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Benchmark and best practice of IFaCOM industrial demonstrators

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Abstract

Benchmarking and best praxis are a part of the concept of Total Quality Management (TQM). To make a good product or production processes system it is often focused on the working performance efficiency. Best practice or Benchmark is methods to focus on the best possible method to understand working processes, systems and performance ability. KPI's (Key Preformats Indicators) are measureable goals in all companies, this to align business activities to the vision, strategy and goals both in companies and project organizations.
To achieve optimal effectiveness in large complex projects we are dealing with the execution of strategic and operational management and decisions throughout the projects lifecycles. A project is a living organization and use of change management and continues improvement techniques over the lifetime of the project will lead to improved project management and goal achievements.
The EU-Project IFaCOM (Intelligent Fault Correction and Self Optimizing Manufacturing systems) has five end-user demonstrators where Zero Defect Manufacturing (ZDM) solutions are to be implemented. How to deal with un-certainty within the manufacturing processes for reaching near zero defects, in both product and process perspectives, is the main goal for the IFaCOM project. The ZDM framework is a quality controlled process system. The IFaCOM project uses ZDM concepts for manufacturing improvement. The added value for quality improvement is both a part of the continuous process improvements and the continuous improvement of product value to the costumer. Benchmarking and Best praxis methods will be used on the IFaCOM industry demonstrator implementations.

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Keywords: Benchmark; Best practice; Change management; Six Sigma and ZDM Concept

1. Introduction

To make a good product or a good production processes system it is often focused on the working performance efficiency, best practice or benchmark are methods to focus on the best possible method to understand working processes, systems and performance ability. [1]

Measuring performance ability is often an excellent argument of economical matter and in most companies and project visible goals. [2] So when it comes to benchmark of achievements it is often more complex to compare measurable goals with other type of criteria. To benchmark your own company against highly rated companies is often wrong, since your company doesn't have the same possibilities in resources and capital. However, it is possible to split some of their best business cases in smaller parts and then see where there are best achievements.

Where to look for the right documentation and structure this is a best practice will be important and it's also mentioned as one of the best methods to define best in class. You have to find the right questions to ask that can compare structured processes in own business. To make use of lean techniques and six sigma approaches are also among the necessary steps in such processes, and critical achievement factors can be made as checklists of how to stepwise improve working processes. [3]

In the last several years there have also been focused on change management. The management processes are led by the top management of the company. This means that the responsibility for changes of old control systems- and processes to find deviations that can lead to defect product and processes, are led by the owners of the strategic goals. Management that makes the right strategic decisions and implementations of changes as continuing stepwise processes, has larger influence on the strategic process flow in their company and therefore also more successful in implementing their goals. [4]

Changes of mindset and working procedures are important issues to make quality work visible for the workers in the shop-floor and in the value chain. Process improvement

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will be a permanent part of the company's culture and quality system. In an ideal plant this is shown as six different phases in the following Figure 1.

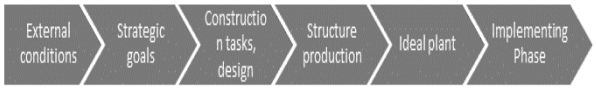

Figure 1: Development of productions systems.

When you look at today's manufacturing processes, factory and shop floors, we are aware of the processes and machines that are improving. But we can still see that the human operators, not always are comfortable with their own skills and ability to work with the new high speed systems and data technical functions. The processes have often such a high speed that small operating procedures or written documentation are not good enough for training the personnel. Quick reactions, visible signs and learned skills are necessary to guide the workers in right directions.

It is here the IFaCOM project can do possible changes, as a large scale EU-project across two different manufacturing sectors. It will through the demonstration implementations be possible to achieve new information of how to deal with complex projects in an industrial environment and to benchmark the industrial demonstrators at the implementation phase.

2. IFaCOM Demonstrators

The main goal for the project IFaCOM is to reach near zero defect manufacturing. The ZDM framework is shown as a quality control process system that has some main loops and will be the most important in the "built in" system for rating quality of products, processes and services. The zero defect concept are not new and "Philip Crosby" a quality guru defines quality as" conformance to requirements". [5]

The IFaCOM project started to use the ZDM concept for finding quality parameters that needs improvement. In this research project with 5 industry demonstrators it is a different way of thinking of how to meet the costumer's expectation. The added value is often described as a part of the continuous flow process; however it is also a part of the continuous improvement of value to the costumer. One of the key benefits of the customer satisfaction indexes is that this is a uniform and comparable system of measurement, if we look apart from typical statistical methods this gives us the possibilities to measure a systematic benchmark of the cases in the project over time and across firms.

In a complex project this is difficult issues, due to the fact that some of the companies have to protect their IPR, however no one in IFaCOM are directly competitors and therefore this process could be added value for each of the companies and their customers.Retrieving and presenting information

During system knowledge modelling it would be ideal for the users of the system to check all the information available at the moment of taking a decision. Since a lot of information is available within the simulation application environment, including product requirements, machine specifications, scheduling information and process information, it is very difficult if not impossible for the stakeholders to review all the information available.

At best, stakeholders are limited to searching and gathering the information, which is required. This can be done by searching different databases where information is stored, searching the internet for information about machine requirements or searching email archives for supplier communications. This said the simulation application stakeholders may not always be aware that information is available and accessible for them to search.

This problem has been further exaggerated with the advent of Industry 4.0 and the internet of things. In the smart factory, [8] cyber-physical systems will be continuously collecting data from the shop floor that may be relevant to the factory planner who is reconfiguring a plant layout.

This data from the real factory will be available together with data being generated by the simulation application tools in the virtual factory during the factory planning process. These combined activities generate a very large data set that is difficult to store, access and analyse. Therefore it can be concluded that the smart factory paradigm brings along the challenges associated with Big Data, especially in the decision making stages [9]. Data management and information retrieval will therefore become an essential element of the factory planning process.

This said factory planning stakeholders cannot continuously be presented with large amounts of available information to process. This is because human stakeholders are limited by their mental brain capacity in what is defined as the human brain's working memory [10]. Only information which is of high relevance to the task and decisions currently being made needs to be presented to the stakeholders, otherwise there is the risk of information overload.

3. Characteristics of benchmark

3.1. Best practice and Benchmark

One of the most important points of benchmarking processes is to identify areas that can be significant improved by adapting or matching other systems that are better. The literature identifies some of the most important reasons why organizations need benchmarking processes to rate and improve their activities. [6 - 7]

To meet the customer requirements, industry has to adapt best practice from each other's. Surveys of requirements for your company are therefore necessary. To define a best practice or the best guideline concept is to put together teams with cross disciplinary background. Rating your competitiveness is meaningless if you do not find the gap between best and average, also in the weak areas of your businesses.

To set realistic indicators or parameters for your company which are achievable for linking the customer requirements and proven best practice. Implement internal organizational practice and processes, make SWOT and stakeholder analyses that are available for the whole organization, as a "bottom up" approach, all must be aware of internal processes. Changes of internal culture in an organizations takes time and areas that needs continual improvement for making productivity growth