Operational Excellence in Supply Chain Management
- Using a Holistic View and Key Performance Indicators
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Abstract
This article presents the recommended improvements to increase the efficiency and effectiveness at the department of Procurement and Supply (P&S), Ericsson Mobile Platforms. The improvements include new and changed measurements to achieve increased transparency and traceability through the supply process, new operational way of working for example with failure analysis, and new tools to simplify the analysis documentation. Theories related to the improvements are described briefly in this article.

1. Introduction
The master thesis [1], which this article is based on, was carried out at Ericsson Mobile Platforms in Lund, Sweden, and at the Department of Industrial Management and Logistics, division of Engineering Logistics at Faculty of Engineering Lund University.

Ericsson Mobile Platforms (EMP), which is a unit within Ericsson, delivers platform technology to mobile handset developers. Because of the short product life cycle on mobile phones, EMP’s delivery performance and supply reliability is crucial. In order to keep control of the supply process EMP established performance measurements. The measurement system used today has been used since the beginning of 2008. The objective to start measuring on the EMP internal performance and their suppliers’ performances has been to increase the control of the supply process and to be able to proactively work with improvements and changes in the supply set-up.

2. Problem Description and Purpose
2008 was the first full year of using the established measurements and therefore EMP sees it as important to evaluate whether the measurement system has the correct focus, if all important steps of the process as a whole are measured and the right information is gathered.

The purpose of the study is to "create a foundation for improvements regarding efficiency and effectiveness in the flow of goods and information, and the way of work within the supply process". The main areas of focus through the study has been to secure Operational Excellence in Supply Chain Management through using KPIs, “way of working” and information flow, and to establish a foundation for improved process control.

3. Method
Relevant literature was studied to build a frame of references for further work.

In order to create a detailed view of the organisation of the P&S the authors mapped the whole supply process. From this holistic stage the decision of concentration on the supply process and its measurements was taken.

The authors’ findings and recommendations have been stated through gap analysis and logical reasoning on the outcomes of
interviews, surveys, EMP internal data sources and literature studies.

4. Theory
Several theories and philosophies were used to identify weakness and possible improvements of the supply process and the operational work within P&S. These are described below.

4.1 Measurements
The measurement is a wide concept and in this study the below described areas are the most used/important ones.

4.1.1 Purposes
There are seven different purposes with measurements; Look ahead, Look back, Motivate, Compensate, Roll up, Cascade down, and comparison. To secure a stable foundation of measurements in large organisations all these purposes should be considered.[2]

4.1.2 Performance measurements
The performance measurement tells the company how well they perform compare to the targets. There are several purposes why business performance should be followed up. For example measurements can be used as a warning bell for potential problem. The Performance measurements can be used on Strategic, Tactical and Operational level. Common for all levels is that the independent measurements shall not be counterproductive. When designing a measurement system each step shall be measured but important to consider is that the process as a whole must be measured. The whole process can perform as target even if one part does not.[3]

4.1.3 AHP
AHP, Analytic Hierarchy Process, is an approach to structure the decision making through par wise comparison. The AHP is Based on multiple-choice criteria into a hierarchy where each criteria’s importance relative to the other criteria’s are ranked.[4]

4.2 Supplier relation
4.2.1 Bensaou model
The Bensaou model describes which relation a company should have with its suppliers. The model classifies/categorises all suppliers and each category have its own strategy how the relation should be carried out.[5]

4.2.2 WRI - Working Relation index
WRI is a ranking system that describes how well a company's relation to a supplier is performing. The Index concerns 5 areas, Relationship, Company Communication, Company Help, Company Hindrance and Supplier Profit opportunity. The index helps the company to receive long-term competitive advantages with its supplier.[6]

4.3 Process framework
Theoretical framework regarding Process mapping and Process analysis has been used through the study. The theoretical framework chapter in the master thesis report[1].

5. The situation as if today

5.1 Order process
The study identified the Supply process as two separate flows of material. One for ASICs[1] and one for PCBs (printed circuit board). The ASIC flow starts when the P&S receives the BOM (Bill Of Material), which includes information about which components that need to be ordered to a specific project. The PCB flow starts when P&S receives the CAD-DATA, which describes how the PCB needs to be manufactured. In the end of the process the two process flows merge in a prototype factory where the ASICs are mounted on the PCBs.

5.2 Measurements
The P&S uses measurements to measure the performance of different areas within the department but only the ASIC measurements

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1 ASIC = Application Specific Integrated Circuit (ASIC) is the name for an integrated circuit (IC) design with a specific functionality
are reported in the monthly report (MR). The reason that only the ASICs are reported in the MR is because of the ASIC's strategic importance.

The P&S have one measurement that measures the departments overall performance. This measurement is designed and compiled on the performance of some of the other measurements but not all of them.

5.3 Departments way of working

5.3.1 Root cause analysis
The P&S does root cause analysis on failures in the supply process. The department uses the 5-why methodology to find the final root cause. P&S has stated the first level of categories to simplify the analysis workload.

5.3.2 PO LOG file and system tools
The P&S designed and developed in the end of 2008 a new order book system called PO LOG file. The excel based system is wide and for example the measurements are calculated and reported through the system.

5.4 Supplier survey
A supplier survey was conducted in order to find areas of improvements in the operational relation between P&S and the suppliers. The survey was based on theories of WRI- and Bensaou-model theories. The survey was sent to the most important suppliers.

6. Findings and recommendations

6.1 Order process
The study found that there is a poor transparency of the information in the supply process and the information regarding the ASIC/PCB performance cannot be traced through the whole process. In the ASIC flow there are two major gaps where the information is poorly transferred or not transferred at all. In the PCB flow there is full transparency but the two flows are not connected to each other. These poor connections result in no knowledge of which specific component that is mounted a specific PCB. In figure 1 the big arrows visualise the material flows and the cracks visualise the lack of information transparency.

![Figure 1, Supply process as if today](image)

The analysis showed that the performance in some areas predicts the performance of later stages in the order process. Therefore it is important to fill the information gaps in the process.

The target for the Supply process was to erase the information gaps and to increase the control of the process. This target was achieved through the measurements changes and through standardisation of the documentation of the basic data from which the measurements are calculated. These improvements are further discussed in Measurements chapter. Figure 2 shows the supply process with the improvements the authors stated.

![Figure 2, Supply process with improvements](image)

The information transparency increases with the stated improvements, which enable traceability and the process control can be achieved.

6.2 Measurements
Through the empirical study the authors found that not all areas where measured and reported. Even that the measurements were...
measuring single activities instead of the whole process was an important finding. The first improvement the authors stated was that the PCB process shall be measured and reported as ASIC. It is not necessary that both process flows have the same set up of measurements but the measurements that are used need to be comparable to each other.

To erase the information gaps in the supply process and to secure that the P&S achieves full control of the supply process, changes in existing measurements and new measurements were established in both process flows. To enable the improvements of the measurement system, the documentation of the underlying information were improved and standardised.

There were found that the P&S performance measurement only considers some measurements in the ASIC part of the supply process. To increase the process approach, instead of the single activities, of the measurement system the authors included all important measurements from both PCB and ASIC. Two measurements were designed; One that also considers the previous departments' performance and one without this consideration. The new overall performance measurements reflect a more correct picture of the P&S's performance. The included measurements' internal importance within the new overall performance measurements is weighted through using the AHP methodology.

6.3 Departments way of working

6.3.1 Root cause analysis

The authors stated sub categories, the second level of categories in the 5 why methodology, in the root cause analysis. This standardisation of categories and sub categories simplifies the analysis work for the employees.

The authors also designed a new document for the root-causes documentation. The document compiles all root cause information regarding all measurements in one document. To be compared with the old documentation there each measurement had a document. The new document simplifies the workload and increases the transparency of failures and subsequence failures can more easily be identified.

6.3.2 PO LOG FILE

There have been guidance and requirement specifications in the design of the PO LOG file. The guidance has been stated to secure that the changed and new measurements can be used, and the fulfilment of the process can be achieved.

6.4 Supplier survey

P&S has a satisfied operational relation with their suppliers. To summarise and generalise the findings from the survey; EMP thinks the operational relations are satisfied and the suppliers perceive the relation as better than the EMP employees perceive the relation.

7. Result

The authors increased the number of measurements in the supply process to secure that the whole process is measured. The target to measure the whole process is achieved through a standardisation of the underlying data documentation. The standardisation is important and because of the standardisation a few old measurements needed to be redesigned to fit into the new measurement system.

New measurements to measure the overall department performance have been established. The new measurements consider the entire process compared to the old one, which did not. The conclusion of the improvements and the new measurement system is that the process approach increases and the focus on single activities decreases.

These measurement improvements and the improvements of the operational way of working, for example root cause analysis and the new order book system, ensures an efficient way of handling the information and the control of the supply process can be increased.
References


