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DYNAMIC TEAMWORK WITHIN A LEAN ORGANIZATION

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ABSTRACT

Many manufacturing companies operate in a competitive and in part unpredictable market. This is illustrated by shorter product life cycles, decreased forecast accuracy within the supply chain and often new releases of products. In addition, the total amount of output and the work description are strongly fluctuating. Rigid organizations face significant challenges if they are unable to manage targets correctly and rapidly with all value stream processes. Such situations lead manufacturing firms to pass Lean Production Systems concepts on to other business divisions, such as growth and operation. The aim is therefore the creation of a Lean Enterprise which allows for the overall consideration of all processes across the whole value stream. Through this detailed process orientation all participants in the entire value chain can be connected together. Therefore it is important to consider both internal and external stakeholders. This can be regarded as one basic consideration for optimal coordination. Approaches that allow all processes within a Lean Organization to be dynamically organized have not yet been developed. Considering this subject, this paper extracts and describes an approach to the processes of all units across the entire value stream to decide objectives of the corporate enterprise strategy. Additionally processes can be modified rapidly to cope with competitive and volatile markets. Thereby a complex integration of all operations can be realized within a Lean Enterprise.

1. Introduction

The essential success factor for future enterprise production in global competition is the ability to customize all enterprise processes to the customer,

in which a flexible process design needs to be considered. Besides that, it is important to continuously develop certain business processes to prevent waste. With that aim in mind, effective businesses operate according to Lean Production Systems concepts. The modified circumstances, however, induce companies to pass the Lean Production Systems concepts to other units of enterprise. Many companies are working on the launch of a Lean Enterprise to develop a well-coordinated overall system which considers the entire enterprise.

A Lean Enterprise's goal is to increase cost efficiency across the entire enterprise and at the same time provide the consumer with the necessary quality and an ideally individual product in the shortest time possible [1]–[3]. To this end, high demands are placed on a company's goods, procedures and organisation. To prevent local changes, the implementation of a well-coordinated overall structure, which considers the entire organization, is important for a business. In general, besides the manufacturing dimension, product production, distribution and operation, as well as administration, must be considered. All actors can be connected together through a detailed process orientation along the entire value path. Approaches that allow all processes within a Lean Organization to be dynamically organized have not yet been developed. Considering this subject, this paper extracts and describes an approach to the processes of all enterprise units across the entire value stream to decide objectives of the corporate enterprise strategies. Additionally processes can be modified rapidly to cope with competitive and volatile markets [4]–[6]. Thereby a complex integration of all operations can be realized within a Lean Enterprise.

1. Structure and composition of a lean enterprise:

The general structure or architecture of such a Lean Organization is shown in Figure 1 according to DOMBROWSKI et al. accordingly, the Lean Business architecture includes a Lean Development System, a Lean Manufacturing System, and a Lean Sales and Service System. Leadership and culture (Lean Leadership) and consideration of administrative processes (Lean Administration) are important for Lean Organization to be effectively implemented. All in all, the overall structure needs to be aligned with a company’s cultural, ecological, and social objectives.

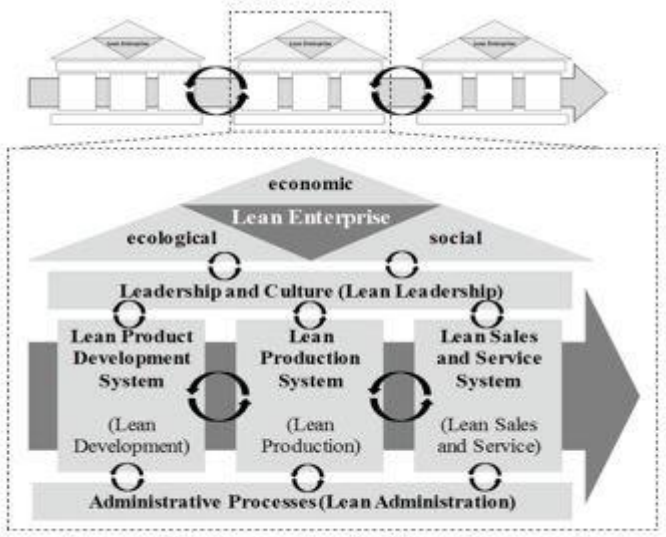

Figure 1. Elements of a Lean Enterprise

For a better understanding, the mentioned elements of a Lean Enterprise are will be characterized more precisely below:

The Lean Product Development Framework is a company-specific guideline for principles, practices and techniques based on an appropriate theory and organizational culture for the systematic and sustainable nature of the processes of product production. This helps change drivers to be met with due consideration of the operational, staff and economic aspects [7]–[12]. Lean Architecture is composed of seven concepts according to DOMBROWSKI et al. These include standardization (1), visual management (2), aim alignment and management of workers (3), flow and pull (4), zero faults (5), front loading (6), and quality improvement (7). As described at the beginning, the Lean Production Strategy is "an enterprise-specific, methodical system of rules for the continuous orientation of all business processes towards the customer in order to achieve the goals set by the management of the enterprise." The goal is development alignment with the consumer, waste management as well as quality improvement to ensure sustainable growth. Lean Production Systems concentrate on production and assembly processes as well as support processes such as maintenance and repair management, human resource management, logistics and quality control, both in research and industrial practice. There are eight principles differentiated in VDI- Guideline 2870 for improving performance. Which include standardization (1), the zero defect theory (2), the flow theory (3), the pull principle (4), quality improvement (5), task alignment and management of workers (6), visual management (7), and waste reduction (8).

In the field of Lean Sales and Service Systems, the highest regular interaction between customer and company occurs. Services are largely intangible tasks. And there is no land- or owner Therefore the company will increase the quality of its products if, in addition to the primary product, they provide customer-oriented services. The Sales and Service serves the company towards the consumer and will be able to determine the best possible customer demands. Customers are thus increasingly demanding on punctuality, the availability of

spare parts or even the product's image. A clear structure can be accomplished with the implementation of Lean Sales and Service, starting from product production via fabrication to service. Relationship transaction between supplier and consumer. The service may therefore be linked to a physical object. The goal, for that matter, is to increase the added value for the customer while at the same time reducing waste in company processes. Organizational, personnel and economic factors have to be addressed for this reason.

Stringent enhancement of business processes, reducing waste or increasing added value are also relevant topics for the introduction of Lean Production Systems. However, in the sense of Lean Production Systems the employee's position changes dramatically, so a new form of leadership is required. Lean Leadership defines a modern form of leadership that has the superior aim of expanding the Lean Manufacturing Method to a learning organization, which constantly enhances itself and its processes. Thus Lean Leadership is aimed at achieving long-term employee growth with the effect of higher customer satisfaction. The Lean Leadership is based on 5 values, according to DOMBROWSKI et al. In addition to a culture of change (pursuit of perfection), executive and employee self-development is also significant.

In addition, a holistic process-development goes hand in hand with a holistic employee-development, and it is also important to qualify the employees in Lean Leadership. Additionally, it is important to consider the place where value is generated, the so-called "Gemba." The last principle is goal-oriented management that includes all measures to achieve consistent and well-coordinated goals for all employees at all levels of hierarchy. Lean Administration is a variant of Lean Management which aims to reduce waste in process support or administrative processes. Non-value-adding activities must be removed in the light of Lean Management if they are not necessary to achieve the process efficiency. Therefore administrative tasks should be that in general. The types of waste in administration processes are similar to the types of waste found in manufacturing. These include over-production, inventory (files), and excessive transport, waiting time, inadequate computer systems, excessive movement and quality deficiencies.

Based on the study of DOMBROWSKI et al., four main elements of a Lean Enterprise can be identified that must be considered for the creation and implementation of a Lean Enterprise:

1. Consideration of all units of the entire value chain, within and outside the organization itself, 2. Consideration from multiple stakeholders with a particular interest interpretation,

3. Any implementation of lean concepts, processes and instruments,

4. Coordination of all functional areas, processes and actors to create an integrated unit within the value stream.

On the basis of these elements, it is clear that it is important to consider various stakeholders and their divergent value-understanding. Including stakeholders are therefore not only consumers and vendors but also employers, owners, members of employers and society. A comprehensive integration of all Lean Business processes is required to organize those interest groups. Therefore,

more comprehensive explanation of teamwork within a Lean Enterprise is given in the following. Based on this, a framework for complex teamwork inside a Lean Organization is deduced.

2. Coordination within a lean enterprise

In scientific literature various meanings of the word teamwork exist. Coordination is usually about the successful modification and coordination of interdependent organizational unit activities with respect to an objective sought. Accordingly, teamwork is an effective measure for counteracting induced adjustment problems and thereby facilitating an improvement of the operating procedure for improved performance.

2.1. Operational structure by function- and process-orientation and its operational procedure:

The operating procedure is characterized as "the spatial and temporary cooperation between humans and equipment of capital respectively work equipment, through which the input corresponding to the work function is transferred to the output". Thus, the operating procedure specifies the steps of the process required to accomplish the work function in spatial and temporal sequence with the aid of capital equipment and work equipment. Structural organization is essential to improving the operational procedure. This governs the distribution and relationship between the tasks of a socio-technical structure on various units. Through this the institutional structure controls the duties and competences. Responsibility means a person's or even a group of people's obligation to account for the execution of a mission and to serve both legally and economically a mission field. Competencies are the rights, authority and abilities needed to carry out certain tasks.

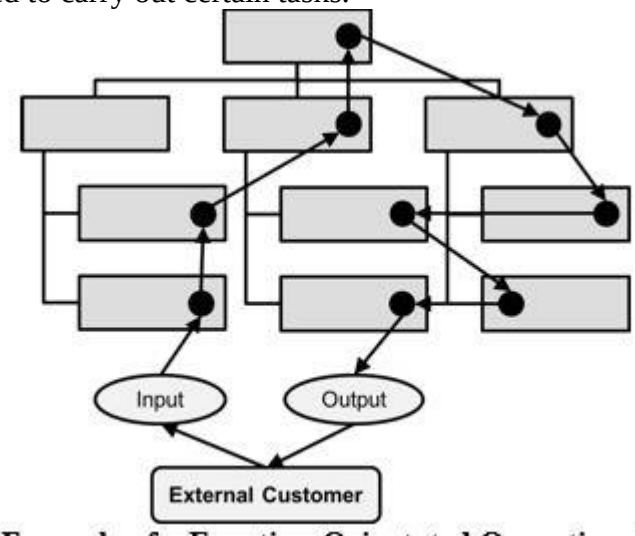

Figure 2. Example of a Function-Orientated Operational Structure

The function-oriented and process-oriented organizational structure is defined in research and practice as the critical basic type of the hierarchical organisation, which has fundamental effects on the organizational procedure (Figure 2).

The function-oriented organizational structure was developed when in one area of responsibility the same work activities are combined. Area of responsibility specializes in a certain type of work tasks and therefore generates only a fraction of the product, or the service that the consumer requires. This is the classical organizational model affected by departmentalization, with a high degree of specialization and optimum resource utilization.

A process-oriented operational structure can be introduced in contrast to a conventional function-oriented operational structure. Process-orientation is thus understood as a recurring series of predecessor-successor-relationship activities with specified starting points and endpoints. The process' goal is to increase value through the transformation of inputs into outputs. Growing (sub) process within the organization has its own specific customer and supplier. This implies that process chains are often interpreted as a partnership between customer and supplier, where customers may be both internal (= executor of the following activities) and external (= customer's classical meaning). Thus, a method is a series of activities that produces a tangible added benefit for the customer and facilitates the achievement of objectives by the enterprises. All in all, that means the obligations are no longer bound to tasks, but are strictly bound to the processes of enterprise. A process owner controls the business systems and develops them.

Therefore, enterprise processes are characterized as partitioned into business processes which define an overall requirement-performance relationship and thereby generate added value for the external customer. A business process consists in detail of a series of sub-processes that can again be divided into several hierarchical stages. The business process is thus placed at the supreme level within the process hierarchy, such that the output of the individual process levels adds up to the business process result. As shown in Figure 3, the process phases and at the lowest structural level are the individual activity as well as relevant activities after subdivision into sub-processes that are deduced directly from the business process. Thus, activities can be defined as the fundamental elements of a process. All processes should be organized in conjunction with this hierarchical structure, in order to achieve the ultimate purpose of the business operation.

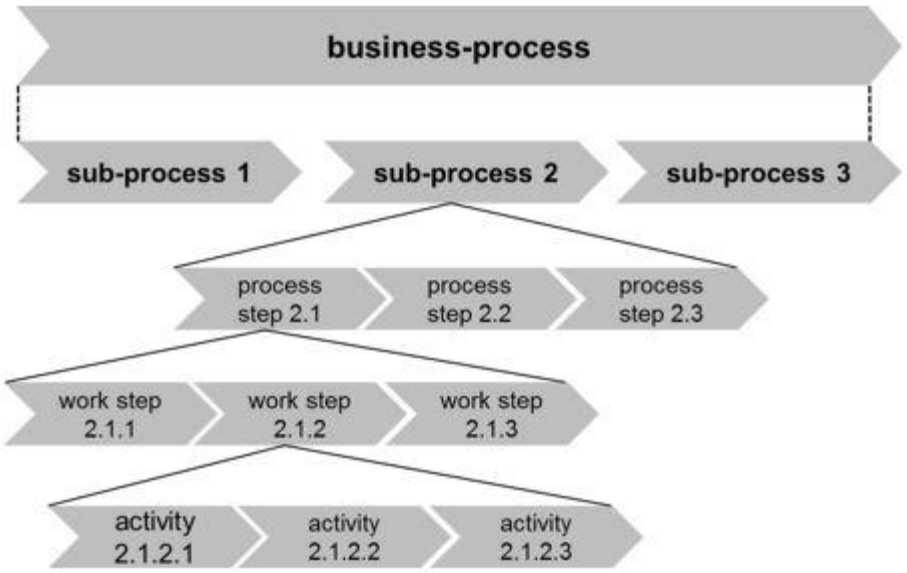

Figure 3. Process Hierarchy of a Process-Organisation

2.2. Process-oriented operational structure as a foundation for improving coordination within a Lean Enterprise:

The function-oriented operational structure is vertically divided into tasks and branches, opposed to the process-oriented operational structure. Customer-orientation and sub-process consistency is disrupted by tasks, where roles are shifted and several interfaces occur. The more distinct the functional orientation is, the more interfaces must be established, resulting in increased teamwork effort and neglected customer orientation.

Concretely, the demand for coordination within function-oriented organizational structure is strong and contributes to a high degree of coordination effort on:

1. Strong degree of labour-division distinction,
2. High degree of interdependence among organisation,
3. A multitude of individuals involved in labour-divisional results,
4. Distinguishing the size and performance spectrum of the performance units involved,
5. Wide distances spatially, terminally, and interpersonally,
6. Too unstructured, dynamic and detailed research.

Process-focused organizations are geared compared to function-oriented organizations, to consumer demands and therefore to end-customer demands and wishes. This means different process chains emerge which, through an internal customer-supplier relationship, capture specific business objectives. The coordination effort will be reduced within the process-oriented organizational framework, based on the following criteria, according to the aforementioned explanations for coordination efforts:

The degree of differentiation of the division of labour is reduced because of the common contemplation of a common object of the process. Figure 2. Through the process-focused organizational framework, all process-involved people are

focused towards the overall customer goal, so that an important collaboration through interdependence already exists. A tightening and merging of individual procedures becomes possible because of the process-orientation, because the interfaces are reduced. Hereby the number of individuals involved decreases.

2.3. Only by process-orientation an improved coordination can be achieved:

Method orientation is thus the basis for enhancing collaboration within a Lean Enterprise. All elements of a Lean Enterprise (development, output, service) can be organized efficiently and comprehensively only with the overall process-orientation. Hereby, Lean Enterprise is seen as a set of interdependencies of shared success which is demonstrated in particular by the fact that the interconnected processes make up the organizational framework. The process phases, process sequences, process dates and process goals thus come to the core and the authorities take a back seat in organizational structure design. Market-oriented customer-supplier partnerships and external and internal customer preferences dictate the business processes and, thus, the alignment within a Lean Enterprise.

3. Dynamic coordination within a lean enterprise through the x-matrix:

However, the company-wide process-orientation approach is nothing new and is presented in detail within the subject of reengineering business processes. While the current works lack the definition of teamwork within an organization as a whole and the regular review, comparison and enhancement of the processes. Especially waste avoidance by continuous improvement of all business processes within a Lean Enterprise holds great importance. Therefore, the process-orientation must not be a transient activity in which a new institutional structure is built on an ongoing basis. In addition, a comprehensive approach is required that allows for collaboration within a constantly evolving organization and its processes. Dynamic integration of all processes can be accomplished through the application of the KUDERNATSCH X-matrix, as shown in Figure 4. This allows communication of constantly changing criteria or goals, under consideration of the process-oriented organizational framework. There needs to be a run across four quadrants for recording and cascading the goals from the overall business-process to individual sub-processes and individual operations. Inside the X-matrix the following points must be answered and documented:

1. What are the ‘overall process-objectives?
2. What are the ‘annual process-objectives?
3. What are the ‘improvement-projects?
4. What are the ‘key performance indicator?
5. Who are the particular responsible persons for the process-improvements?

The connections of all questions are distinguished by dots within the X-matrix

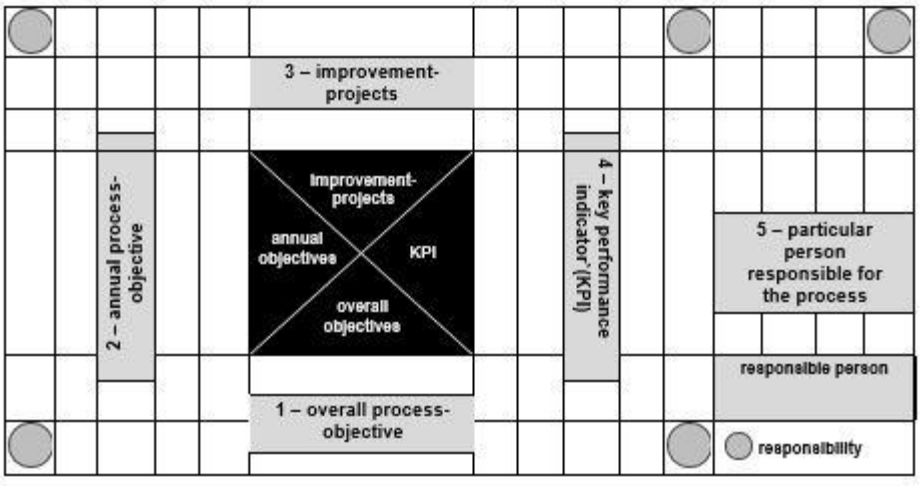

Figure 4. X-Matrix for Dynamic Coordination

For each process stage, this matrix must be conducted on the basis of the business process and the priorities of the organization, whereby duplication occurs. A constant cascading of them to the lowest process stage occurs v.
This helps in process management and the alignment of all operations towards an organization's aim. The X-matrix allows for the synchronization of various sections of coordinating sub-processes in terms of time, form, volume or other goals, respectively, the business-process.
Thus the upper process level's 'annual process goals' and 'improvement-projects' are translated into the 'overall process-objective' and 'annual process goals' within the next process stage. To reflect the objective-relationship of all process levels, the goals of each upper process level migrate to the lower process level.

2. Conclusion

This publication explains that the Lean Organization allows for an overall evaluation of all operations across the entire value system. All stakeholders in the entire value chain are integrated into one unit. It is shown that there is currently inadequate definition of an approach for complex integration of all processes within a Lean Enterprise. This teamwork approach can be applied over and over again and thus fulfils the requirement to respond consistently to changed environmental requirements. Thereby a complex collaboration is allowed within a Lean Enterprise. A overlapping of objectives. This publication derives, therefore, that the process-oriented organizational framework is the foundation for improving collaboration within a Lean Enterprise.

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