

# Investigation of Performance Management of Small and Medium Enterprises in the Aviation Maintenance Repair and Overhaul

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## Abstract

This abstract describes the research undertaken to investigate Performance Management for small- and medium-sized enterprises in the Maintenance Repair and Overhaul sector. An evaluation is performed of the three most common performance management approaches found in the literature. This evaluation resulted in the identification of a process, which is used for this investigation. The data that is collected from the participating companies is analysed using hypotheses. These hypotheses are based on the answers we need for our research questions and the interview guide we set up. By using hypotheses the research questions can be answered in a structured manner. At last the companies are compared to each other and benchmarked to determine their performance. This research is part of a two year research and is done in close collaboration with the process optimization research.

## Nomenclature

|     |                                   |
|-----|-----------------------------------|
| MRO | = Maintenance Repair and Overhaul |
| SME | = Small and Medium Enterprise     |
| PM  | = Performance Management          |
| PI  | = Performance Indicator           |

## I Introduction

This research investigates the current situation of Small and Medium Enterprises (SMEs) in the Aviation Maintenance Repair, and Overhaul (MRO) environment with regard to performance management.

Since 2008, SME's that perform Maintenance Repair and Overhaul (SME MRO's) in the aviation industry are affected by the economic crisis and have been having difficulties achieving cost- and lead time reductions in order to cope.

It is argued that characteristics such as lack of resources, and low product volumes, which can be associated with SME's together with the unpredictable nature of the MRO industry, make it increasingly difficult for these companies to effectively incorporate existing process improvement initiatives. Several SME's involved in Aviation MRO have therefore started a collaboration with the Aviation Research Programme of the Amsterdam University of Applied Science in a two-year research initiative. This two year project has as a main goal to provide SME MRO's with ways to improve their performance and offer a comprehensive toolkit for process-improvement. The related main question

of this research is: *What are the opportunities for SME MRO's given their specific characteristics, to improve and consolidate their performance.*

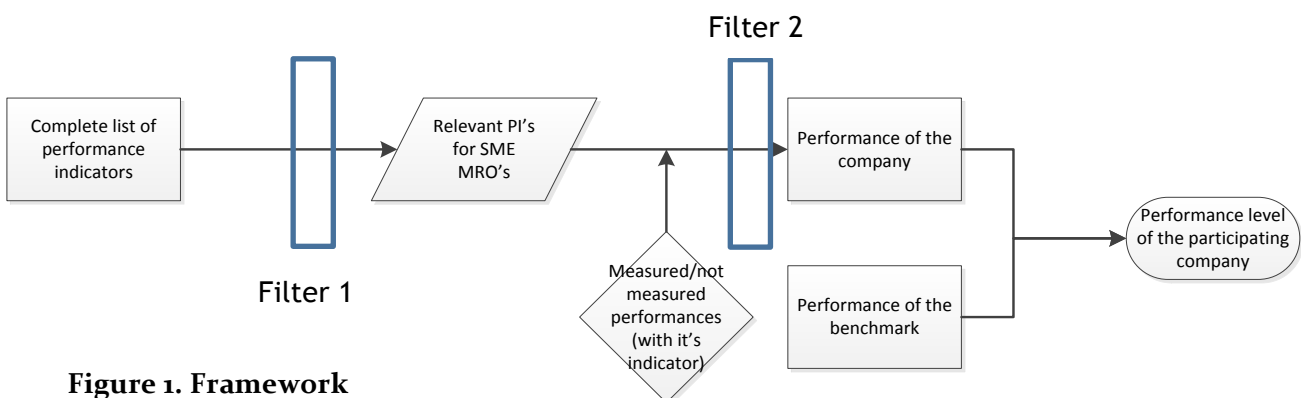
In the first phase of this two year initiative, two separate researches are being carried out simultaneously and in close collaboration. These researches should give a clear review on the current situation of the participants. One research focuses on process improvement methods currently in use at the companies and the other research focussing on which and how performances are currently measured and how the participants could improve their insight in their own performances. These results will be necessary to monitor any improvement further on in the project. This data can be compared with measurements in the future to prove the accomplished improvement. This particular research focuses on the current performance of participants and effective ways of determining this.

### A. Problem definition

To eventually measure the improvements of the whole research at the companies, it has to be determined what the current performance level of the participant is. Insight in how the performance level is determined, what the performance level is and how a company performs compared to other participants and benchmarks should give the participant tailored performance measurement methods to assess their current situation and improvement potential.

#### - Framework

With a clear problem definition, a framework can be established. The framework and this research can be divided into several steps. The first part of the research consists of a literature review on performance measurement and management methods. The second part is the data gathering part of the research where information will be gathered at the participant. During the third part is the analyses where the gathered data will be elaborated and eventually compared with benchmarks. This will lead to the “performance level” of the participant.



**Figure 1. Framework**

The aim of this study is, to establish the current performance level of the participant, to benchmark and compare the performance levels with each other. To achieve this, a framework is made to guide the research into the right direction. The framework consists of six steps and represents the flow of the research. The first step is performing a literature study, where a complete list of performance indicators (PIs) is generated. The complete list of PIs is filtered (filter 1) on the relevancy for SME MRO characteristics. After this part of the research, the data

gathering at the participant takes place. The second filter stands for the comparison of the data gathered at the companies and the data from the literature. This comparison will be carried out by answering the hypotheses. The result will be a list of PIs which the company do measure and don't measure and, from the literature, which PIs they should measure. With this data, the companies can be benchmarked with similar companies with outstanding performance in specific areas. This will lead to the "performance level" of the participant.

- **Research questions**

When the problem definition and framework were established, four research questions were defined. These research questions give an answer to the main question of the first phase. The research questions are:

1. What are the relevant performance indicators for this industry?
2. What is the current performance level of the participant?
3. How is the performance measured at the participant?
4. How does the participant perform in relation to benchmarks?

- **Theoretical background**

To be able to give companies insight in their performances, a method to measure performances and a method to present these performances have to be found. There are many performance measurement and management methods for different types of organisations. After reviewing different management methods, like: the "Balanced Score Card" (BSC), the "European Foundation for Quality Management" (EFQM) method, and the "Instituut voor Nederlandse Kwaliteit" (INK) model (Wu, 2009), (Lambalk, 2011) we found out that there's a wide body of variables per company and that every method affects every aspect differently. The most commonly used method is the BSC (Kaplan, 1992). The BSC uses, like many other methods, KPI's as method to indicate a performance level. These KPI's are subdivided into four company segments; customer, financial, internal and learning and growth. With the KPI method in mind we searched literature for suitable KPI's for SME MRO's (Muchiri, 2010) (Parmenter, 2007) (Hudson, Smart, & Bourne, 2001) (Lebas, 1995) (Moullin, 2003).

Another result from the literature is that SME's are best helped with a simple performance measurement method (Lambalk, 2011). We choose to use the KPI part of the BSC together with the four segments to keep the performance measurement as simple as possible.

The basic KPI's which are applicable for the participant depends on the specific characteristics of SME MRO's. Beside these KPI's we strive for specific KPI's per participating company based on the mission, vision and strategy and the characteristics of the specific company.

## II Method

We used the quantitative research method for our case studies at the participants. All the data that is gathered during our visit is analysed, to figure out what the current performance level is of the participants.

### A. Research

During the case studies, we used three kinds of data gathering methods. We held semi-structured interviews at different layers in the company. By using this strategy an overall view of the entire organisation is created. Every level gives its own insights about the performance of the company. The number of levels is dependent of the company, but we strived to interview all the layers from top management to the technicians. The topics of the interview are:

- Strategy and objectives
- Measuring methods and area's (customer, internal processes, finance and learning and growth.
- The performances

Beside the interviews, we strive to get as much data from the company, as possible. Documents like, specific process lay-outs, a company lay-out, information about an already used measuring method, we made a findings list with remarkable and usable information that was not discussed during an interview and doesn't stand in the documentation and we did some participative observations.

We gathered data about different company processes, company structures, performance measuring methods and performances. However in most of the cases it will be very hard to determine a performance level, because there are no PI's or other data available or presented to us. Specific data is mostly confidential data which most of the companies are not willing to give. We used a non-discloser agreement to guarantee confidentiality but without success.

### B. Data analysis

The collected data from the interviews is transcribed and sorted together with the findings and the collected data such as PI's or other documents. All the obtained data is compared with the data from the literature study to find the current performance of the participating SME MRO.

This research depends heavily on the data that the companies share with the researchers, from basic information to confidential information. More specific data will give a more extensive overview of the company which will result in a more suitable performance measurement method for the company. Less data can result in a recommendation less effective.

### III Results

All the data that is collected by these methods is analysed. However Currently all the data is being analysed and will be tested with hypotheses. These hypotheses are the connection between our research questions and the gathered data. All the data we gathered from the participants using our interview guideline and findings list will answer the research questions.

The hypotheses are:

- The mission, vision and strategy is linked to the KPIs
- The mission, vision and strategy is known to everyone in the company
- The company objectives are linked to the mission, vision and strategy
- The company has specific objectives for the company, department and employee
- Objectives are defined by external companies (benchmarks)
- KPIs are balanced on finance, internal processes, and customer development
- KPIs are SMART (Specific, Measurable, Achievable, Realistic and Time-bound) defined
- The KPIs of the company match our defined set of KPIs
- There is one single system to measure and report KPIs.
- KPIs are used to indicate whether there are problems in the process
- The company performs optimal compared to benchmarks
- A company that uses KPIs, performs better than other companies that do not have KPIs

At the end of this first phase we will delivery every participant their performances level according to these hypotheses and other companies and benchmarks. Beside the performances we also want to deliver a set of KPI's that the participants should measure. This should help them knowing their own performance.

### V. Literature cited

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