A Holistic Approach to Production Optimization as an Integral Part of the Strategy Development and Implementation in Small and Medium-sized Enterprises

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Agenda

1. Introduction
2. Production strategy for SMEs
3. Production optimization for SMEs
4. Holistic approach to production optimization in SMEs
5. Conclusions
Introduction

- Small- and Medium-Sized Enterprises (SME) problem definition -

- SMEs are acutely faced with the tough requirements of the turbulent environment.
- SMEs are subject to specific requirements and limitations, therefore they need to find ways to tackle these challenges.
- SMEs need a production strategy …
  … to cope with the current challenges.
  … to provide them with a long-term concept for using their limited resources appropriately.
- SMEs don’t plan production optimization systematically.
- Production optimization is carried out without considering production strategy.

SMEs require a framework for linking the optimization measures to production strategy.
Introduction
- Situation of the European SME -

- 99.8% of all enterprises in the European Union are SMEs.
- 66.1% of all jobs in Europe are in SMEs; only the rest (33.9%) are provided by large enterprises.
- SMEs build the backbone of the European economy and employment market.
- SMEs contribute to entrepreneurship, innovation and growth.

Source: Observatory of European SMEs 2003

Breakdown of main indicators in the EU-25’s business economy by enterprise size class, 2001, %share of total

Introduction
- Production strategy for SMEs
- Production optimization for SMEs
- Holistic approach
- Conclusions

Production strategy
- Definition -

A production strategy … … is a sequence of decisions that, over time, enables a business unit to achieve a desired manufacturing structure, infrastructure, and a set of specific capabilities. Source: Hayes/Wheelwright

… should serve as a technology or investment strategy and should be seen as a chance to develop the enterprise. Source: Wildemann

… can be regarded as the combination of the decisions in these three fields of activities (products, capabilities and processes). Source: Schneider

These definitions yield the following statement

Production strategy guides the decisions not only about the configuration of the production system and its elements but also about the implementation of the production-related methods and tools that support the achievement of the enterprise's goals.
Production strategy
-SME situation and potentials-

**SME situation**
- Production strategy is often a pragmatic and spontaneous reaction to changes in external conditions.
- SME’s entrepreneurs focus on short-term planning and demand quick and concrete results.
- Lack of knowledge about strategy development and diagnose of strategic opportunities.
- The few SMEs that possess a production strategy focus at only one field of activity (product, process or capabilities).
- Implementation is hindered by the intense involvement of the entrepreneur in day-to-day business, the difficult access to financial resources and constraints related to the infrastructure.

**SME potentials**
- Flat hierarchies accelerate the decision-making process and support the implementation.
- Employees of SMEs are involved in strategy development and generate an entrepreneurial spirit.
- The transparency of objectives and organization enables employees to realize their influence and increases their motivation.
- Entrepreneur personality favors an organizational culture based on the proximity between the entrepreneur and the employees.
- The entrepreneur has access to relevant knowledge towards SME networks.

Production optimization
-SME situation and potentials-

**SME situation**
- Production optimization comprises all operational measures employed to enhance production.
- Production optimization in SMEs is often carried out unplanned and according to immediate needs.
- Lack of knowledge about methods and tools for production optimization.
- Lack of resources (manpower, time and budget) impede the implementation of new optimization measures.
- Complicated and complex methods for production optimization have to be adapted for SMEs.

**SME potentials**
- Flat hierarchies and short information and communication paths support and accelerate the implementation of new optimization measures.
- The close contact to customers and suppliers enables the integration of the customers demands in the production optimization process.
- Flexible employees and transparency of process and organization simplify the selection of methods and tools for production optimization.
Production optimization
- SME situation and potentials -

For optimizing the production in SMEs three aspects have to be considered:

- A production strategy for SMEs must be desired and achieved by the entrepreneur.
- Production strategy supports the respectively pursued competition strategy and must be taken into account during the production optimization.
- Operational-methods and -tools have to be used in order to support the achievement of the production strategy.

Development of a holistic approach to production optimization

The holistic approach to production optimization in SMEs...

... offers a framework for aligning optimization measures with production strategy.
... supports SMEs by the production optimization.
... considers SMEs characteristics, requirements and potentials.
... is based on a new type of lean production systems.

Basics of Lean Production Systems
- Definition -

A Lean Production System (LPS) is...

... an enterprise-specific compilation of rules, standards, methods and tools, as well as the appropriate underlying philosophy for the comprehensive and sustainable design of production. An LPS enables an enterprise to meet the requirements of today’s business environment, taking into account technological, organizational, workforce-related and economic aspects.

The implementation of an LPS is not just a regular rationalization project, but a fundamental change in the organization and culture of an enterprise.
Holistic approach to production optimization in SMEs

Development of a production strategy
- Definition of the future state vision, philosophy and strategic goals of the company.
- Focus on customer value.
- External support.

Development of a Lean Production System (LPS)

SME production optimization

Development of a Lean Production System (LPS) - Structure -

1. General Goal
   - GG 1
   - GG 2
   - GG i...

2. Sub-Goal
   - SG 1
   - SG 2
   - SG i...

   Field of Activity
   - FA 1
   - FA 2
   - FA k

   - Method
     - Method 1
     - Method 2
     - Method m

   - Tool
     - Tool 1
     - Tool 2
     - Tool n
**Holistic approach to production optimization in SMEs**

1. **Development of a production strategy**
   - Definition of the future state vision, philosophy and strategic goals of the company.
   - Focus on customer value.
   - External support.

2. **Development of a Lean Production System (LPS)**
   - Description of the general goals.
   - Deduction of the sub-goals.
   - Selection of methods and tools.
   - Bundling in fields of activities.
   - Consideration of SMEs requirements.

3. **SME production optimization**
   - Application of methods and tools.

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**Example for the utilization of the framework**

1. **General Goal (GG)**
   - Minimize manufacturing costs

2. **Sub-Goal (SG)**
   - Reduction of downtime at the bottleneck machine

3. **Field of Activity (FA)**
   - Total productive maintenance/TPM
   - Analysis of reasons for machine failure
   - Failure list

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Development of a LPS
- Configuration and implementation -

Configuration of the LPS for SMEs

- SMEs entrepreneurs need support for the selection of adequate method and tools.
- Specific goals, capabilities and resources should be considered.
- Methods and tools should be adjusted to the requirements of SMEs.

Implementation of the LPS for SMEs

- Implementation plans and procedures have to be analysed.
- Lean ideas have to be reflected in the philosophy and corporate culture of the SMEs.
- SMEs possess characteristics that facilitate the implementation of the intangible parts of an LPS.

Development of a LPS
- Research Project ProfiL -

Objective ProfiL
Continuous adaptation and improvement of SMEs strategies, structures and manufacturing systems to new conditions and market requirements.

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- Technical University of Braunschweig
- University of Konstanz

Practice partners:
- Six small-sized enterprises

Activities ProfiL
- Development of a production strategy for SMEs.
- Configuration of LPS and selection of methods (tangible elements of LPS).
- Evaluation of LPS methods and tools according to SME criteria.
- Implementation plans for LPS in SMEs.
- Creation of a lean philosophy (intangible elements of LPS).
Conclusions

- SMEs need production strategies and production optimization that is aligned with the enterprise strategy.
- The system approach to lean production serves as an ideal framework for linking production strategy with operational measures of production optimization in SMEs.
- Applying the framework to SMEs is necessary:
  - external support for entrepreneurs in SMEs
  - adaptation of methods and tools for the use in SMEs
- SMEs are suited for the application of the LPS framework – especially since their characteristics facilitate the difficult implementation of intangible LPS elements.

Thank you for your attention!