
- Capability – what capabilities have to operate and do enhance these processes?
- Stakeholder contribution – what contributions are required from our stakeholders if these capabilities are to be maintained and developed?

These questions emphasize the importance of a multi-dimensional performance measurement system. Organisations have to consider both internal (strategy, processes and capabilities) as external (stakeholder) aspects when designing performance measures. Other authors emphasise more the operational aspects of performance measures. With respect to the development and selection KPI, some principles must be taken into account: (Keki, 1989, p. 109):

- The measurements should be meaningful, fair, easy, and not subjective.
- The cost of each measurement should be at least an order of magnitude lower than the tangible benefits to be derived.
- The fewest possible number of parameters should be selected to meet the objectives of measurement. Too many measurements lead to too little action.

4.4.3 Techniques to come to a final vendor score

After determining the list of criteria to use in a vendor rating system, there are different approaches to come to a final score for each criterion. (Yahya & Kingsman, 1999; Weber, 1996). Each technique has its strong and weak aspects. Several methods for evaluating vendors' performance are:

- ***Categorical method***

This technique focuses on the performance of suppliers whereby supplier vendor's performance is rated in specific areas. The buyer keeps a record of all vendors to be monitored, along with their actual performance on key factors. The vendors' performance is assessed by ranking the score on each criterion as good, neutral and unsatisfactory. This technique can be described as intuitive, relying on the buyer's memory, personal judgement, ability and experience and often leads to inconsistent vendor ratings among buyers (Weber, 1996) Nevertheless, the main advantage of this technique is that it is inexpensive and requires a minimum of data.

- ***The simple linear weighted average method***

According to Weber (1996) this technique attempts to improve on the subjective nature of the categorical method by providing numerical weights to the evaluation criteria. To determine a vendor's overall performance, each factor is multiplied by the vendor's performance value and subsequently totalled to achieve the final suppliers rating. The difficulty of this technique is the determination of the weights to use, because this has to be done subjectively by the management.

- ***Cost ratio method***

This technique focuses on costs. The total cost of each purchase is calculated as its acquisition price plus the buyer's internal operating costs associated with the quality, delivery and service elements of the purchase. According to Weber (1996) this technique is an extremely complex approach which requires a comprehensive cost-accounting system to generate the internal operating cost data.

The categorical technique requires the lowest effort of the three methods and has the lowest cost, but produces the least reliable results. The simple linear weighting average technique is flexible and can accommodate any number of evaluation factors, however the determination of appropriate weights is not an easy task. The cost ratio technique is extremely cost-control oriented, which may not be useful

in comparing suppliers because of the difficulties of translating all aspects of vendor performance into precise cost figures.
A technique that attempts to overcome these issues is the Analytical Hierarchy Process (AHP).

- ***Analytical Hierarchy Process (AHP)***

The AHP is a systematic approach for evaluating, monitoring and selecting suppliers. This approach has been applied by a number of researchers and practitioners (Barbarosoglu & Yazgac 1997, Hill and Nydick 1992, Narasimhan 1983). Sarkis & Talluri (2002) are describing AHP as a robust technique that allows managers to determine preferences of criteria, quantify those preferences, and then aggregate them across diverse criteria. Murahalidharan & Anantharaman (2001) state that the model has 3 features which differentiate it from other decision-making approaches:

- its ability to handle both tangible and intangible attributes;
- its ability to structure problems, in a hierarchical manner to gain insights into the decision-making process;
- its ability to monitor the consistency with which a decision maker makes judgment.

The AHP method considers conflict as positive and instrumental to achieve change and effective decision making (Murahalidharan & Anantharaman, 2001). Most group problems are complex, unstructured and are difficult to solve. AHP results in better communication leading to clearer understanding among the members of decision-making groups. According to Yahya & Kingsman (1999) the AHP method determines the relative importance of a set of criteria or activities by using a systematic process. This is achieved by a series of pair wise comparisons of all criteria. Despite the technique consists of complex statistical calculations, the structured approach contains useful insights. First of all, the authors address the importance of integrating various functions during the decision-making process. Secondly the authors propose brainstorming sessions or nominal group technique (NGT) involving various individuals drawn from different functions. Hereby the focus during the initial phase lies on achieving a shared understanding of the problem and commitment to action. Nevertheless, the technique contains also some weak aspects. First of all the method does not propose a preliminary phase for the selection of a possible vendor rating method. The first step begins with the selection of active participants, but there are for example no selection criteria for the choice of a vendor rating model. It seems plausible that the AHP technique is not for every organisation suitable, because it is based on complex statistical calculations. Secondly, the determination of KPI is unique for each organisation and should therefore require a more structured approach.
Besides these weak aspects of the AHP technique, all the above described techniques calculate a total vendor score. This implies that scores on individual KPI could be fluctuating but that the overall score on a vendor remains steady. Continuing on these limitations the next section discusses the difficulties of designing a vendor rating system.

4.4.4 Difficulties with vendor rating

The design of a vendor rating system is not an easy process. Different authors mention different sorts of problems and difficulties during the design and implementation of a vendor rating system. These difficulties range from structural, external, administrative to decision making problems. According to Murahalidharan & Anantharaman (2001) supplier monitoring or vendor evaluation is a complicated decision making problem, because of the following reasons:

- The complexity of the decision making process is caused by the relative difficulty to conceptualize and structure the numerous criteria of the rating system into a framework. Moreover the nature of the criteria is frequently both quantitative as qualitative.
- Increase competition in the marketplace leads to an extended search space for decision makers.

Keki (1989) summarises structural and administrative weaknesses associated with traditional vendor rating systems:

- Frequently the same supplier, for the same part is subjected to different rating systems in different divisions of the same company.
- There are differences between the purchasing, quality, and engineering departments in interpreting the same rating system.

- Ø Unilateral and arbitrary decisions may be unfair to suppliers.
- Ø Inconsequencies lead to numerous arguments and negotiations between buyer and supplier personnel.
- Ø There is an inherent conflict between simplicity and accuracy in these rating systems.

Also Bourne & Neely (2003) mention a list of (potential) problems when designing a performance measurement system as vendor rating:

- Ø Difficulties in evaluating the relative importance of measures and the problems of identifying true 'drivers'.
- Ø Metrics are too poorly defined
- Ø Goals are negotiated rather than based on stakeholder requirements
- Ø The need to quantify results in areas that are more qualitative in nature
- Ø Large number of measures diluting the overall impact
- Ø Difficulty in decomposing goals for lower levels of the organisation
- Ø The need for a highly developed information system

These points of interest indicate that designing a vendor rating system is not a straight forward process. The described difficulties range from strategic to operational issues. Taking these difficulties into account, an adequate design process is essential in order to achieve added value.

4.5 Overview

This chapter has described the field of vendor rating. By narrowing down from the broad overview of performance measurement to a specific system for supplier monitoring, is attempted to give a comprehensive review of the design process of a vendor rating system. Multiple authors have addressed the subject of vendor rating, but the focus lies primarily on the implementation process or different techniques for calculating total scores on each KPI. These often relatively difficult statistical methods do not give attention to the selection of a suitable method previous to calculating a total vendor score. It is therefore difficult to prescribe a 'best practise' for designing a vendor rating system. Nevertheless several elements are emphasised by multiple authors.

As described in this chapter, the following definition of a vendor rating system is adopted; ***A performance measurement system that measures on regular intervals supplier performance on specific key performance indicators as a basis for corrective and preventive actions regarding the product and process quality.*** In order to realize such a system, the literature review showed that an organisation designing a vendor rating system has to be conscious of multiple elements.

The design of a vendor rating system is not solely an internal activity. The organisation should also consider stakeholders externally of the company. Neely (2002) was stating that both internal as external parties must be involved in the selection and development of measurement criteria. This implies that also the suppliers' perspective must not be underestimated. After all, aligning the suppliers strategy with that of the buyer, will lead to added value for the buyer-supplier relationship.

Besides needs of suppliers, the internal company requirements are obviously just as essential. Handfield (1994) did emphasise this by stating that supplier evaluation criteria have to be translated from key performance indicators (KPI) of their industry and subsequently of their organisation. Table 5 showed an overview of frequently used performance measures. Remarkable is that most of these criteria are general in nature and can be categorised under quality, delivery, flexibility and costs. According to Keki (1989) criteria for a vendor rating system should be simple to use, provide fast feedback and stimulate continuous improvement. Thereby top management must agree with the performance criteria of the vendor rating system. Besides top management, more functions within organisations are occupied with the monitoring of suppliers. Every function (e.g. purchase, quality, R&D) have their own perspective of the purpose of a vendor rating system. During the design process these multiple perspectives have to be considered and taken into account as input during the design of a vendor rating system.

As multiple authors were stating, the organisation's strategy is the starting point for the design of a vendor rating system (Neely 2002; Maskell 1989; Kerklaan 2004). It determines the expectations of an organisation with respect to supplier monitoring and therefore the final design of a vendor rating system. Also according Kerklaan (2004) the design of a performance measurement system should start at the company's strategy. He proposed a strategy map that elucidates the organisation's ambition.

This ambition subsequently needs to be translated into key performance indicators and measurable criteria. The way of thinking is aligned with that of Bititci et. al. (1997), who are stating that it is relevant to design an integrated set of performance measures that supports rather than contradicts the business strategy. The organisation's strategy should therefore be considered as leading when designing a vendor rating system.
Many organisations already work, on various levels and sophistication, with performance measurement systems. When organisations decide to design a performance measurement system, they have to consider if the current (traditional) performance measurement systems are up-to-date. As described in this chapter, there can be made a distinction between traditional and non-traditional performance measurement systems. Despite non-traditional performance measurement systems show a rising popularity, non-traditional systems can still be in operation and useful. Again, the organisation must identify its ambition and strategy with respect to supplier monitoring. When for example problems arise with respect to long processing times, no specific information regarding problems or poor accessibility of report data, considering a complementation on the current system is advisable.

4.6 Conclusion

This chapter addressed the question ***'How should, according to literature, a vendor rating system be designed?***' The findings of this literature review will be presented in a comprehensible figure. This section describes which elements are relevant when designing a vendor rating system and how these elements are interconnected.
Before an organisation actually can start with the design of a vendor rating system, certain choices and considerations have to be made. The foundation of a vendor rating system is the ***organisation's strategy***. It determines the focus and ambition of an organisation and thus also the degree of significance an organisation gives to supplier monitoring. In this way, the strategy of an organisation indirectly influences the status of ***the current performance measurement system***. After all, when an organisation does not give high priority to supplier monitoring, the current performance measurement system is most likely outdated or under-developed.
Complementary to the organisation's strategy, specific ***company requirements*** must be highlighted. With company requirements is meant the different expectations of functional departments within an organisation and these follow (reasonably) from the organisation's overall strategy. As discussed in this chapter a vendor rating system is an integral system. This indicates that various functional departments have their own interests in using, defining and designing this system. When the company requirements are not made transparent, the risk increases that the commitment of a vendor rating system will be limited.
As described in this chapter a vendor rating system contributes to an increasing value of products and processes in the supply chain. Therefore not only the company requirements are relevant, but also the insights of the supplier or the ***supplier requirements***. Suppliers have a different perspective towards a vendor rating system and these insights serve as input when designing a vendor rating system. These requirements can be illustrated as needs or requests towards issues like communication, selection of criteria or the added value of a vendor rating system. Off course, not all suppliers are of the same importance for an organisation, but application of the Kraljic matrix is an effective way of getting insight in the supplier base.
Together, the combined outcomes of the organisation's strategy, company- and supplier requirements have implications for the actions that have to be initiated in order to design a vendor rating system. These combined insights can be categorised under the name of ***business implications*** and describes the preferred and current status regarding a vendor rating system**.** These implications contain thus multiple insights from as well internal as external actors and form the basis for the design of a vendor rating system. Nevertheless the presence and value of the current performance measurement system must not be ignored. The current performance measurement system should, even if it contains elements of non-traditional way of performance measurement, be analysed on the value added elements. This comparison, between the business implications and the current performance measurement system, is labelled under the name of ***gap analysis: Design of a vendor rating system*****.** This gap analysis makes in short a comparison between the desired objectives of a vendor rating system and the current performance measurement system. During this phase the KPI and criteria as well as the technique how to score vendor performance are determined. The outcome of this comparison

subsequently is a (first) design of a vendor rating system. This system then needs to be tested and evaluated. During a test phase a preliminary representation of the characteristics of the design is made. This test phase results in an amount of conditions under which the vendor rating system eventually becomes operational. Subsequently an ongoing evaluation phase of the vendor rating system should ensure the continuity of the system. This ongoing evaluation is the basis for further sophistication of the system. As Murahalidharan & Anantharaman (2001) stated, a supplier monitoring system should improve learning and knowledge creation in the supply chain. This implies that the outcomes of the vendor rating system influences different design elements in terms of feedback loops. Perhaps the strategic objectives of the organisation are not focused enough, or the organisation has no clear insight in the supplier base, KPI and criteria are not well defined or it becomes clear that the technique to score the vendor on is not sufficient etc. These feedback loops indicate that vendor rating is a continuous process and subject of an organisation wide process.
The following figure presents how these elements fit together. This overview shows the different main elements during the design phase and how these elements are interconnected.

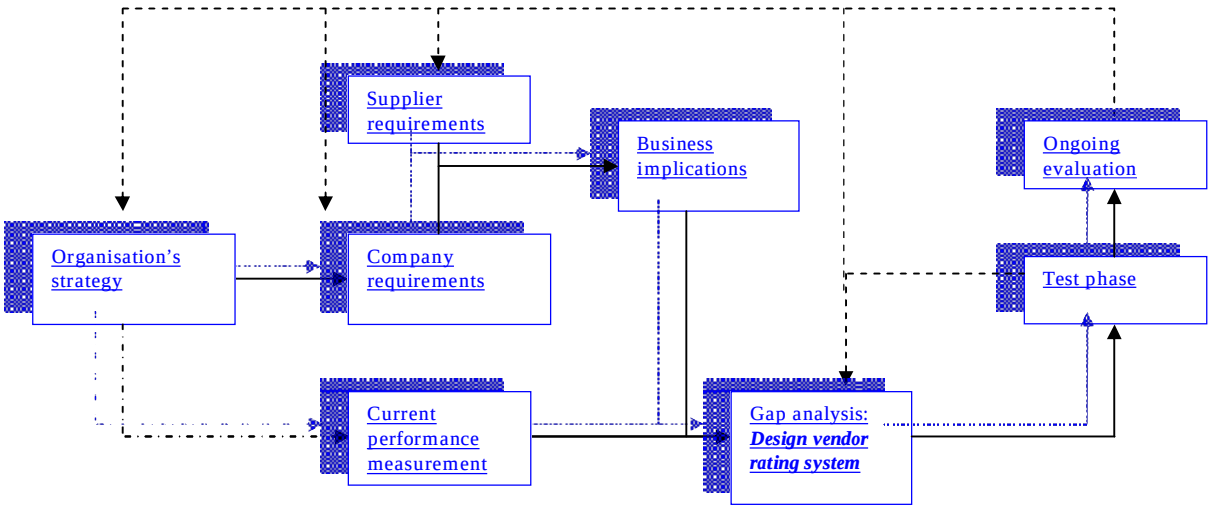


Figure 5 Overview of design process

The next chapter focuses on the internal situation of ATAG. The overview of the design process determines the structure of the next chapter. This means that the different elements in Figure 5 are the topics on which the situation within ATAG is examined.

5. ATAG and the desired needs towards supplier monitoring

Introduction

After outlined the findings from the literature review, this chapter answers research question III: "***Based on the design process, what are the needs of ATAG that forms the basis for the determination of KPI and criteria so that the product and process quality can be maintained?***" This chapter is structured according the design elements as visualised below.

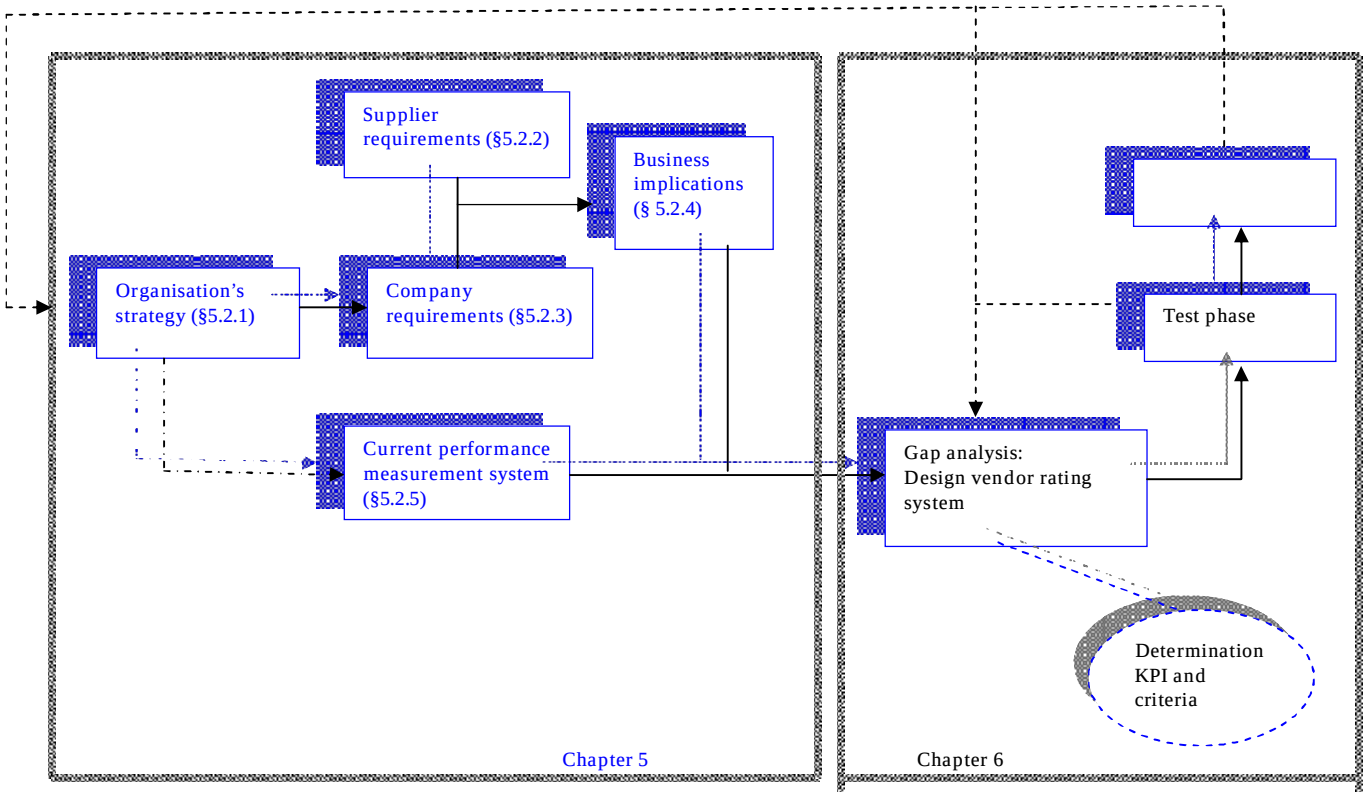


Figure 6 Steps to determine KPI and criteria

Figure 6 visualises the structure of the design process of a vendor rating system and this chapter focuses on the left part. § 5.1 starts with a description of the applied methodology in order to gather the desired information. Subsequently the interview findings corresponding to the organisation's strategy are discussed (§5.2.1). Than the company and supplier requirements (§5.2.2 & §5.2.3) with respect to supplier monitoring are presented. These combined insights have implications for the choices ATAG should make with respect to the design of a vendor rating system. § 5.2.4 gives an overview of these implications. Than § 5.2.5 gives an overview of the current performance measurement system and the chapter ends with a concluding paragraph (§ 5.3).

5.1 Methodology for determining the needs of ATAG

To determine the strategy with respect to purchase related issues, the Michigan State University (MSU) model based on the work of Monczka (1999) is applied (for a complete description of the MSU model, see appendix X). This model describes an integral framework of 8 main strategic processes and 6 enabling processes with respect to purchasing and supply management. All together these processes give an overview of the 'purchasing excellence'. For each strategic process are criteria developed on which an organisation can score 0 to 10 points In this way the current situation (IST), but also the desired (SOLL) situation with respect to the selected strategic processes can be determined. With the application of the MSU model it is necessary to emphasise some limitations. The presence of a purchase policy for example leads to a higher assessment score, but the model does not take into account the quality of the purchase policy. This could lead to a situation in which an inferior purchase policy leads to a higher score and the other way around. The purpose of the model must therefore be

considered as a tool that assists in creating an overview of the present and desired perspectives regarding the objectives of a vendor rating system.
According Monczka (1999), it is not realistic for an organisation to score the maximum score on each process. Each organisation has 'the freedom' to determine which processes are relevant for their business. In order to keep the focus on the design of a vendor rating system, not all processes are included. Moreover, this research is restricted by the factor time and therefore a selection is made between the 8 strategic processes. The following strategic processes are selected: Strategic process 2 is relevant because this process focuses on the (purchase) strategy of the organisation. Strategic process 3 is relevant because it focuses on the current supplier base and the strategy for optimizing it. It provides insight in the processes of determining the right amount and maintaining an up to date overview of suppliers. Strategic process 7 has a direct relation with the main subject of this graduation assignment, monitoring supplier performance. In short, these are the strategic processes in focus:

- Strategic process 2: Development of a strategy for each product group or brand.
- Strategic process 3: Optimise the supply base.
- Strategic process 7: Enhance supplier performance and monitoring the quality.

The content or assessment criteria of strategic process 2, 3 & 7 are translated into an interview guide. In this way the interviewees assume a conversational manner of communication, but with the notion that the interviewer is following a certain set of questions divided under different topics (Doorewaard & Verschuren, 2003). The choice for interviews is based on the fact that it gives more objective information, instead of just displaying the criteria of each strategic process. By individual interviews with purchasers the current (IST) and the desired (SOLL) situation are determined. In appendix XI the interview guides with the different purchasers are described. Besides the 3 purchasers also other functions (director operations, product manager & business analyst) are approached, because of the integral character of a vendor rating system. Despite these interviewees have no detailed insight in purchase related issues, it is valuable to assess how they score on the strategic processes of the MSU model. Therefore their interpretations are also translated into a score on each of the strategic processes.

		Purchaser 1	Purchaser 2	Purchaser 3	Director operations	Product Manager	Business analyst
Strategic process 2	IST	1	1	1	2	2	1
	SOLL	8	7	8	6	6	5
Strategic process 3	IST	3	1	2	3	2	2
	SOLL	8	7	7	6	7	6
Strategic process 7	IST	5	4	5	3	4	3
	SOLL	8	6	8	6	5	6

Table 6 Overview of MSU scores

Considering the scores on each strategic process, the following remarks can be highlighted. Each strategic process shows scores along the IST and SOLL situation that are generally consistent with each other. Remarkable is that the purchasers have in general a higher expectation level with respect to the SOLL situation of the individual strategic processes. This can presumably be explained by the fact that the questionnaire is focused on purchase related issues and they have thus more detailed insight in these processes. Moreover it is reasonable that they have a more ambitious attitude regarding their specific work aspects. The gaps between the IST and SOLL scores individually show on the other hand considerable differences and will be further outlined in this chapter

5.2 Design elements of a vendor rating system

This section categorises the needs of ATAG according the design elements of Figure 6. The findings are based on the analysis of interview findings and internal reports.

5.2.1 Organisation's strategy

During the interviews, a relevant characteristic with respect to the organisation's strategy of ATAG came forward. The strategic direction of ATAG is summarised below and is further clarified in the remaining paragraph:

Ø ATAG's strategic direction: Creating customer value (customer intimacy)

Three brands with their own competitive arena requires clear differentiation of strategy per brand in order to:

- Extend good reputation and corporate identity to the market and foreign (outside Benelux) markets.
- Create competitive advantage by investing in knowledge.

From the interview with the director operation it became clear that ATAG is positioned in a dynamic market. This influences the strategic objectives of the organisation, because the three brands of ATAG have their own competitive arena. The director operations visualises ATAG's strategic direction with the help of the model of Tracey & Wiersma (Mulder & Ten Cate, 2006). This model distinguishes three differentiation strategies: operational excellence, customer intimacy and product leadership. ATAG can be placed in the upper left corner of the model, with the focus on customer intimacy. This becomes clear from the following quotations: "***ATAG is strongly focused on customer intimacy and is concerned with the question how ATAG can be a reliable partner for its customers. ATAG's added value lies in the right match of products and an additional package of supportive services*** (e.g. maintenance, advice etc.)." This is visualised in Figure 7 below. This strategic positioning shows that customer requirements are leading and that for example on-time delivery and high quality products are very relevant aspects for a company as ATAG.

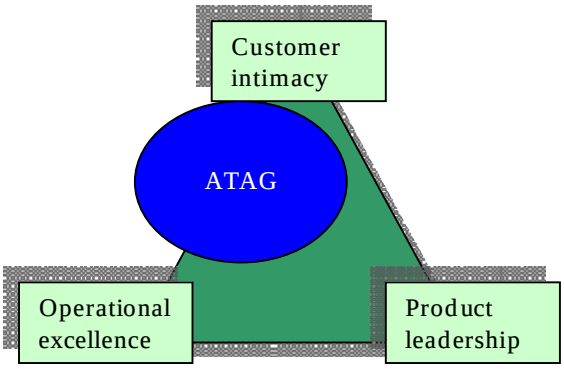


Figure 7 Strategic focus of ATAG.

From the interview with the business analyst, this strategic focus came also forward. According to him ATAG has to focus on a solid reputation and distinctive brand identity in order to fulfil the customer requirements. Brand differentiation assists ATAG in clarifying the expectations the organisation can settle with respect to the performance of suppliers.

The product manager has a vision in compliance with the strategic direction of ATAG. He states that the most competitive advantage can be obtained by investing and maintaining the knowledge of its markets and customers. Comprehensive knowledge of these aspects is difficult to copy by competitors. Nevertheless he is, as well as the business analyst, stating that the differentiation of the brand strategy can be improved in the current situation. Thereby it is important to document the strategic objectives. From multiple interviews it became clear that individuals have their own specific knowledge, but an overall shared overview of the strategic direction of the organisation is limited because of a failing knowledge sharing process.

5.2.2 Company requirements

This section describes the interview findings of the expectations and demands of different functional departments within ATAG in relation to vendor rating. In short, the company requirements for ATAG can be described as:

Ø The need of a well-defined purchase policy and strategy.
Ø Knowledge sharing throughout the organisation regarding supplier related issues.
Ø Measure supplier performance based on multiple (integral) insights (vendor rating);

A vendor rating system is an important tool for the purchase department, because they are for a great part responsible for selecting and monitoring suppliers. This means that the purchase policy and strategy should be well defined and shared throughout the organisation. The director operations noticed with respect to the development of the purchase policy that the three brands of ATAG are leading: "***The business teams ATAG, ETNA & Pelgrim are responsible for determining the objectives for each brand. Product Management is on the other hand responsible for gaining insight in market and technological developments. Subsequently the purchase department is occupied with price negotiations with suppliers***." In practice this process is not working smoothly. Multiple interviewees are stressing the importance of a thorough insight in the supplier market, but a lack of knowledge sharing restricts this insight. Moreover supplier monitoring should be based on integral insights and consist of a system that is easy to apply. The need for a vendor rating system is therefore reasoned. This system should, according the interviewees, measure the KPI quality, delivery, flexibility and costs. Frequently mentioned criteria with respect to these KPI are:

KPI	Criteria
Quality performance	Agreed service call rate % % approved quantities on the basis of incoming inspection. % received quantities without damage % product audit lists received on time % approved first product release
Delivery performance	% purchase orders confirmed by supplier on the required delivery date for ATAG. % confirmed purchase orders by supplier within 10 (working) days. % delivery performance towards ATAG customers. % delivery performance of the supplier
Flexibility performance	Flexibility rating Access to new technologies Responsiveness (Competences supplier) Innovation strength Flexibility rating Cycle time reduction
Price / cost performance	Lead time reduction After sale costs Price setting

Table 7 Proposed KPI and criteria according to interviewees of ATAG

To improve the internal processes and the level of knowledge sharing, ATAG has recently started the 'operational excellence project'. This project has according the business analyst as objective: "***To optimise processes that lead to a more effective organisation***." Because the design of a vendor rating system is carried out according a cross functional approach, this project contains useful aspects. The function of the product manager changes into a product category manager (PCM). A PCM is responsible for 1 or more product groups, but for all the brands. The function of a PCM is more focused towards the suppliers of ATAG. This can be concluded from the following quotation: "***Currently product management has a broad function, focused at suppliers and market aspects. This is going to change by focusing the product category manager to the supplier side. This has to improve the relation and communication with suppliers***." Moreover a PCM manager has in this 'new' role more opportunities to put effort in benchmark activities, which are in the current situation under exposed. These benchmark activities should lead to better insight in ATAG's performances and could form the basis for improvements of internal processes and procedures.

5.2.3 Supplier requirements

In order to design a vendor rating system, commitment of relevant stakeholders is essential. As described in chapter 4, Neely (2002) stressed the importance of stakeholder contribution and stakeholder satisfaction. This section focuses on the needs of ATAG with respect to supplier requirements as addition on the findings of §3.3.

With respect to the perspective of ATAG it can be stated that in the current situation many aspects of the relation between ATAG and its suppliers are described within the purchase agreement. This document describes on main points the conditions for collaboration (logistics-, product specifications, call rate agreements etc.). Nevertheless, in this agreement is not made a clear distinction between the (strategic) importance of suppliers: "***ATAG should differentiate the policy for supplier relations with respect***

to the strategic importance of the supplier. Multinationals must be approached in a different way than small organisations." This means that for strategic suppliers of ATAG the communication should go further than operational agreements and therefore should be focused on aligning or communicating the strategic objectives. An aspect that lies in close connection with this strategic importance of suppliers is the power balance between ATAG and suppliers. It is important for ATAG to keep control over this power balance, because when ATAG becomes too dependent on a supplier, the supplier can practise demands on ATAG (e.g. price negotiations). On the other hand, ATAG is not able to switch unrestricted from one supplier to the other. Each collaboration goes together with knowledge sharing, product development activities, investments of financial or knowledge sources etc. From the interviews became clear that ATAG gives currently no high priority to the power balance, but that this is on the other hand an important point of interest to consider in the future. The trade-off between controllability and spreading of risks should be taken into account***: "ATAG does not encounter problems regarding an unequal power balance between the organisation and suppliers, because ATAG is an important actor in the Benelux market and provides suppliers with useful information by the call rate method"***. On the other hand the interviewees are aware of the fact that the power balance will be an important point of interest: "***Nevertheless the spreading of risks has to be taken into account. ATAG has to consider alternative suppliers when suddenly suppliers will disappear."*** The design of a vendor rating system assists in clarifying the insight in the supplier of base by categorising strategic versus non-strategic suppliers and therefore also creates better insight in the power balance between ATAG and its suppliers.
The attitude towards suppliers was in the past characterised as re-active. This implies that actions in the past mostly took place when a supplier produced inferior quality of products. Though, this attitude is nowadays changing towards a pro-active one. This means that the intention of ATAG lies on preventing quality issues. A good illustration of this changing attitude is the increased effort in supplier monitoring and increased attention for supplier monitoring activities.

5.2.4 Business implications

The interview findings presented in previous paragraphs have consequences for the direction and choices of an organisation and thus the design of a vendor rating system. Therefore this section will give an overview of the implications that the '***organisation's strategy, company requirements*** and ***supplier requirements***' impose on the design of a vendor rating system.
First of all with respect to the organisation's strategy; Chapter 4 described that the design of a vendor rating system starts from the organisation's strategy. ATAG needs to consider the question; what does the organisation desire regarding supplier monitoring? This means that the organisation needs to determine its strategic direction. A part of this strategic direction is the objective with respect to suppliers, which has consequences for the design of a vendor rating system. Therefore a well-defined purchase policy and strategy is relevant. § 5.2.1 showed that ATAG lacks a well-defined and documented brand differentiation. There is no documented purchase strategy that differentiates the three brands. This means that there are no specific criteria set up which can serve as guideline for each brand: "***ATAG suppliers need to be assessed on different criteria in comparison to ETNA suppliers***". This can furthermore be deducted from the results of the MSU model. The interviewees score between the 5 and 8 on strategic process 2 (development of a strategy for each product group or brand). This implicates that ATAG desires a differentiated purchase strategy for each brand that is aligned with the organisation and purchase policy. These strategy and objectives should be communicated with suppliers and be supported with corrective actions with respect to the product- and process quality.
Secondly with respect to the company requirements; Since ATAG has 'chosen' for a certain business model (see §1.1), the company is highly dependent on the performance of its suppliers. ATAG expects from its suppliers a degree of quality both with respect to products as well for processes. Therefore ATAG must be aware of the status of the 'supplier relation'. This means that the organisation needs to consider aspects as power balance, communication or cooperation. In other words, ATAG desires a more specific and detailed insight in the supplier base and its supplier relations. From the score on strategic process 3 (optimise the supply base) it can be stated that this is a relatively high priority. The interviewees score between the 6 and 8. This means that ATAG strives to implement an advanced supplier monitoring system, with weighted criteria and aligned with organisation policy. Besides this system, it should be complemented with regular supplier audits of all the strategic suppliers. Eventually, the ultimate goal should be to create a clear understanding of the current supplier base and future opportunities and competences. An additional aspect that also can be categorised under

company requirements and which has close connection with the design of a vendor rating system is the 'operational excellence project'. In order to improve the supplier performance and monitor the quality of products and processes, the organisation desires to work pro-actively on supplier development. Thereby it is advisable to put effort in the most important suppliers (strategic) and invest in competences of employees to sustain supplier development. As described the operational excellence project is initiated to create more transparency and efficient processes in the organisation. Knowledge sharing is also essential during the design process of a vendor rating system. Functional departments have different perspectives regarding the meaning and application of a vendor rating system. This implies that during the design of a vendor rating system and the determination of KPI and criteria a cross-functional perspective and knowledge sharing is essential. Though not only during the design this knowledge sharing is important, but also when the system is operational. This last aspect will be further elaborated in § 7.2.1.
Thirdly with respect to supplier requirements; the performance of suppliers is crucial in the process of enhancing customer satisfaction. Delivering high quality products is an important objective for ATAG. To achieve this, improvements can be made regarding the supplier relation. An aspect of this is to get a clear insight in the supplier base by categorising suppliers on strategic importance. Clear insight in the supplier base also improves the view regarding the power balance between ATAG and suppliers. Two aspects have to be taken into consideration: risks dispersal and controllability. On the one hand becoming to dependant on a supplier has negative influence with respect to the negotiation position. On the other hand switching between suppliers causes reasonable risks regarding the loss of valuable knowledge. ATAG should focus on their strengths, which makes the company an interesting partner for suppliers. In order to improve the relation between ATAG and supplier (strategic) objectives should be shared, not only in the first stage of the cooperation, but on a continuous basis. Thus to improve the supplier performance it is important to continue with efforts of supplier monitoring. From the scores of strategic process 7 (enhance supplier performance and monitor the quality) of the MSU model can be concluded that the interviewees score relatively high on the IST situation. This can be explained by the fact that ATAG has already started with initiatives for monitoring supplier performance (see chapter 3). The SOLL situation shows a score between 5 and 8. This implies that ATAG strives to organise audits and a process control system for each strategic supplier, whereby a pro-active attitude towards supplier monitoring is pursued.
In short, the following organisational needs are relevant for the design of a vendor rating system for ATAG:

- Organisation's strategy:
  - Strategic direction: focus on customer intimacy, requires a well-defined purchase policy and strategy.
- Company requirements:
  - Create insight in the supplier base and supplier status (power balance, communication and cooperation).
  - Create a comprehensive system and clear responsibilities with respect to vendor rating, which requires knowledge sharing.
- Supplier requirements:
  - Strive for a pro-active attitude towards suppliers.
  - Communicate (and align) strategic objectives with suppliers.
  - Categorise suppliers based on their performance and / or strategic importance.

5.2.5 Current performance measurement system

Chapter 3 already has presented an overview of the status of the current performance measurement system of ATAG. Therefore this section only summarises the main points:

- ATAG must be aware of the overall objective of applying current supplier monitoring tools in order to prevent a waste of administrative energy.
- Supplier monitoring is assisted by the SAQ method (1&2) and the call rate technique.
- The call rate technique is well developed and provides valuable information both for ATAG as supplier.
- The SAQ 2 is currently, despite satisfying content, encountering some complications:
  - Perception differences
  - Lack of weighting factors

- Ø Results of the SAQ's are not shared unambiguous throughout the organisation. Feedback of results can be improved.
- Ø New developments are started to improve the SAQ method by the recently initiated 'supplier profile'. This tool assists ATAG in auditing new and current suppliers.
- Ø Suppliers experience the call rate technique as a positive tool for creating insight in the product quality, but the technique is also in some cases perceived as a complicated methodology.

5.3 Conclusion

In this chapter the question: "***Based on the design process, what are the needs of ATAG with respect to supplier monitoring that forms the basis for the determination of the KPI and criteria?"*** is addressed. To answer this question the outcome of the literature review is used. In this paragraph the design elements will be highlighted by giving an overview of the desired needs from the view of ATAG. In order to put the needs of ATAG (SOLL-situation) in the right perspective, the IST-situation is also added.

	IST-Situation	SOLL-situation (needs of ATAG)
Organisation's strategy	The overall organisation's strategy of ATAG is clear (focus on customer Intimacy), but, the strategy for each brand is not documented and merely based on personal judgement. This has influence on the selection and monitoring process of suppliers; selection criteria for suppliers are differentiated for each brand, but are also not documented.	➢ Strive for a clear strategy differentiation for each of the three brands, which is documented and shared throughout the organisation. ➢ ATAG should focus on the core competences: product & market knowledge and technology.
Company requirements	Large part (80%) of the supplier base is considered as strategic suppliers; nevertheless the term 'strategic' is not defined. A lack of insight in the supplier base can be declared by the fact that the company does not formally use purchase models (like Kraljic Matrix)	➢ Use purchase models (Kraljic) to create a shared understanding of the supplier base of ATAG. ➢ ATAG has to become more transparent by introducing clear procedures and guidelines, improve communication and clearer responsibilities. ➢ Keep supplier improvement / monitoring high on the management agenda, thus continue and expand where necessary these activities
Supplier requirements	The purchase agreement is an important tool for communicating (operational) agreements between ATAG and suppliers. Thereby is not made an explicit distinction between the strategic importances of suppliers. (see company requirements) Actions for improving the product and process quality were mainly reactive.	➢ In order to improve the supplier relation, improve the communication of (strategic) objectives, not only at the start of the collaboration. ➢ Prevent adhoc / reactive actions towards suppliers. A proactive attitude should improve the supplier relation and decreases the level of energy (support) ATAG has to put into the supplier relation. ➢ Categorise suppliers on the basis of their performance level, vendor rating.
Current performance measurement system	Supplier selection and monitoring is supported by the SAQ 1 & 2 and the call rate technique. Unfortunately, there is no formal procedure for communicating the outcomes of the SAQ's to all relevant actors. Supplier visits / audits are organised, but not on a structural basis Call rate analyses form the basis for corrective actions and improvement plans.	Ø Continue evaluating, testing and developing the renewed SAQ 2, the supplier profile. Ø Audit every (strategic) supplier, but take into account the capacity restriction. Ø Develop and increase effort in supplier monitoring. Measure supplier performance on a regular bases (vendor rating)

Table 8 Overview of the IST- and SOLL situation

The question remains how these needs of ATAG (SOLL-situation), can be made measurable. Therefore the design elements need to be further made explicit. To achieve this, the design elements are translated into different KPI. These KPI can be described as short-term quantitative operationalzed targets, which are extracted from long-term strategic goals and provide management with information about the performance of specific work processes. With respect to the view of ATAG, 4 KPI are determined that correspond with the design elements as described in this chapter. They represent the desired KPI and criteria that should be measured by use of a vendor rating system. In order to give an overview of how the overall needs of ATAG and the KPI and criteria are interconnected, Figure 8 is presented. This figure visualises an overview at a given point in time, whereby the KPI and criteria

follow from the vision and strategic objectives of ATAG. This overview is thus a static overview, which implies that the KPI and criteria are not definite. Through learning experience with the vendor rating system, the aspects in a previous design phases (strategic objectives and design elements) can be refined. This means that the proposed KPI and criteria can serve as input for further development of the organisation as a whole.

Chapter 6 is going to focus on the right part of Figure 6: the design of a vendor rating system and attempts to overcome the discrepancy between the IST- and SOLL situation. Thereby the chapter focuses on the interpretation of the proposed KPI and criteria and presents a (preliminary) design of a vendor rating system customised for ATAG.

Conclusion of the needs of ATAG

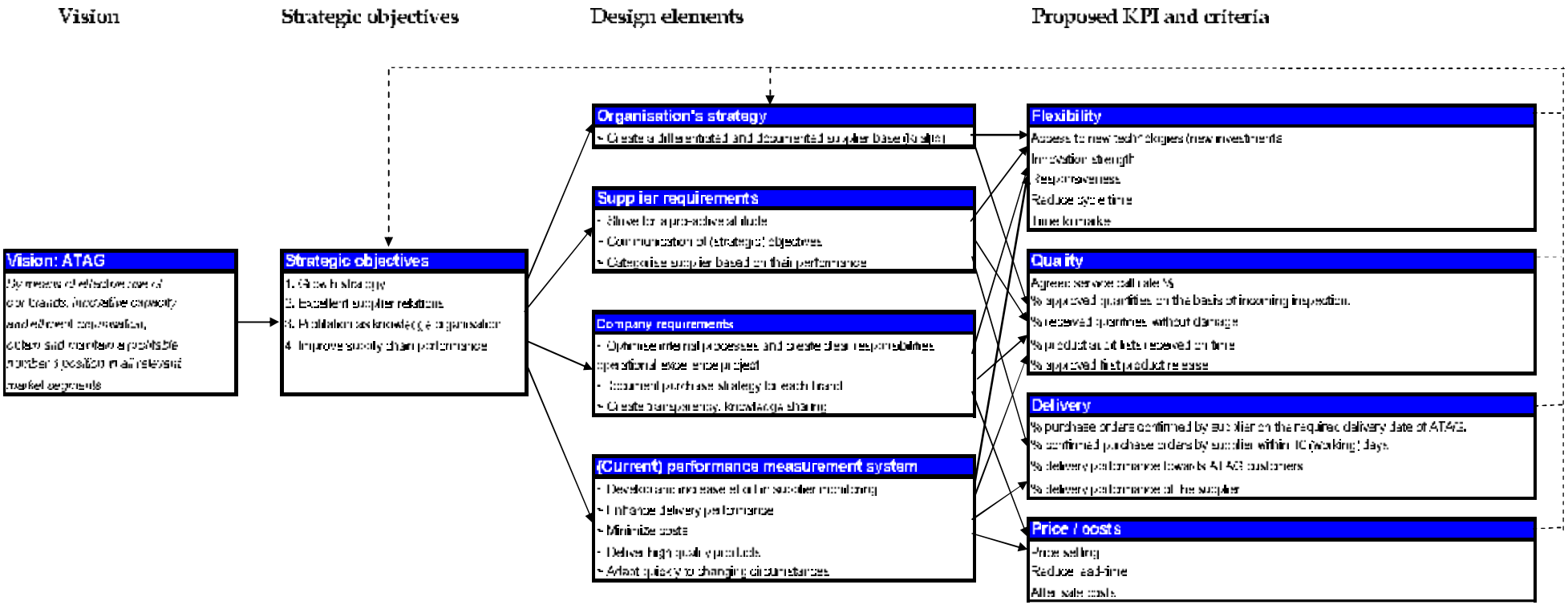


Figure: 8 Conclusion KPI and criteria based on the needs of ATAG.

6. Design of a vendor rating system

6.1 Introduction

This chapter focuses on the element '***design of a vendor rating system***'. An important part of this design is the determination of KPI and criteria. Therefore this chapter addresses research question IV ***"What is the outcome of the comparison between the current status of supplier monitoring of ATAG and the literature review linked with the needs of ATAG?"***

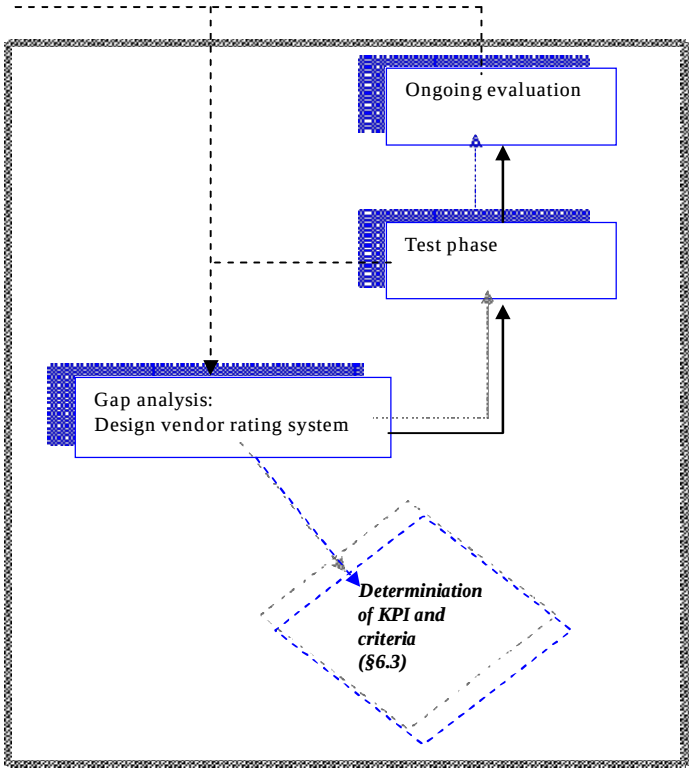


Figure 9 Design process vendor rating system ATAG.

The design process starts with categorising and discussing relevant KPI & criteria in § 6.2 and gives an overview of the KPI and criteria proposed by ATAG / suppliers and the literature, which results in a list of KPI and criteria that need to be closer examined. Therefore § 6.3 criticizes this list and results in a preliminary list of KPI and criteria for the vendor rating system of ATAG. Subsequently § 6.4 presents a customised design of a vendor rating system for ATAG. Because the time available for this graduation assignment is restricted, the "test- and ongoing evaluation phase" are not part of this research. These phases will instead be discussed in the recommendations, which are described in §7.2.1.

6.2 Relevant KPI and criteria

In chapter 4 & 5 various KPI and criteria are described. The question remains what these insights imply for the design of a vendor rating system for ATAG. Therefore this section discusses and compares the needs of ATAG with the insights from the literature.

The literature review has shown that the KPI and criteria of a vendor rating system should complement '***the organisation's strategy'***. The '***company requirements'*** subsequently determine the expectations or ambition level of the organisation with respect to supplier monitoring. Together with insights of '***supplier requirements'*** an overview can be created of the KPI and criteria.
As described in § 4.4.2 the literature proposes different KPI and criteria. Table 5 (performance criteria) showed an overview of frequently proposed KPI and criteria. When comparing the KPI of these authors, 4 KPI seems to be leading: quality, time, costs and flexibility. Nevertheless, the corresponding criteria show differences. These differences can be explained by the fact that the level of measurement

is different. Some criteria are on strategic level and other on operational level and this should be taken into consideration when determining the KPI and criteria. Besides the difference of measurement level it is important to be aware of the distinction between qualitative and quantitative criteria. Qualitative criteria (e.g. 'perceived quality') require more explanation and personal judgement than in comparison to quantitative criteria (e.g. 'cost of goods').

It can be stated that especially the criteria with respect to the KPI 'quality' have a qualitative nature. After all, criteria as 'overall customer satisfaction', 'conformance quality' or 'perceived quality' are difficult to express in quantitative figures and are based on personal judgements of different stakeholders. Regarding to the KPI 'time' can be remarked that it shows a parallel with 'delivery performance'. The authors propose criteria that correspond with each other and have many similarities with the delivery performance. Besides the KPI 'time' shows similarities with 'delivery performance', it shows also similarities with the KPI 'flexibility'. This is logical, because both terms are interconnected. When for example an organisation is able to adapt fast to changing demands, it can be labelled as flexible. With respect to the KPI 'cost' can be stated that it contains criteria that are made up out of all the possible costs incurred during the production and movement of products along the supply chain (manufacturing, service, transportation or material handling costs). Since costs consist primarily out of quantitative features, this KPI and its criteria are suitable to be included in a vendor rating system.

Nevertheless every organisation has its specific characteristics and competences and therefore the determination of criteria is a company specific activity. Insights purely from literature are not sufficient.

As described in the literature review the determination of KPI and criteria is a crucial phase during the design of a vendor rating system and should be based on cross-functional approach. Therefore this section gives an overview of the proposed KPI and criteria by multiple stakeholders. The procedure that is followed to come to this overview can be compared with the systematic procedure proposed by Yahya & Kingsman (1992) in § 4.4.2. In short the steps can be summarised as: select relevant stakeholders, present list of potential criteria to assess and combine insights in a 'final list'. This results in a list of possible KPI and criteria, which should be taken in consideration when designing a vendor rating system. The next step is to discuss and interpret these proposals and determine the KPI and criteria that are included in the vendor rating system (see § 6.2.2).

KPI	Criteria	
Quality performance	ATAG & Suppliers: Agreed service call rate % % approved quantities on the basis of incoming inspection. % received quantities without damage % product audit lists received on time % approved first product release	Literature: Perceived quality Conformance quality Forecast accuracy
Delivery performance	ATAG & Suppliers % purchase orders confirmed by supplier on the required delivery date of ATAG. % confirmed purchase orders by supplier within 10 (working) days. % delivery performance towards customers of ATAG. % delivery performance towards suppliers.	Literature: Delivery speed Frequency of delivery Delivery lead time Response time
Flexibility / time performance	ATAG & Suppliers: Flexibility rating Time to market Access to new technologies Responsiveness (Competences supplier) Innovation strength Design differentiation Exchange of information between parties.	Literature: Manufacturing lead time Conflict resolution Resource mix
Price / cost performance	ATAG & Suppliers After sale costs Lead time Price setting	Literature: Manufacturing costs Total delivered costs Material handling costs Transportation costs Cost reduction activities

Table 9 Overview of KPI and corresponding criteria ATAG and literature

Which consequences does table 9 have for the design of the vendor rating system? There are multiple potential problems when establishing performance measurement criteria. One of these problems was mentioned by Bourne & Neely (2003) '***large number of measures diluting the overall impact***'. This issue also applies to the situation of ATAG. It is important that the overall objective of a vendor rating system is kept in focus. This means that it is useless to measure criteria that provide no additional value. From the findings of the literature and also from employees of ATAG it became clear that it is for example more useful to measure 5 criteria valid and reliable instead of 15 criteria superficial. This principle was also stressed by Keki (1989) who stated that; "***the fewest possible number of parameters should be selected to meet the objectives of measurement. Too many measurements lead to too little action.***" This implies that a vendor rating system should remain 'easy' to use and that the energy to keep the system operational must be minimized. Moreover, the author stated that a vendor rating system should prevent administrative weaknesses caused by the fact that different departments interpret the same rating system in a different way. Commitment of all the departments involved is thus essential to prevent discussions and ineffective effort. There seems to be an inherent conflict between simplicity and accuracy in many rating systems. On the one hand performance measurement systems suppose to be easy to apply, but on the other hand the system must be comply with the requirements of multiple departments and translate their needs accurately.
Besides these considerations from literature, ATAG also raised certain conditions to a vendor rating system. When determining which criteria should be taken up in the vendor rating system, the following points of considerations are relevant:

- Top management desires to measure the performance of suppliers on a monthly basis.
- In order to generate reliable information, different departments need to share their knowledge.
- On behalf of top management supplier performance should at least be measured on quality and delivery aspects.
- The proposed KPI and criteria from ATAG and suppliers, contain both qualitative as quantitative measures.

In the following section, these points of interests will be taken into consideration by examining the proposed KPI and criteria. This leads to a proposal of KPI and criteria that will be part of the preliminary design of a vendor rating system.

6.3 Determination of KPI and criteria

The previous section described the KPI and criteria as proposed by literature and ATAG. In order to determine the KPI and criteria they have to be discussed on aspects like added value, feasibility, and frequency of measuring or responsibility. Though, before discussing these KPI and criteria of table 9, two remarks have to be made.

1. It can be stated that the KPI and criteria from literature are general and for a great deal already covered by the criteria proposed by ATAG. Keki (1989) stated that "***the measurements should be meaningful, fair, easy, and not subjective"***. Unfortunately the criteria mentioned within the literature do not fully meet these requirements. Many criteria are on a high strategic level and need to be translated into meaningful and objective criteria before they are useful for a specific organisation. This can be explained by the fact that the design of a vendor rating system is a company specific process. Despite that every organisation has its own characteristics and therefore determines its specific criteria, the insights from literature give direction to the determination of KPI and criteria. For example the criteria mentioned under the KPI quality ('conformance quality') can be translated into company specific criteria (e.g. the call rate percentage with respect to ATAG). Therefore the focus in the following paragraphs lies on the discussion of criteria that come from insights of ATAG and its suppliers.
2. One of the prerequisites of a vendor rating system is that the criteria should relatively easy be quantified in numbers as is stated by Van Weele (1997). He states that vendor rating should consist of "***standard, factual data, measuring on aspects of price, quality and delivery per supplier".*** Considering the proposed KPI ***flexibility***, the following remarks can be made. The criteria have a relative qualitative nature in comparison with the criteria from the KPI '***quality performance***', '***delivery performance'*** and '***price/costs***. Since the KPI ***'flexibility performance'*** criteria cannot easily expressed in quantitative figures, knowledge from different departments should be shared

(e.g. purchase, quality assurance, product management or product development), which requires clear responsibilities and coordination. When considering the characteristics of a vendor rating system, measuring supplier performance on a regular interval, it can be stated that the KPI and criteria are not very suitable to be included. ATAG desires to measure the performance of the suppliers on a more operational level and short-term interval. Criteria like '***innovation strength', 'time to market'*** or ***'access to new technologies',*** usually do not change in a short-term period. The KPI ***flexibility*** is therefore not part of further discussion.

6.3.1 KPI quality performance

The purchasers of ATAG negotiate '***the service call rate percentage'*** with the supplier. As already described the call rate percentage is calculated by the number of service visits of ATAG divided by the number of sold products over a certain period. This agreed percentage is a target that the supplier should meet. When the supplier does exceed the target, this has financial consequences.
The purchase department of ATAG establishes with each supplier call rate agreements, specified for every product group. This criterion measures each quarter of a year to what extent the supplier has achieved the agreement. With respect to the design of a vendor rating system it would too complex to monitor for each product group the established call rate percentage. Otherwise the rating will lead to a too complicated overview of data, because for example the number of call rate percentages can exceed 20 different types of products for a single supplier. Thus in order to generate on a high level the performance of the supplier, the mean of all the call rate percentages for each product group can be used. Subsequently the quality engineers calculate the actual achieved call rate percentages. The disadvantage of this method is that individual call rate percentage can fluctuate independently without influencing the mean score. Therefore the quality engineers, who calculate the call rate percentages for every product group (see appendix IX), should be held responsible for monitoring strong negative (or positive) percentages (§7.2.1 elaborates further on this point). An actual overview of the agreed call rate percentages with each supplier should be delivered by the purchase department, because they negotiate and settle together with suppliers the service call rate percentages. Currently there is no concrete overview that gives an actual insight in the agreed service call rate percentage for each supplier, which causes problems for finding efficiently the right numbers. Such an overview is important, because this percentage changes for each supplier periodically. The purchase department is recently started with mapping the agreed service call rate percentage into an overview. Another point of interest is the distinction between the net call rate percentage and the gross call rate percentage. The net call rate percentage is the figure that expresses only the service visits that can be claimed on the supplier and is thus a figure for which the supplier can expect a financial penalty in case of exceeding the agreed percentage. The gross call rate percentage on the other hand is calculated on the basis of all service visits, thus also when the supplier is not to blame. The net call rate percentage deserves thus the preference, because it is more accurate and can also be measured in a short-term period for each supplier individually.

The criterion '***% Approved quantities on the basis of incoming inspection'*** refers to the question; how many goods that are delivered to ATAG are in fact approved? As a consequence of capacity restrictions of ATAG (currently 1 incoming goods inspector) it is difficult to establish a realistic target for this criterion. An excellent score should reasonably be a score of 100 %, which implies that each delivered party is approved. Though, one could question if this is a realistic norm, because it is not possible for 1 person to inspect all incoming goods. The '***%Received quantities without damage'*** criterion focuses on packaging and outwardly visible damage. For example transport damage is currently reported by so-called non-conformity reports (NCR). By these reports the supplier or the shipping-agent for example can be held responsible for the caused damage. ATAG should strive obviously for a score of 100%, because all products should preferably be approved. Nevertheless it is practically not possible to inspect all received goods.
Despite management of ATAG wishes to measure '***% approved quantities on the basis of incoming inspection*** and ***% received quantities without damage'***, some disadvantages must be considered. One of these disadvantages is that for both criteria it is difficult to determine the targets. The main reason for this is that in the current situation 1 incoming goods inspector is occupied with this task and it is therefore impossible to control all incoming goods. With only 1 incoming goods inspector measuring these criteria remains an ad hoc activity and therefore it remains difficult to set realistic targets.

Another disadvantage is that both criteria are not independently measurable from each other and show similarities. After all, when a product is received with package damage the product will obviously not be approved.
Therefore these 2 criteria should preferably be replaced by the criteria called ***'the Q-index'***. The incoming goods inspector is administering information about the quality of received goods. In a so-called Q-index shortcomings of received products (on a random basis) are divided in A, B or C faults. Whereby an A-fault is critical, B-fault is dubious and a C-fault is minor. The index calculates a weighted score of the different identified failures of received products by a specific formula. At this moment the incoming goods inspector administers the Q-index and therefore it should be valuable to apply the present knowledge and moreover it gives a good overview of the quality of the received goods. Currently ATAG has established a target of >93. Nevertheless the test phase should point out if this is a realistic target. § 7.2.1 will further elaborate on the topic of target setting.

A ***product audit list*** is a final checklist set up by the product development department of ATAG and is carried out by the supplier at the final stage of the production. It can be considered as the alternative for incoming goods inspection for ATAG or as outgoing inspection from the perspective of the supplier. The difficulty with this criterion is that ATAG has not established a formal procedure for the supplier how to deal with product audit lists. For example, some suppliers send these lists by email others as attachment with the delivery and others do not fill in the product audit list at all. As a consequence, it is currently difficult to generate reliable data. This implies that there aren't set up any procedures for measuring these criteria. No agreements are determined how suppliers should fill in the product audit lists and when (each month, on request) to sent them to ATAG. Besides no current procedures, an additional point of consideration is that the criterion ***'% of product audit lists received on time'*** does not directly say something about the (product) quality. It could be that suppliers always sent the lists on time to ATAG, but not filled in completely or inferior. Therefore this criterion is not included in the vendor rating system.
The criterion ***'% approved first product release'*** measures the percentage of products, which are approved by ATAG in the case of a so-called 0-serie test. A 0-serie test is an inspection performed by ATAG when a new product is introduced or when adaptations to existing products are made. It verifies if a supplier can produce and deliver the product on the basis of the required specifications of ATAG. On the longer term this figure gives thus insight in the capabilities of a supplier. When for example a supplier always is successful during the 0-serie test, opportunities and confidence is created for product introductions in the future. Moreover with the historical trend of this figure the scheduled time for new projects can also better be determined. If a supplier has in the past structurally scored well on this criterion, than the lead-time of future projects can be adjusted to this fact. On the other hand when a supplier has problems with achieving a satisfying score, alternative suppliers could be considered when new products are initiated. Since ATAG does not measure this criterion at this moment, no guides for how determine targets are present. The most basic way to calculate this criterion is to determine a go or no-go moment. Thus an approved product of a supplier implies a score of 100% and when a product is rejected it will obviously score 0%. In practice a 0-serie test is also influenced by commercial pressure of other departments within ATAG. This implies that sometimes products are approved with notes and that minor adjustments are necessary. Clear agreements are essential in order to prevent discussions in the future. The calculation method is therefore not completely clear and should be sophisticated. §7.2.1 describes further considerations regarding the calculation method

6.3.2 KPI delivery performance

Top management of ATAG attaches high priority to measure the KPI ***delivery performance*** and its criteria. It can be stated that the data required to measure these criteria are relatively easy accessible by the application of computer software. The criteria are currently measured and expressed in quantitative percentages and monitored by the manager of the logistic department. The criteria are therefore not new for ATAG and can relatively easy be included in a vendor rating system:

- The criterion '***purchase orders confirmed by supplier on the required delivery date of ATAG',*** refers to the percentage of purchase orders confirmed by the supplier on the required delivery date of ATAG and gives thus insight in the extend a supplier enables to deliver the products on time to customers of ATAG.

- **Ø** ***'%confirmed purchase orders by supplier within 10 (working) days'*** measures in an objective way the percentage of purchase orders that is confirmed by the supplier to ATAG within the specified period.

The last 2 criteria '***%delivery performance towards customer of ATAG'*** and '***%delivery performance towards supplier'*** are interconnected. The first measures the delivery performance between ATAG and the customer and the last measures the same but than between the supplier and ATAG. Together they gave an overview of the delivery performance within (a part of) the supply chain

Despite the requirement of top management to measure these criteria, some remarks can be made. First of all with respect to the criterion ''***% purchase orders confirmed by supplier on the required delivery date of ATAG'.*** One must be aware that only a trend is being measured. This trend does not have any value without proper analyses that give further explanations of this figure. The figure does not show why suppliers haven't confirmed the purchase order, which could have numerous causes. A further analysis is thus required and is highlighted in the recommendation 'supplier roadmap' in § 7.2.1.

The criterion ***'% delivery performance towards customer ATAG'*** encounters a degree of resistance of employees of ATAG. From multiple departments and employees it has become clear that this figure is not suitable for a vendor rating system. This is caused by the fact that the supplier cannot in all cases be held responsible for a short falling delivery performance. ATAG must be aware of influences and causes that are for example caused by ATAG self or by the shipping-agent (e.g. traffic accidents, wrong handling, wrong forecast etc.). As a consequence, this figure could indicate something about the performance of the supplier, but ATAG has to be aware that the supplier cannot always be held responsible.

6.3.3 KPI price / cost performance

For both ATAG and the supplier it is essential to ensure competitive cost throughout the supply chain. Therefore the KPI '***price / cost'*** and criteria are determined in this paragraph. These criteria vary from quantitative (***after sale costs)*** to more qualitative criteria (***price setting)***. The criterion ***'after sale costs'*** measures the amount of costs products of supplier's causes after the products are sold to the customer. Van Weele (1997) named these costs external failure costs. The after sale costs consist out of the number of visits by a service mechanic of ATAG multiplied by a standard amount, added with costs like scrap and rework costs, warranty expenses of individual spare parts under warranty or inspection requirements. The after sale costs are administered by the service and QA department and gives insight in which supplier is causing the highest 'after sale costs' for ATAG. Since this criterion is not measured yet, no targets are established. Though, not every supplier is delivering the same quantity of products with the same purchase price to ATAG, which hinders comparison and scoring of suppliers objectively. Therefore the development of a standardized ratio or index supports direct comparison of suppliers. Monczka & Trecha (1988) initiated such an index relating the total cost to contract purchase price. Translated to this research the following calculation can be applied:

$$\text{Total after sales cost index} = \frac{\text{Purchase price + non-performance costs (after sale costs)}}{\text{Purchase price}}$$

The best rating will be 1.0. A higher index means a worse 'total after sales performance'. An internal benchmark between 'good and bad' performing suppliers and a test period can give insight in realistic targets (will be further discussed in § 7.2.1).

The criterion '***lead time'*** is linked with the inventory level of ATAG. The lead-time is the time between the start of the production of a product and the moment when it arrives at ATAG. It seems valid that when the lead-time is longer, the inventory of ATAG needs to be higher which increases the inventory costs. A product category (and logistic) manager has insight in the different lead-times of the products, in order to estimate the planning schedules for projects. Insight in (fluctuating) lead-time gives thus increased understanding of which supplier is causing high inventory costs. Moreover, regular insight in (fluctuating) lead-times makes timely interventions possible and prevents unnecessary costs. With respect to the criterion '***lead time'*** can be stated that this number is relatively easily accessible in the ERP system of ATAG. Although it is useful to gain insight the lead times of suppliers, the criterion can give difficulties when a supplier is producing multiple product groups with various lead-times.

'***Price setting***' refers to the general price level of a supplier. Because many suppliers deliver multiple products, the general price level of the supplier should be compared to the trend in the market. The purchaser and the product category manager can determine together if a supplier is offering a competitive price. Moreover, these both functions perform regular benchmark activities and they have thus already a profound insight in an acceptable price level. An aspect that has to be considered with respect to this criterion is the fact that there is a difference between agreements made with suppliers (by contract) and the capabilities of a supplier. This implies for example that for the criterion '***price setting***' agreements are settled on a yearly basis and a supplier cannot adjust these during the year. This does not match with the demand of monthly measurement; nevertheless '***price setting***' is an essential criterion to measure. After all, the products have to be sold at the most competitive price. In order to measure the price setting of a supplier, a realistic reference price should be established. Therefore multiple views are necessary to gain insight in market-, product- or supplier issues. There is thus an important role for the purchaser and product category manager, because their combined insight should lead to an objective reference price through benchmarking.
In short, this paragraph focused on the determination of the KPI and criteria that will be included in the vendor rating system. Table 10 gives an overview of the KPI and criteria that are included (Y / N) or which must be further adjusted and refined (H).

	Include in VRS (Y/N or Hold (H))	Remarks
Quality performance		
Agreed service call rate %	Y	* Actual overview of call rate % required (overview is recently set up)
% approved quantities on the basis of incoming inspection % received quantities without damage	H	* Only 1 incoming goods inspector * Target setting difficult * Substitute by Q-index
% product audit lists received on time	N	* No formal procedures available for supplier * No direct link with quality of products
% approved first product release	Y	* New criterion * Clear agreements nescessary regarding calculation and target setting
Delivery performance		
% in accordance with required delivery date of ATAG confirmed by supplier	Y	* Measure is available
% confirmed by supplier within 10 (working) days.	Y	* Consider the period of 10 working days
% delivery performance towards ATAG customers.	H	* Supplier cannot (always) be held responsible for bad performance, only internal use.
% delivery performance of the supplier	Y	* Measure is available
Costs / Price		
Price setting	Y	* Requires an objective-manufacturing price or reference price through benchmarking. * Requires knowledge sharing
After sale costs	Y	* New criterion * Attention for calculation method
Lead time	Y	* New criterion * Multiple product groups have different lead - times, consequences for target setting.

Table 10 Overview of determination of KPI and criteria

6.4 First design vendor rating system

To give an impression of how the vendor rating system is designed and should work, this section gives a presentation of the different parts of the vendor rating system. For a complete overview of the vendor rating system is referred to appendix XII.
The first design is build up out of 4 elements that together form an overview of the performance of an individual supplier. In this way this design can be considered as an action plan, which consists out of

4 parts: database, vendor rating cards (Quality, Delivery & Price / Costs), appendices with definitions of vendor rating criteria, overall performance supplier and the supplier profile.

1. Database

In order to minimize the energy in searching the required data that gives input for the vendor rating, 1 overall database is constructed in which all the relevant data is gathered. This overall database forms the basis to fill in efficiently the vendor rating system. The database contains thus all the relevant data that forms input for the vendor rating system. Each month the responsible department / person should deliver the required figures, so that the database can be updated. This database is visualised below in table 11.

Vendor rating ATAG Nederland	General information				Quality				Delivery			Price / costs		
Period: April 2008	Status supplier	# of deliveries received	# of deliveries inspected (incoming inspection)	Rank	Rejected [illegible]	Meet or Exceed?	Q index score	% Approved first product [illegible]	% confirmed by supplier within 10 (working) days	% delivery performance of the supplier (based on confirmed purchase order)	% purchase orders confirmed by supplier on the required delivery date of ATAG	Price setting	After sales	Lead time (in weeks)
Supplier 1		50	2	1	6%	Y	80	nvt	98%	99%	99%		nvt	2
Supplier 2		156	13	2	7%	N	96	nvt	99%	91%	98%		nvt	5
Supplier 3		51	10	3	4%	Y	76	nvt	100%	100%	87%		nvt	6
Supplier 4		23	11	4	8%	Y	55	nvt	80%	91%	95%		nvt	9
Supplier 5		23	55	5	8%	Y	80	nvt	80%	91%	95%		nvt	7
Supplier 6		23	4	6	8%	Y	98	nvt	80%	91%	95%		nvt	3
Supplier 7		23	6	7	8%	Y	92	nvt	80%	91%	95%		nvt	5
Supplier 8		23	15	8	8%	N	94	nvt	80%	91%	95%		nvt	7
Supplier 9		23	20	9	8%	Y	96	nvt	80%	91%	95%		nvt	6
Supplier 10		23	3	10	8%	Y	87	nvt	80%	91%	95%		nvt	4

Table 11 Data base vendor rating

2. Vendor rating cards

The database forms an overview of the data that is necessary to fill in the vendor rating system or the so-called vendor rating cards.

The essence of the vendor rating system is the vendor rating card for each of the specified KPI. With the help of these cards the scores on the KPI are calculated. Every KPI is made up out of multiple criteria. Subsequently it is possible to indicate different weighting factors to each of the criteria (column 'importance'). The second column displays the actual score on the criteria. These scores range from poor to excellent. In order to come to an objective vendor score, it is important that the meaning of every assigned score correspond to the shared perception of employees of ATAG. To realize this, for every vendor rating card is a distinctive appendix developed (see Figure 11). The literature review has shown that there are 4 techniques that assist in determining a vendor score: Categorical-, simple linear weighted average-, cost ratio method and analytical hierarchy process. When comparing these techniques with the first design of ATAG, it can be stated that this design shows the most similarities with the 'simple linear weighted average method' as described by Weber (1996). The design focuses on the performance of suppliers whereby supplier performance is rated on specific KPI and complemented with numerical weights to the criteria. As described by Weber (1996) the difficulty with this method is the determination of the weights to use, because it remains a subjective action. This first design does not give propositions with respect to weighting factors, because the organisation should firstly get acquainted with the KPI and criteria. Nonetheless, the technique is better suitable than the complex approaches like the cost ratio or analytical hierarchy process, because these

techniques require sophisticated knowledge about cost-accounting systems and statistical calculations. Management of ATAG expects on the other hand a relatively simple system in order to increase the continuity of the system.

Vendor rating Card

Vendor measure: Quality

Supplier		*Brand*			
Supplier number		*Product group*			
Date		*Rating period*			

Criteria Quality	**Importance**		**0**	*	**
Agreed service call rate %	Moderate	3	Excellent	2,5	7,5
Score Q-index	Moderate	3	OK	1,5	4,5
% Approved first product release	Moderate	3	Very poor		
			Vendor rating		12

* This column is the actual value assigned this rating.
** This column is the adjusted value of the rating based on the importance of the criterion.

Importance values	
Very high	5
High	4
Moderate	3
Low	2
Very low	1

Vendor score values	
Excellent	2,5
OK	1,5
Poor	0,5

Figure 10 Vendor rating card

As described by the definitions of vendor rating, a relevant aspect of a vendor rating system is to measure the performance of suppliers in an objective way. Therefore the criteria need to be defined in a standardized way. Below an example of the appendix for the delivery performance is displayed. Because target setting is not for each criterion straight forward, the scale for the criteria is divided in three alternatives (very poor, OK and excellent). Though, when the system develops the possibility for further sophistication of the scores remains open to for example a 5-point scale. The targets as displayed in Figure 11 are determined by ATAG. One could question if this is a suitable method. In order to create commitment and also to ensure that the targets are feasible other stakeholders (suppliers or customers) could be involved. As Verkaaik (2006) has stated, suppliers can propose valuable initiatives, because they know their own processes the best and know what relevant cost drivers are. § 7.2.1 discusses further on the aspect of target setting.

3. Appendices with definitions of vendor rating criteria

Delivery

Objective: The timely and flexible delivery of qualitative and quantitative required products and focused on the reliability of supply and flexibility.

% purchase orders confirmed by supplier on the required delivery date of ATAG.
Poor = < 97 %
OK = 97 - 99 %
Excellent = > 99%

% confirmed by supplier within 10 (working) days
Poor = < 97 %
OK = 97 - 99 %
Excellent = > 99 %

% Delivery performance of the supplier
Poor = < 97 %
OK = 97 - 99 %
Excellent = > 99 %

Figure 11 Appendix Delivery performance

4. Overall performance supplier

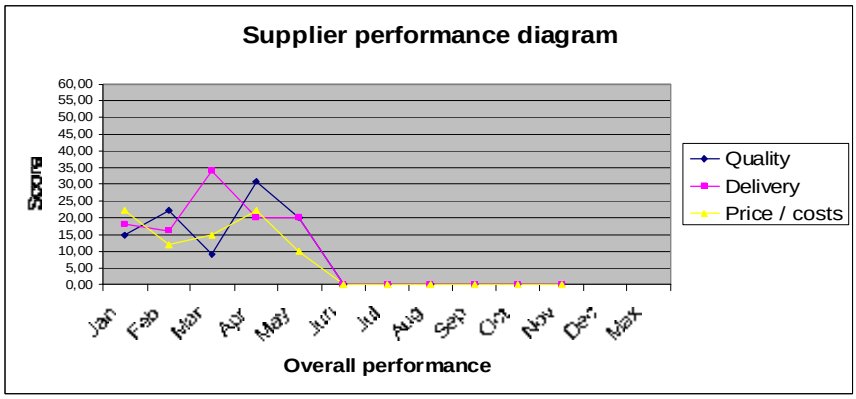
When the vendor rating cards are filled in, the scores are summarised in a management overview. Besides information of the supplier, the total scores are of each KPI are listed for each month. These scores are subsequently put into a supplier performance diagram, which visualises the mutual differences between the KPI-scores. In short, this part of the vendor rating system shows on a high level the performance of the supplier:

Vendor rating ATAG Nederland B.V.

Supplier		*Brand*	
Supplier number		*Product group*	
Date		*Rating period*	

1

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Quality	15	22	9	31	20	0	0	0	0	0	0	
Delivery	18	16	34	20	20	0	0	0	0	0	0	
Price / costs	22	12	15	22	10	0	0	0	0	0	0	
Total	**55**	**50**	**58**	**73**	**50**	**0**	**0**	**0**	**0**	**0**	**0**	



Definition of supplier:		Score
Strong positive	Solid provider of strategic products, services or solutions **Action: Continue investments**	>60
Positive	Demonstrates strength in specific areas, but is largely opportunistic **Action: Continue incremental investments**	35-60
Promising	Shows potential in specific areas, however, initatives or supplier has not fully evolved **Action: Watch for change in status and consider scenarios for short- and long-term impact**	20-35
Caution	Faces challenges in one or more areas **Action: Understand challenges in relevant areas; Assess short and long term benefit / risk to determine if contingency plans are needed**	10~20
Strong negative	Difficulty responsing to problems in multiple areas. **Action: Exit immediately**	<10

Figure 12 Vendor rating ATAG Nederland; overall supplier performance.

Subsequently the vendor rating system gives an overview of the status of the supplier by illustrating a supplier profile (Figure 13). The KPI are specified in criteria and by means of colour indication is visualised if a supplier is performing according initiated (improvement) plans of ATAG.

Supplier Profile

		Agreed improvements	Status
Quality	Agreed service call rate % Q-index score % approved first product release		
Delivery	% in accordance with required delivery date of ATAG confirmed by supplier % confirmed by supplier within 10 (working) days. % delivery performance of the supplier		
Costs	Lead time After sale costs Price setting		
	Green: Action according to plan **Yellow**: Action not according to plan; corrective actions started **Blue**: Action defined; not started yet, timing agreed **Red**: Action not according to plan, no confidence in realization		

Figure 13 Supplier profile

6.5 Conclusion

This chapter addressed research question IV: ***"What is the outcome of the comparison between the current status of supplier monitoring of ATAG and the literature review linked with the needs of ATAG?"***

Chapter 3 described the current situation of supplier monitoring, chapter 4 presented a design process based on the insights of literature and chapter 5 illustrated the needs of ATAG regarding a vendor rating system. Based on the insights of these gained insights, this chapter has presented the preliminary design of a vendor rating system customised for ATAG. From the literature review and the needs of ATAG multiple KPI and criteria were identified. The KPI and criteria with respect to '***flexibility***' is not included in the vendor rating system. The reason for excluding this KPI and criteria is that it is focused on a strategic level, consists mainly out of qualitative criteria and can only be measured on a long-term interval. The KPI and criteria that are included in the vendor rating system are displayed below. The criteria with an ***H*** (hold) are not included in the first design, but could after adjustments or considerations in the future become part of the system. Besides the KPI and criteria also a proposition of the responsible persons / departments, calculation method and frequency of measuring are given:

	Include in VR system Y/N or Hold [H]	Responsibility	Calculation	Frequency of measuring
Quality performance				
Agreed service call rate %	Y	* Calculation QA deparment * Updating overview purchase department	Net call rate percentage (See appendix IX)	Quarter of a year
% approved quantities on the basis of incoming inspection % received quantities without damage	H	* Substituted by Q-index * Incoming goods inspector (QA)	Internal calculation method available	Monthly
% approved first product release	Y	* Incoming goods inspector (QA)	Percentage of products that is approved.	Monthly
Delivery performance				
% purchase orders confirmed by supplier on the required delivery date of ATAG.	Y	* Logistics department	Calculation in Diver (computer software)	Monthly
% confirmed by supplier within 10 (working) days.	Y	* Logistics department	Calculation in Diver (computer software)	Monthly
% delivery performance towards ATAG customers.	H	* For internal report only * Logistics department	Calculation in Diver (computer software)	Monthly
% delivery performance of the supplier	Y	Logistics department	Calculation in Diver (computer software)	Monthly
Costs / Price				
Price setting	Y	* Purchaser * Product category manager	Market price is reference, judgement based on insights from purchaser and product category manager.	Yearly
After sales costs	Y	* Purchase department	After sales index	Monthly
Lead time	Y	* Product category manager	Determination based on historical experience, figures available in ERP system.	Quarter of a year

Table 12 Overview of responsibilities, calculation and frequency of measurement.

These KPI and criteria are taken up in the first design of a vendor rating system for ATAG. For a complete overview of the vendor rating system is referred to appendix XII. The design consists out of a structured action plan with 4 elements:

- Ø The overall database: 1 Document in which all the bases data is gathered and which forms as input for filling in the vendor rating cards.

- Vendor rating cards: Score cards for the 3 KPI. For every criterion a score and weighting factor can be determined which results in a final vendor score on each of the 3 KPI.
- Appendix: In order to score the criteria on an objective basis, shared understanding of the rating possibilities is required. These appendices give therefore indications of the targets on each criterion.
- Overall supplier performance: Shows on a 'high level' and longer-term period the overall performance of a supplier on the 3 KPI in terms of a visual overview. The supplier profile gives per supplier an overview of the KPI and criteria and the status of (possible) improvement programmes.

7. Conclusions and recommendations

Looking back at the research, it can be concluded that the research objective "***gaining insight in ATAG's supplier monitoring, in order to design a vendor rating system that measures supplier performance as a basis for corrective and preventive actions regarding the product and process quality"*** is largely achieved. Since the system is not operational yet, results of the vendor rating system (corrective and preventive actions) are not available. Nevertheless, the completion of this graduation assignment has contributed to place supplier monitoring higher on the management agenda within ATAG. The research has resulted in an improved perception of supplier monitoring within ATAG and that it is not just the implementation of a tool, but entails relevant strategic choices and considerations. This chapter highlights the conclusions of the research. Subsequently a number of recommendations for ATAG and future research possibilities are discussed.

7.1 Conclusions

During the research a vendor rating system customised for ATAG is designed. This has been achieved by applying insights from the literature on the practical situation of ATAG. By comparing the current status of supplier monitoring of ATAG (IST) with the desired design requirements from literature combined with those of ATAG (SOLL), an answer is given to the central research question: ***"How should a vendor rating system that enables ATAG to monitor the performance of its suppliers be modelled, in order to control and improve the process and product quality"?*** This will be illustrated by presenting the conclusions with respect to the research questions.

What is the current status of supplier monitoring within ATAG?

The current supplier monitoring system of ATAG consists of 2 methods: the SAQ method and the call rate technique. Although the research has shown that the methods have potential, it can be concluded that supplier performance measurement can and should be complemented and adjusted in order to improve the product and process quality. With respect to the current methods can be concluded:

- There is no procedure for sharing the outcomes of the SAQ's to all relevant actors.

In the current situation results of the SAQ's are 'only' administered, without further initiatives or action plans. Both the literature review as the needs from ATAG have shown that supplier monitoring is a cross-functional activity. This implies that multiple departments of ATAG must be able, but also willing to consult the outcomes of the SAQ's. Therefore in the current situation this method has little added value.

- The SAQ 2 encounters complications and therefore lacks sufficient commitment to become completely operational.

The SAQ 2 method suffers from perception differences of employees and therefore the method lacks sufficient commitment. Thereby the method is not completely objective, because of missing weighting factors. The design of a vendor rating system is thus a needed improvement and addition in order to measure the performance of suppliers on a regular basis. Thereby, the supplier profile that recently is developed as replacement of the SAQ 2 should be further sophisticated in order to audit suppliers over a longer term period.

- The call rate technique is a well-developed method for controlling the product quality, but remains a management control system.

Call rate analyses form the basis for corrective actions and improvement plans. It can be concluded that the method is based on a methodology that provides both ATAG as well as the suppliers with valuable information with respect to the product quality. Though, it remains a method that is designed by ATAG and causes financial restrictions for suppliers in case of decreasing performance. Therefore the possibility exists that the analyses of call rate information causes discussion on detail level, which should be prevented in order to achieve the overall objective of this technique.

How should, according to literature, a vendor rating system be designed?

The literature review has highlighted the domain of performance measurement and focused on a specific part, namely the design of a vendor rating system. The research has adopted the following

definition of vendor rating: ***A performance measurement system that measures on regular intervals supplier performance on specific key performance indicators as a basis for corrective and preventive actions regarding the product and process quality.***

This definition indicates with the notion of 'specific key performance indicators' that the design of a vendor rating system is an organisation specific process. This is confirmed by the fact that multiple authors have addressed the topic of vendor rating, but the focus lies primarily on the techniques for calculating vendor scores. With respect to these calculation techniques must be remarked that they often consist out of difficult statistical methods and do not give attention to relevant design steps prior to these calculations. Before an organisation actually can start with vendor rating, it should be aware of the expectations or requirements of the organisation and other stakeholders. Consequently an important conclusion is that the literature does not prescribe a 'best practice' for designing a vendor rating system. Nevertheless the literature review presented several design elements, which should be taken into consideration in order to increase the chance for a successful design. Figure 14 shows on a high level the design process as is concluded from the literature review. In this research the last 2 steps ('Test phase' and 'ongoing evaluation phase') are not part of the research. The recommendations in § 7.2.1 give attention to the question which steps ATAG has to take in order to test and evaluate the vendor rating system as presented in this research. Important to emphasize is that these 2 steps is not the ending of the design process. Learning experiences contribute to a continuous refinement of the system, since it influences again the other design elements.

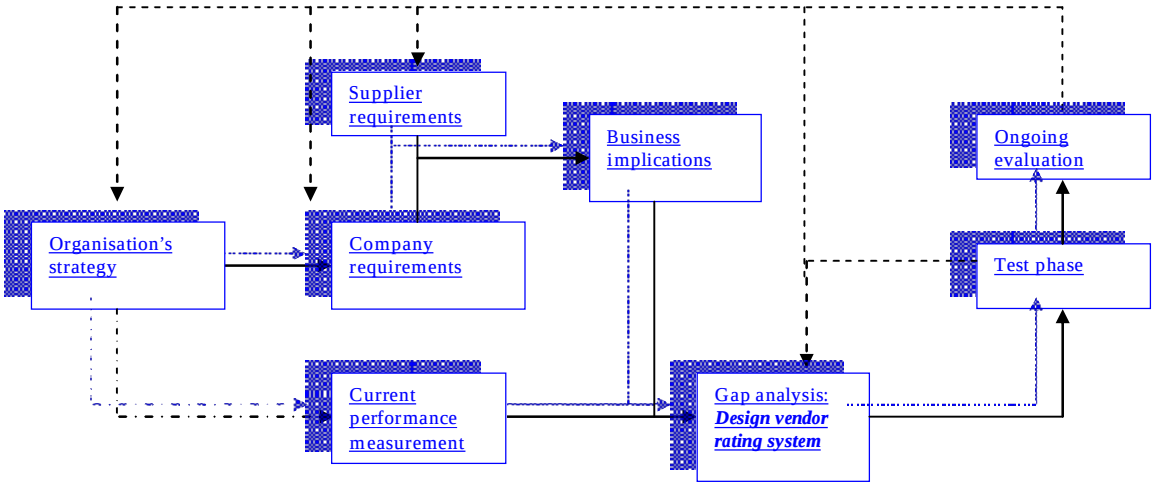


Figure 14 Conclusion design process.

Based on the design process, what are the needs of ATAG with respect to supplier monitoring that forms the basis for the determination of KPI and criteria?

Figure 14 functioned as basis for determining the needs of ATAG. The design process showed that a vendor rating system is a tool based on cross-functional insights.

Organisation's strategy

The organisation's strategy forms the basis of the design of a vendor rating system. During the internal analysis it became clear that the strategy of ATAG is focused on customer intimacy. This implies that the following objectives are relevant in relation to the design of a vendor rating system:

- Ø Clear strategy differentiation for each of the 3 brands, which is documented and shared throughout the organisation.
- Ø Focus on the core competences: knowledge & technology.

These needs of ATAG formed the basis of the determination of the KPI and criteria in order to comply and achieve these objectives.

Company requirements

The expectations and demands of different functional departments are categorised under the label of company requirements. It can be concluded that ATAG has in the current situation insufficient insight

in the supplier base. The causes can be found in a lack of knowledge sharing and documentation of purchase strategies. The following company requirements were therefore highlighted:

- Ø The need of a well-defined purchase policy & strategy.
- Ø Knowledge sharing throughout the organisation regarding supplier related issues.
- Ø Measure supplier performance on a regular basis based on integral insights (vendor rating).

Supplier requirements

The literature review has shown that the design of a vendor rating system is not purely based on internal insights. Insights of other stakeholders will increase the commitment towards the system and thus also the continuity. The following supplier requirements were discussed:

- Ø Pro-active attitude towards supplier monitoring, focus on preventing quality issues.
- Ø Communication of (strategic) objectives.
- Ø Categorise suppliers based on their performance and get better insight in the supply base.

Business implications

The above described needs of ATAG have implications for the direction and choices the organisation has to make with respect to the design of a vendor rating system. In other words, the business implications describe why supplier monitoring is relevant for ATAG and form the basis of the preliminary design by giving direction to the determination of KPI and criteria.

Design element	Needs of ATAG	Implications for design vendor rating system
Organisation's strategy	§ Clear strategy differentiation for each of the 3 brands, which is documented and shared throughout the organisation. § Focus on the core competences: knowledge & technology.	§ ATAG's production-independent approach requires high priority for supplier monitoring. § More accurate supplier selection and evaluation is essential in order to achieve competitive advantage.
Company requirements	§ The need of a well-defined purchase policy & strategy. § Knowledge sharing throughout the organisation regarding supplier related issues. § Measure supplier performance on a regular basis based on integral insights (vendor rating).	§ Supplier monitoring improves insight in supplier base with respect to communication, supplier relation, power balance or cooperation. § Measuring supplier performance requires a cross-functional approach.
Supplier requirements	§ Pro-active attitude towards supplier monitoring, focus on preventing quality issues. § Communication of (strategic) objectives. § Categorise suppliers based on their performance.	§ Constant feedback and information about the performance of suppliers stimulates a pro-active attitude. § Supplier monitoring should improve the level of information sharing

Table 13 Conclusion business implications

What is the outcome of the comparison between the current status of supplier monitoring of ATAG and the literature review linked with the needs of ATAG?

From the ***business implications*** came forward that the production-independent approach of ATAG requires supplier monitoring. These implications are compared with the current initiatives of supplier monitoring of ATAG and thus served as basis for the actual design of a vendor rating system. An important part of this design was the determination of KPI and criteria. These were determined by comparing insights from literature and needs from stakeholders. After discussed the proposed KPI and criteria, the following are included:

Quality performance	Delivery Performance	Price / costs
Agreed service call rate %	% purchase orders confirmed by supplier on the required delivery date of ATAG.	Lead time
Q-index score	% Confirmed purchase orders by supplier within 10 (working) days.	After sale costs
% approved first product release	% Delivery performance of the supplier	Price setting

Table 14 Conclusion KPI & criteria

The bold criteria visualises new measures for ATAG or those for which are not developed guidelines to measure them. This implies that for these criteria no targets are established, or that these targets are based on estimations. Through learning experiences can be determined what a 'good versus an inferior' score is. The learning cycle is thus important in order to sophisticate and maintain commitment for the system. § 7.2.1 further elaborates on this learning cycle.

The vendor rating system enables ATAG to measure the performance of its suppliers in an objective and regular way. When a supplier fails to meet quality, delivery or price / costs requirements, additional costs are incurred by ATAG to correct these deficiencies. By establishing a vendor rating system related to supplier non-performance, issues associated with inadequate quality, delivery and costs can be identified in a relatively early stage. Supplier ratings are recorded monthly on a so-called vendor rating card and visualised in a supplier performance diagram. These can in the future be sent to all suppliers, but firstly it is important to get the measurements on a reliable level so that the system:

- Measures effective the supplier's actual performance and its continuous improvement efforts.
- Compares supplier's performance on an objective basis.
- Gives constant feedback to ATAG as well as to suppliers, which motivates to achieve superior performance.

7.2 Recommendations

This graduation assignment has contributed to the design of a vendor rating system based on scientific and practical insights. The final section will give recommendations in order to further develop the application and implementation of the vendor rating system.

7.2.1 Practical recommendations

In order to optimise the vendor rating system, different recommendations are formulated. This paragraph proposes a number of recommendations ATAG has to consider in order to complete the last 2 steps of the design cycle.

1. Be alert with the use of outcomes of the vendor rating system towards suppliers.

It is important to consider that a vendor rating system is not 'a judgment tool'. ATAG must therefore be alert with communicating the outcomes of the measurements towards suppliers and use the vendor rating system as basis for constructive feedback to suppliers. The reliability and validity of the criteria need to be on a high level before any form of bonuses can be assigned to suppliers. In order to achieve a reliable system, ATAG should 'just start' with measuring the performance of its suppliers. Therefore it is recommended to make a selection of 15 suppliers of the supplier base and measure for these suppliers the performance on the settled KPI and criteria. This selection of suppliers should consist out of 'good' and 'bad' performing suppliers and be determined by different departments (QA, logistics or purchase). The advantage of selecting a relative small number of suppliers is that less suitable suppliers are excluded and the energy is focused on optimising the vendor rating system.

2. Create and maintain a comprehensive system that does not lose the overall goal of vendor rating.

In order to prevent many discussions about figures and numbers, the complexity of the system and the outcomes should be minimized. This implies that the vendor scores should be well founded with valid arguments. Of course not each calculation of the criteria can be explained in detail to all stakeholders (call rate percentage or Q-index), but the supplier must get the feeling that what ATAG is measuring is based on facts and objective data. Thus 'beautiful graphs and figures' without proper analyses and background information is useless. Again, this means that the content of the vendor rating system must be reliable. The overall objective of a vendor rating system should not be forgotten and therefore other stakeholders (suppliers or customers) should be informed in a comprehensive way in order to create a win-win situation.

3. Create clear responsibilities and commitment.

Commitment for the vendor rating system is essential. Again, the attitude of all participants should be constructive, thus how can ATAG together with the supplier tackle 'the problem' in order to create a win-win situation for both parties. On of the biggest challenges for succeeding the designed vendor rating system is that the responsible persons deliver the required data. As addition on the proposed responsibilities in chapter 6 and to prevent unambiguous agreements, the following responsibilities need to be considered:

- The responsible purchaser has to ensure that supplier feedback will be distributed internally to departments involved, since they have intensively contact with suppliers. It is not realistic to expect that the purchaser is completely informed about all the aspects of quality, delivery or price / costs and therefore knowledge sharing with other departments is essential. The next recommendation will further elaborate on this aspect.
- In consultation with the director operation and the QA manager, the senior quality engineer will be occupied with processing of the data. This does not imply that he is also held responsible for gathering the data. After the data is processed he reports the results to the manager QA, manager logistics and the purchase department. Together they should assess which department or employee will be occupied with a possible improvement plan. Thereby it seems most logically that the improvements plans are initiated by the department in accordance with the KPI and criteria.
- KPI Quality performance has to be maintained en reported by the QA department. An important role is for the incoming goods inspector who becomes responsible for administering the criteria ***Q-index*** and ***% approved first product release***.
- KPI Delivery performance becomes the responsibility of the logistic department. Since the measurements of these criteria are already present, it should be relative easy to generate the required information.
- KPI Price / costs becomes the shared responsibility of a product category manager and a purchaser.

This includes that employees have to put effort in the development of the system and should assist in thinking along on preconditions like information- and communication technology, user-friendliness of the system in daily practice etc.

4. Improve knowledge sharing and strive for continuous improvement

ATAG should strive for continuous improvement. The design of a vendor rating system is only the beginning. The creation of figures and numbers should not become an objective. When the information on the KPI are gathered and processed, the next step becomes relevant. What to do when a supplier shows a declining trend on a KPI or criteria? This should be the starting point of further investigation and the development of improvement programs, analyses, communication with supplier etc (see previous recommendation). Thus the implementation and sophistication of the system should not be underestimated. A very important aspect in order to achieve continuous improvement is knowledge sharing. Each department has its own vision regarding the performance of suppliers, but when this is not shared with the remaining organisation the learning capabilities will be limited. Knowledge sharing also assists in recognizing weak aspects of the internal organisation. After all continuous improvement implies also that ATAG should be aware of the weak aspects of the internal organisation. It is easy to blame the supplier for inferior quality or bad delivery performance, but the supplier cannot always be held responsible. Communication problems, insufficient product specifications, wrong forecasts, shipping problems etc. are examples of aspects on which the supplier has no influence. Therefore it is recommended to:

- ***Organise every quarter of a year a 'supplier meeting'.***
  This meeting should be attended by participants from each relevant department of ATAG (purchase, QA, product development, product management, logistics etc). During these meeting important issues with respect to supplier monitoring can be discussed, like the evaluation of the vendor rating system or strategic issues (What does ATAG expects from their suppliers?) Discussions on individual supplier level should be prevented, instead a helicopter view should be adopted in order to improve supplier monitoring within ATAG.
- ***Develop 'supplier roadmaps' for each supplier.***

Create for each supplier an individual file that administrates all relevant activities and communication between ATAG and supplier. The big advantage of such a 'supplier roadmap' for each supplier is that purchasers can quick and easily assess the required information when negotiations with suppliers are taking place. Besides, it prevents miss-communication when various persons of ATAG have contact with employees of the supplier. This requires commitment of multiple departments, because they must feel responsible to cooperate in order to keep these 'supplier roadmaps' up to date. This commitment can only be achieved when departments feel responsible, but also when they get feedback of (positive) results. Therefore it is recommended to provide all employees that have frequent contacts with suppliers with a copy of the outcomes of the vendor rating cards.

In order to present an overview of the test phase, the following action plan is presented. It shows the main activities and responsibilities that will be important to (continuous) improve the first design of the vendor rating system.

Test phase Vendor rating ATAG
Select 15 suppliers from supplier base, by QA and purchase department
Start measuring supplier performance * Inform responsible employees
Month 1 * QA collects and processes data from responsible 'KPI (criteria) owners' (last week of the month) * Create management overview
Month 2 * QA collects and processes data from responsible 'KPI (criteria) owners' (last week of the month) * Create management overview
Month 3 * QA collects and processes data from responsible 'KPI (criteria) owners' (last week of the month) * Create management overview * Management compares vendor scores and highlight positive / negative trends > initiate improvement plans by responsible 'KPI (criteria) owner'. * Organise 'supplier meeting' : helicopter view / evaluation
Month 4 * Implement and adjust KPI and criteria as a result from 'supplier' meeting (responsible 'KPI (criteria) owner') * QA collects and processes data from responsible 'KPI (criteria) owners' (last week of the month) * Create management overview * Management compares vendor scores and highlight positive / negative trends > initiate improvement plans by responsible 'KPI (criteria) owner'.
Month 5 * QA collects and processes data from responsible 'KPI (criteria) owners' (last week of the month) * Create management overview * Management compares vendor scores and highlight positive / negative trends > initiate improvement plans by responsible 'KPI (criteria) owner'.
Month 6 * QA collects and processes data from responsible 'KPI (criteria) owners' (last week of the month) * Create management overview * Management compares vendor scores and highlight positive / negative trends > initiate improvement plans by responsible 'KPI (criteria) owner'.
Evaluation meeting with participants of all relevant departments (top management, QA, Purchase department, Product Management, Logistics departement, Product development) * Discuss advantages / disadvantages of KPI and criteria * Add, remove or refine criteria * Evaluate targets on criteria * Evaluate improvement initiatives * Continuous improvement

Figure 15 Test phase vendor rating system

5. Pitfalls and considerations

As described in this research supplier monitoring has a high priority within ATAG. The design of a vendor rating system was also a comprehensive choice. Nevertheless, as already stated in previous

recommendations, supplier monitoring is process of continuous improvement. The vendor rating system as presented in this research is therefore not 'finished'. ATAG should be aware of certain pitfalls and considerations with respect to the determined KPI and criteria:

KPI Quality

- With respect to ***the Q-index*** criterion can be stated that at this moment a score is calculated for the total supplier base. Therefore the measurement on supplier level should be considered as a new measure. Nevertheless with an adaptation in the formula, it is according to the senior quality engineer possible to convert these scores into a score on supplier level. During the test phase the QA department should measure the performance of suppliers in order to get feeling with the figures and numbers, which will lead gradually to improved and realistic targets. An internal benchmark between 'good versus bad' performing suppliers can assist in setting these realistic targets.
- The measure ***'% approved first product release***' is a new measure for ATAG. This implies that there is calculation method or targets established yet. ATAG should therefore determine targets by learning experiences. The test phase could give useful insights in what realistic targets are. Besides target setting, a remark must be made about the calculation method. During the research it has become clear that in some cases commercial pressure lead to approval of products that have not fully past the 0-serie tests. For example B-faults are in sometimes approved, sometimes not. At this moment there is not a 'solution' how to deal with this practical issue. Therefore it is recommended to make clear agreements, for example during the test phase, about how to deal with these exceptions.

KPI Delivery

- The criterion ***'% delivery performance towards customer ATAG***' encounters resistance with respect to the liability. Therefore the criterion is not included in the vendor rating system, because suppliers cannot be held responsible for the outcome of this measurement. This implies that outcomes should not be communicated towards the supplier, without the certainty that the supplier can be held responsible. Since customer satisfaction is essential for both ATAG and suppliers measuring this criterion is valuable but only for internal use.
- With respect to the criterion ***'% confirmed purchase orders by supplier within 10 (working) days***' can be questioned why this is based on 10 working days. For (only) a confirmation of a purchase order, 10 working days seem to be a relatively long period. Perhaps is a shorter period is also sufficient and gives advantages? Recommended is thus to investigate if 10 working days is the most favourable period for giving supplier the opportunity to confirm a purchase order.

KPI Price / costs

- The difficulty with this KPI is that many price and cost aspect are covered by agreements for a longer period, namely in contracts. Therefore a supplier not changes its prices until new negotiations are taken place. The criterion '***price setting'*** can thus not be measured on a short-term basis, but on a yearly basis. The (yearly) price negotiations of the buyer of ATAG with suppliers could on the other hand serve as a perfect moment for discussing the performance on a longer term. Besides evaluating the performance of suppliers, the information sharing also enhances the supplier relation.
- Since the criterion '***lead-time'*** differs for several product groups, it is difficult to measure the lead-time on supplier level when a supplier delivers multiple product groups to ATAG. Again it is difficult to give a solution for this restriction, because no measurements are performed yet. But for those suppliers delivering multiple product groups it is recommended to set up different targets or to differentiate the lead-times for the different production locations.

Target setting

- As already described during the research and here under the topic 'pitfalls and considerations', target setting is not an easy activity. Especially when the organisation has no experience in measuring a criterion, it is hard to set realistic targets. Though, exact and precise targets are of course ideal and the ultimate goal of a vendor rating system, it is not a necessity

to start with measuring. 'Learning by doing' is therefore an important recommendation. Thereby not only internal insights of ATAG could give useful results, but also insights from customers or suppliers. For example, ATAG is expecting a delivery performance of 98% of its suppliers, but what are the expectations of customers? Perhaps they are also satisfied with a alternative percentage? In short, also target setting is a process of continuous improvement and should be influenced by insights from multiple stakeholders.

7.2.2 Future research possibilities

During the research it became clear that it is quite difficult to design a vendor rating system, based on insights from the literature. The main reason is that the design of a vendor rating is a company specific process. With respect to this design process it is remarkable that the literature on vendor rating is focused on the relatively complex statistical methods to calculate a vendor score. These techniques require in the most cases complicated computer software and knowledge in order to keep the system operational. For many organisations starting with vendor rating, not the statistical techniques to score suppliers will be the main point of interest. Instead these organisations have to organise and inventorise the needs and desires of all relevant stakeholders, before these relatively difficult statistical methods are useful. Therefore it should be interesting to investigate how other stakeholders can be included during the design process. By including for example customers and suppliers in the design process, you can be sure you are developing a system that fits your customer's needs and at the same time taking advantage of your supplier's knowledge. With this in mind it is interesting how the design process should be organised? What should be the level of cooperation etc.?

An important conclusion in the research was that the outcomes of the vendor rating system should (in the beginning) be used for internal use only. The information resulting from the vendor rating contains financial, but especially non-financial information. The communication of non-financial information to external parties has to face 'barriers' due to missing measurability and objectivity. It can be stated that information for financial criteria is dominated by quantitative data whereas information on non-financial criteria is often qualitative. Moreover, even if non-financial performance can be measured within vendor rating system, the company might not disclose this information because it might be interesting for competitors and could harm the company's competitive position. Further research on how non-financial performance measures can be assessed on comparability and reliability would be interesting. How can organisations deal with these dilemmas of external reporting in order to create commitment with external parties? Which measures can be taken in order to protect company specific information and on the other hand inform stakeholders with useful information?

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