Benchmarking healthcare logistics processes: a comparative case study of Danish and US hospitals

Logistics processes in hospitals are vital in the provision of patient care. Improving healthcare logistics processes provides an opportunity for reduced healthcare costs and better support of clinical processes. Hospitals are faced with increasing healthcare costs around the world and improvement initiatives prevalent in manufacturing industries such as lean, business process reengineering and benchmarking have seen an increase in use in healthcare. This study investigates how logistics processes in a hospital can be benchmarked to improve process performance. A comparative case study of the bed logistics process and the pharmaceutical distribution process was conducted at a Danish and a US hospital. The case study results identified decision criteria for designing efficient and effective healthcare logistics processes. The most important decision criteria were related to quality, security of supply and employee engagement. Based on these decision criteria, performance indicators were developed to enable benchmarking of logistics processes in healthcare. The study contributes to the limited literature on healthcare logistics benchmarking. Furthermore, managers in healthcare logistics are provided with a list of decision parameters relevant for designing and benchmarking processes.

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Publication information
How the reverse supply chain contributes to a firm's competitive strategy: a strategic alignment perspective

The ongoing transition to a Circular Economy is changing the shape of Supply Chains. They are becoming more 'Closed-Loop', combining forward and reverse flows of products and materials. Reverse Supply Chains (RSCs), originally considered as a solution for handling waste or recovering residual value, can play a pivotal role in determining the competitive advantage of the firm. Firms do not always exploit the potential of the RSC, and the conditions allowing the exploitation remain unclear. This paper explores the alignment between the RSC and the competitive strategy of the firm. Results from seven case studies, focusing on original equipment manufacturers (OEMs), show how the RSC can play a strategic, tactical, or operational role for the firm. The paper applies for the first time the concept of strategic alignment to the RSC and practitioners can use the proposed framework to analyse the role of the RSC within their firm.
How the reverse supply chain impacts the financial performance of original equipment manufacturers

This thesis examines the financial impact of a firm's reverse supply chain (RSC). Specifically, the thesis examines the two questions of how the RSC can contribute to the financial performance of the firm and which factors are decisive for the RSC's financial contribution. The thesis focuses on original equipment manufacturers. The thesis results show that the
RSC can contribute to the financial performance of the firm in more than 20 different ways, which the thesis defines as functions of the RSC. Examples of RSC-functions are 1) resale of recovered end-products to price-focused market segments in the firm’s primary markets, 2) resale to customers in new markets (in e.g. emerging economies), and 3) sale of used materials back to the firm’s original material suppliers. The firm's RSC can conduct several RSC-functions simultaneously and the financial benefits from operating these RSC-functions differ widely among functions. The factors that are decisive for the RSC’s financial contribution depend on the type of RSC-function. For a RSC-function that recovers and resells end-products examples of factors decisive the function’s financial contribution are 1) the market’s willingness to pay for recovered products, 2) the firm’s profits from servicing recovered products once sold, and 3) the added probability of selling additional products to customers of recovered products. The thesis demonstrates that manufacturers can achieve considerable financial contributions from the RSC, which contracts the traditional perception of the RSC in academic literature as well as with logistics practitioners.

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Improving Healthcare Logistics Processes
Healthcare costs are increasing due to an ageing population and more sophisticated technologies and treatments. At the same time, patients expect high quality care at an affordable cost. The healthcare industry has therefore experienced increasing pressures to reduce the cost of healthcare provision whilst providing high quality care. Logistics activities in hospitals provide a significant opportunity for cost containment in healthcare through the implementation of best practices.

Literature provides little guidance on how to improve healthcare logistics processes. This study investigates logistics processes in hospitals and aims to provide theoretically and empirically based evidence for improving these processes to both expand the knowledge base of healthcare logistics and provide a decision tool for hospital logistics managers to improve their processes.

Case studies were conducted at hospitals in Denmark and the US investigating three different types of processes: bed logistics, hospital cleaning, and pharmaceutical distribution. Based on an analysis and comparison of the case studies, a set of factors were identified influencing the decision on how to improve healthcare logistics processes. Furthermore, a method for benchmarking healthcare logistics processes was developed. Finally, a theoretically and empirically founded framework was developed to support managers in making an informed decision on how to improve healthcare logistics processes.

This study contributes to the limited literature concerned with the improvement of logistics processes in hospitals. Furthermore, the developed framework provides guidance for logistics managers in hospitals on how to improve their processes given the circumstances in which they operate.

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On the Circular Supply Chain’s Impact on Revenue Growth for Manufacturers of Assembled Industrial Products – a Conceptual Development Approach

Materials scarcity, legislative compliance, and cost savings opportunities drive firms to take back used products from their customers for reuse, recovery, and recycling. For this purpose, firms implement circular supply chains. Although academia has given circular supply chain related topics considerable attention since the 1990s, the relationship between the circular supply chain and the firm’s revenue growth remains under-researched. Using revenue growth theory, this study examines how the use of circular supply chains can grow the revenue of manufacturers of assembled industrial products (e.g., process equipment and engines). Findings show that the circular supply chain can increase revenue streams from the firm’s existing markets, create market opportunities in new geographies, and provide access to market segments unaddressable with the firm’s new products. The paper adds to understanding of the circular supply chain and provides research suggestions into the revenue potential inherent in circular supply chains.

Complexity management in the food industry

The many stakeholders in the food industry with their diverse interests make this industry complex and interesting to work with. There are four main stakeholders; 1) The customers with their increased demand for customized products, quick delivery times and increased responsiveness, 2) The authorities with increased legislations, 3) Employees with salary demands and 4) Owners/shareholders with profit wishes add to the complexity. Furthermore, markets are getting bigger and the competition harder. The profit margin for many companies is getting smaller. There are a demand for quantifying this complexity and finding a method for using these complexity factors in economic calculations. The research question this paper seeks to address is therefore “Which complexity factors can be quantified in the food industry and how can they be used in economic calculations?” A case study of a SME Danish bread producer will address the research question due to the explorative nature of this study and the limited amount of previous research within this field.
Interactive Foresight Simulation
The Combined Simulation Approach (CSA) is a way to evaluate risks and address potential unforeseen problems in a more interactive way than what is often observed in practice in companies or sectors. The approach is based on a combination of scenario analysis and discrete-event computer simulation with which the strategies can be continuously developed. The contribution of this paper is to narrow the knowledge gap between strategic, tactical and operational levels of an organization. The paper demonstrates how it is possible to work proactively with both the breadth and depth of strategies using a Danish knowledge intensive company as an example. © 2015 Elsevier Inc. All rights reserved.
Revenue in reverse? An examination of reverse supply chain enabled revenue streams

When original equipment manufacturers (OEMs) examine whether to implement a reverse supply chain (RSC) for their products, oftentimes the motive is cost savings or regulatory compliance. However, a frequently overlooked but equally important benefit is the possibility for creating new revenue. The purpose of this paper is to examine which revenue streams the RSC enables for OEMs to utilize and how these streams are utilized in industrial practice. First, the paper identifies the RSC-enabled revenue streams that are available to OEMs using a literature-based conceptual modeling approach. Second, using a set of eight cases the paper explores these streams’ utilization pattern and develops a set of propositions that explain the pattern. Results show a set of 12 distinct RSC-enabled revenue streams within three categories: new revenue through sales of used items, new revenue through sales of recovered items, and new revenue through added sales of virgin products. Six of these 12 streams are utilized in industrial practice. Among the propositions that explain the utilization pattern are the degree of component customization, product life-cycle longevity, and the value gap between used and recovered products. While extant literature concerning the relation between the RSC and the firm’s revenue is scarce, this paper contributes to the understanding of RSCs’ revenue generation potential and thus to the stream of literature that views the RSC as a value creator rather than a costly nuisance. Furthermore, the paper provides managers with a broad view of how their firm’s RSC can increase revenue from existing markets as well as create revenue from new markets.
This paper focuses on the integration of risk and supply chain modelling by means of analysing a case concerning a Hydrogen Refuelling Station in Berlin. It presents a framework that can analyse an energy supply chain and at the same time enables easy reporting and presentation of various results by utilizing Discrete Event Simulation (DES). The industrial implication of this work is to provide practitioners with an analysis framework for improved decision support. The novelty of this paper is the approach to model a supply chain together with a dynamically modelled event tree-based approach that facilitates the inclusion of time-varying aspects of failure modelling.
The profit potential in reverse supply chain functions for catalyst manufacturers
The reverse supply chain (RSC) contains inherent uncertainties, e.g. the quality level and return volume of used products. By contrast, the catalyst manufacturing industry is characterized by Certainty (manifested in e.g. well-defined and highly controlled production – processes and widespread standardization). This paper's purpose is to examine whether RSC – processes can be profitably applied in this industry. Using case study research the paper examines which RSC - functions that are generally available to manufacturers are profitable for a selected catalyst manufacturer. Results show three profitable RSC – functions. These results contribute to the emerging view of the RSC as a value creator rather than a costly nuisance.

Using the Analytic Network Process (ANP) to assess the distribution of pharmaceuticals in hospitals – a comparative case study of a Danish and American hospital
Pharmaceuticals are a vital part of patient treatment and the timely delivery of pharmaceuticals to patients is therefore important. Hospitals are complex systems that provide a challenging environment for decision making. Implementing process changes and technologies to improve the pharmaceutical distribution process can therefore be a complex and challenging undertaking. A comparative case study was conducted benchmarking the pharmaceutical distribution process at a Danish and US hospital to identify best practices. Using the ANP method, taking tangible and intangible aspects into consideration, the most suitable solution for pharmaceutical distribution reflecting management preferences was identified.

Development of a Generic Performance Measurement Model in an Emergency Department
Fewer and larger hospitals are expected in the forthcoming years due to the latest and on-going structural changes in the Danish healthcare sector. These large hospitals must be able to handle an increasing flow of patients, thus creating challenges for both logistics and resources. In connection to the establishment of the new hospitals, one of the biggest changes is the new concept of emergency departments (called "FAM"). In practice, the new emergency department (ED) is a merger of the former ED, urgent care unit, and observation unit, where most acute patients are to pass through a joint entrance. From here, patients are either treated completely or transferred to other specially in-hospital departments. The EDs at the new hospitals can expect to cover a demographical area with 200,000-400,000 inhabitants, equivalent to an
area two to three times as large as the current catchment area. The Danish regions have realised that the establishment of a joint reception of acute patients in the ED will be an important step towards improved quality in treatment and better utilisation of resources. It is a requirement that the reception process is formalised and evidence-based to ensure the logistics and resources at the ED are applied in the best possible manner and the most urgent patients are attended first. To meet such requirements, several initiatives are launched. These are, for instance, improving current competencies, new working procedures, enhanced documentation and registration practices, and the use of triage. All of the mentioned initiatives are new and not well validated to date. It would be desirable to enable measurement of each of the initiative’s effects. The goal of this PhD project was to develop a performance measurement model for EDs. The new model comprises only the most important performance measures that provide an estimate for overall ED performance levels. Furthermore, a thorough analysis of the interdependencies between the included performance measures was conducted in order to gain deeper knowledge of the ED as a system. The model enables monitoring of how well the ED performs over time, including how performance is impacted by the various initiatives. In the end, the developed model will be an important management tool to meet the management’s vision of providing the best possible care for the acute patient meanwhile achieving the highest possible utilisation of resources.

How the reverse supply chain enables original equipment manufacturers to compete on low price
Low price is perhaps the most widely present competitive parameter forcing firms to continuously reduce their operating costs. While much literature has investigated how firms can use their reverse supply chain (RSC) processes to comply with regulations or offer RSC-enabled product-attached services, the purpose of this paper is to examine the relationship between the firm’s RSC processes and overall operating costs. The paper asks the question of how a firm’s RSC processes enable continuous operating cost reductions. The paper’s research method combines a literature review of known RSC-enabled cost reduction opportunities with a multiple case study that explores unknown opportunities. The most used cost reduction opportunity among the six firms in the study’s case sample is reducing operating costs by replacing purchasing of virgin materials and internal production with recovery of used products returned through the firm’s RSC.
Measuring process performance within healthcare logistics - a decision tool for selecting measuring technologies
Performance measurement can support the organization in improving the efficiency and effectiveness of logistical healthcare processes. Selecting the most suitable technologies is important to ensure data validity. A case study of the hospital cleaning process at a public Danish hospital was conducted. Monitoring tasks and ascertaining quality of work is difficult in such a process. Based on principal-agent theory, a set of decision indicator has been developed, and a decision framework for assessing technologies to enable performance measurement has been proposed.

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Measuring process performance within healthcare logistics - a decision tool for selecting track and trace technologies
Monitoring tasks and ascertaining quality of work is difficult in a logistical healthcare process due to cleaning personnel being dispersed throughout the hospital. Performance measurement can support the organization in improving the efficiency and effectiveness of processes and in ensuring quality of work. Data validity is essential for enabling performance measurement, and selecting the right technologies is important to achieve this. A case study of the hospital cleaning process was conducted at a public Danish hospital to develop a framework for assessing technologies in healthcare logistics. A set of decision indicators was identified in the case study to assess technologies based on expected process performance. Two aspects of performance measurement were investigated for the hospital cleaning process: what to measure and how to measure it.

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Operations management in the baking industry: A case study

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Optimal Scheduling of Stochastic Production Processes Through Model Checking

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Profits in reverse? An examination of the decisive factors for reverse supply chain profitability

Although the concept of the reverse supply chain (RSC) is not unknown in industry, an inhibitor for its successful use is low (or no) profitability. A research challenge is investigating ways to establish the RSC as a profit-creating center in the organization. This paper contributes to this challenge by examining the factors decisive for whether a firm will achieve profits from operating a RSC. By combining a literature review and multiple case study, the paper identifies a set of factors that prohibit or advance RSC-profitability and develops a set of propositions that define the relation between each factor and RSC-profitability.

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The decisive factors for profitability in direct reuse of polystyrene packaging materials

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The decisive factors for profitability in direct reuse of polystyrene packaging materials

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Organisations: Center for Bachelor of Engineering Studies, Afdelingen for Produktionsudvikling, Department of Management Engineering, Management Science

The profitability drivers in packaging materials reuse for manufacturers in business to business environments

Purpose – The purpose of this paper is to explore the profitability drivers for a firm’s operation of a reverse supply chain (RSC) that takes back and reuses packaging materials. Results apply specifically to original equipment manufacturers (OEMs) in business to business environments.

Design/Methodology/Approach – Using in-depth data from the Danish manufacturer of measurement instruments, Radiometer Medical, the paper first identifies the total set of factors that directly influence the profitability of reusing packaging materials, and second assesses the relative impact among the identified factors. The paper’s theoretical basis is the RSC literature’s business perspective formulated by Guide and Van Wassenhove.

Findings – The drivers of profitability in packaging materials reuse are 1) the amount of avoided costs of purchasing new packaging materials, 2) the firm’s ability to reduce costs of reverse logistics.

Research limitations/implications – The study’s data is limited to one firm’s operation in one country, which limits the generalizability of the paper’s findings. However, the paper provides the basis for examining the bilateral relationships between the identified drivers and reuse profitability as well as between the drivers and their sub-level antecedents. Originality/value – The study provides exploratory insights into the economics of reusing packaging materials and identifies the drivers that are decisive for a firm’s ability to reuse packaging materials profitably.

Waste management in food production

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Addressing production stops in the food industry
This paper investigates the challenges in the food industry which causes the production lines to stop, illustrated by a case study of an SME size company in the baked goods sector in Denmark. The paper proposes key elements this sector needs to be aware of to effectively address production stops, and gives examples of the unique challenges faced by the SME food industry.

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Advancing the use of performance evaluation in health care
Purpose – The purpose of this paper is to develop a framework for health care performance evaluation that enables decision makers to identify areas indicative of corrective actions. The framework should provide information on strategic pro-/ regress in an operational context that justifies the need for organizational adjustments.

Design/methodology/approach – The study adopts qualitative methods for constructing the framework, subsequently implementing the framework in a Danish magnetic resonance imaging (MRI) unit. Workshops and interviews form the basis of the qualitative construction phase, and two internal and five external databases are used for a quantitative data collection.

Findings – By aggregating performance outcomes, collective measures of performance are achieved. This enables easy and intuitive identification of areas not strategically aligned. In general, the framework has proven helpful in an MRI unit, where operational decision makers have been struggling with extensive amounts of performance information.

Research limitations/implications – The implementation of the framework in a single case in a public and highly political environment restricts the generalizing potential. The authors acknowledge that there may be more suitable approaches in organizations with different settings.

Practical implications – The strength of the framework lies in the identification of performance problems prior to decision making. The quality of decisions is directly related to the individual decision maker. The only function of the framework is to support these decisions.

Originality/value – The study demonstrates a more refined and transparent use of performance reporting by combining strategic weight assignment and performance aggregation in hierarchies. In this way, the framework accentuates performance as a function of strategic progress or regress, thus assisting decision makers in exerting operational effort in pursuit of strategic alignment.

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An integrated performance measurement model for emergency department assessment

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Automated evolutionary restructuring of workflows to minimise errors via stochastic model checking
This paper presents a framework for the automated restructuring of workflows that allows one to minimise the impact of errors on a production workflow. The framework allows for the modelling of workflows by means of a formalised subset of the Business Process Modelling and Notation (BPMN) language, a well-established visual language for modelling workflows in a business context. The framework’s modelling language is extended to include the tracking of real-valued quantities associated with the process (such as time, cost, temperature). In addition, this language also allows for an intention preserving stochastic semantics able to model both probabilistic- or non-deterministic branching behaviour. We further extend this formalism to allow for the introduction of error states which allow for both fail-stop behaviour and continued system execution. We explore the practical utility of this approach by means of a case study from the food industry. Through this case study we explore the extent to which the risk of production faults can be reduced and the impact of these can be minimised, primarily through restructuring of the production workflows. This approach is fully automated and only the modelling of the production workflows and the expression of the goals require manual input.

CSA as a Facilitative Foresight Tool

Determining the total cost of reverse supply chain operations for original equipment manufacturers
When original equipment manufacturers (OEM) examine whether or not to invest in a reverse supply chain (RSC), managers need insight into not only the cost savings and new revenue streams the RSC enables, but also the total cost of the RSC itself. Using case study research the study examines what cost parameters constitute the total cost (TC) of the RSC. The specific RSC that the study seeks the TC for consists of 1) end-product refurbishing, 2) component refurbishing, and 3) sales of used materials back to original suppliers or independent recyclers for materials recycling.
Evolutionary optimization of production materials workflow processes

We present an evolutionary optimisation technique for stochastic production processes, which is able to find improved production materials workflow processes with respect to arbitrary combinations of numerical quantities associated with the production process. Working from a core fragment of the BPMN language, we employ an evolutionary algorithm where stochastic model checking is used as a fitness function to determine the degree of improvement of candidate processes derived from the original process through mutation and cross-over operations. We illustrate this technique using a case study where a baked goods company seeks to improve production time while simultaneously minimising the cost and use of resources.
How manufacturers can use their reverse supply chain: a typology of reverse supply chain roles

While traditional forward supply chains end with customer markets, the reverse supply chain (RSC) both begins and ends with the firm's markets. The study applies the prevalent conceptual RSC-description in the theoretical field by Guide and Van Wassenhove (2009). In the description, the RSC begins with take back of used products and physical reverse distribution. Then, the RSC inspects and sorts products to determine the right disposition strategy. Finally, the RSC ends with product recovery and resale. Even though resale of unrecovered products, internal reuse, and disposal through waste streams is not explicitly part of the description, this study does include them as disposition strategies. Although some RSC topics have been fairly well-addressed in extant literature (e.g. product acquisition, inventory models and product disassembly), the RSC-topic remains under-explored (Pohkarel and Mutha, 2009; Kocabasoglu et al., 2007; Huscroft et al., 2013). In supply chain and operations management (OM) literature a RSC is usually seen as a straightforward one-dimensional process, e.g. as the process described in the previous paragraph. However, a RSC can perform a variety of different functions for the firm. Among the many RSC-functions are remanufacturing complete end-products for resale in primary as well as secondary markets, refurbishing of components for reuse in servicing the firms installed product base, take back of items for disassembly and direct resale or for materials recycling, performing the reverse logistical processes required for supporting a liberal return policy, etc. Based on extant literature from the supply chain management and OM fields, this study develops a conceptual typology of what roles the RSC can play in the firm's efforts of achieving higher overall economic profits. Each role in the typology encompasses those RSC-functions that support the role. The results of the study show four distinct RSC types: The logisticians, the reuser, the servicer, and the reseller. Each role has its own distinguishable objective and set of functions. Further research is suggested for typology validation. A validated typology allows examination of the relations between specific RSC types and e.g. customer service, environmental responsibility, economic profit, material consumption, etc.
Increasing productivity based on quality management: Baked goods sector example

This paper investigates productivity and quality management challenges in the food industry, illustrated by a case study of an SME-sized company in the Danish baked goods sector. Companies in the food industry are faced with challenges related to short shelf-life and changing customer demands as well as intense cost pressures. Quality control is largely manual and often based on the bakers' intuition. Problems with reusing dough, production stops and quality issues contribute towards waste. This paper addresses the research question "Is there a relation between the dough, production stops, and quality control?". The paper illustrates the effectiveness of the current quality set-up and examines the productivity challenges based on data from the case company, specifically production data from January to the summer of 2013. Significant suggestions for increasing productivity and reducing waste through improved quality management are detailed. The paper concludes with recommendations for further research.

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Patient Safety and Satisfaction Drivers in Emergency Departments Re-visited - An Empirical Analysis using Structural Equation Modeling

How can emergency department (ED) decision makers contribute to increase patient satisfaction rates? This question has been thoroughly investigated in many hospital departments but not so much in the ED, which has led to a number of untested hypotheses. Maximising value-added activities seen from a patient's perspective has become an essential outcome in health care, meaning that the untested hypotheses are in need of quantitative testing. This study proposes an integrated framework in which four latent constructs reflecting principal aspects of patient care are tested. The four constructs are entitled safety and satisfaction, waiting time, information delivery, and infrastructure accordingly. As an empirical foundation, a recently published comprehensive survey in 11 Danish EDs is analysed in depth using structural equation modeling (SEM). Consulting the proposed framework, ED decision makers are provided with information of where to launch high-impact initiatives to enhance current satisfaction levels.

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SBAT. A stochastic BPMN analysis tool

This paper presents SBAT, a tool framework for the modelling and analysis of complex business workflows. SBAT is applied to analyse an example from the Danish baked goods industry.

Based upon the Business Process Modelling and Notation (BPMN) language for business process modelling, we describe a formalised variant of this language extended to support the addition of intention preserving stochastic branching and parameterised reward annotations. Building on previous work, we detail the design of SBAT, a software tool which allows for the analysis of BPMN models. Within SBAT, properties of interest are specified using the temporal logic Probabilistic Computation Tree Logic (PCTL) and we employ stochastic model checking, by means of the model checker PRISM, to compute their exact values.

We present a simplified example of a distributed stochastic system where we determine a reachability property and the value of associated rewards in states of interest for a real-world example from a case company in the Danish baked goods industry. The developments are presented in a generalised fashion to make them relevant to the general problem of implementing quantitative probabilistic model checking of graph-based process modelling languages.

This paper contains three key elements:
1. SBAT description.
2. Case company description.

The paper concludes by indicating SBAT’s practical applicability and suggests further research directions.
SBOAT: A Stochastic BPMN Analysis and Optimisation Tool

In this paper we present a description of a tool development framework, called SBOAT, for the quantitative analysis of graph based process modelling languages based upon the Business Process Modelling and Notation (BPMN) language, extended with intention preserving stochastic branching and parameterised reward annotations. SBOAT allows the optimisation of these processes by specifying optimisation goals by means of probabilistic control tree logic (PCTL). Optimisation is performed by means of an evolutionary algorithm where stochastic model checking, in the form of the PRISM model checker, is used to compute the fitness, the performance of a candidate in terms of the specified goals, of variants of a process. Our evolutionary algorithm approach uses a matrix representation of process models to efficiently allow mutation and crossover of a process model to be performed, allowing broad exploration of the space of possible models.

We present a simple example of a distributed stochastic system where we determine a reachability property and the value of associated rewards in states of interest for a generated range of models. This example is taken from a case company in the Danish baking industry and will illustrate the practical applicability of this tool by helping the company analyse and optimise selected workflows.

Tradeoffs between alleviating emergency department crowding and return visits

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Authors: Sørup, C. M. (Intern), Sepúlveda Estay, D. A. (Intern), Jacobsen, P. (Intern), Anderson, P. D. (Ekstern)
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Using quantitative stochastic model checking tool to increase safety and improve efficiency in production processes

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A literature review analysing endorsed performance and quality-in-care measures for emergency department assessment

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Application of Structural Equation Modeling to determine Emergency Department patient satisfaction drivers

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Application of Structural Equation Modeling to Determine Emergency Department Patient Satisfaction Drivers

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Challenges facing the food industry: Examples from the baked goods sector
This paper investigates the challenges in the food industry, illustrated by a case study from the baked goods sector in Denmark. The paper proposes key elements this sector needs to address in order to limit waste, improve productivity and increase profitability.

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Evaluation of emergency department performance: A systematic review on recommended performance and quality-in-care measures
Background
Evaluation of emergency department (ED) performance remains a difficult task due to the lack of consensus on performance measures that reflects high quality, efficiency, and sustainability.
Aim
To describe, map, and critically evaluate which performance measures that the published literature regard as being most
relevant in assessing overall ED performance.

Methods
Following the PRISMA guidelines, a systematic literature review of review articles reporting accentuated ED performance measures was conducted in the databases of PubMed, Cochrane Library, and Web of Science. Study eligibility criteria includes: 1) the main purpose was to discuss, analyse, or promote performance measures best reflecting ED performance, 2) the article was a review article, and 3) the article reported macro-level performance measures, thus reflecting an overall departmental performance level.

Results
A number of articles addresses this study’s objective (n = 14 of 46 unique hits). Time intervals and patient-related measures were dominant in the identified performance measures in review articles from US, UK, Sweden and Canada. Length of stay (LOS), time between patient arrival to initial clinical assessment, and time between patient arrivals to admission were highlighted by the majority of articles. Concurrently, “patients left without being seen” (LWBS), unplanned re-attendance within a maximum of 72 hours, mortality/morbidity, and number of unintended incidents were the most highlighted performance measures that related directly to the patient. Performance measures related to employees were only stated in two of the 14 included articles.

Conclusions
A total of 55 ED performance measures were identified. ED time intervals were the most recommended performance measures followed by patient centeredness and safety performance measures. ED employee related performance measures were rarely mentioned in the investigated literature. The study’s results allow for advancement towards improved performance measurement and standardised assessment across EDs.
Healthcare performance turned into decision support

Purpose – The purpose of this study is to first create an overview of relevant factors directly influencing employee absence in the healthcare sector. The overview is used to further investigate the factors identified using employee satisfaction survey scores exclusively. The result of the overall objective is a management framework that allows managers to gain insight into the current status of risk factors with high influence on employee absence levels.

Design/methodology/approach – The research consists of a quantitative literature study supported by formal and semi-formal interviews conducted at the case organisations. Employee satisfaction surveys were applied to analyse the development over time of selected factors correlated with concurrent employee absence rates. Checking for causal results, comparisons with the included published literature findings were also carried out.

Findings – Four major clustered factors, three of which constitute the term “social capital”, showed a high degree of connection with employee absence rates. The factors are general satisfaction, fairness, reliance and co-operation. Integrating the four elements in a management framework will provide valuable and holistic information about the determinants with regard to current levels of employee absence. The framework will be a valuable support for leaders with the authority to alter the determinants of employee absence.

Research limitations/implications – Since a great part of the empirical material is supplied from the healthcare sector, the results obtained could be restricted to this sector. Inclusion of data from Arbejdsmarkedets Tillægspension (ATP) showed no deviation from the results in the healthcare sector.

Practical implications – The product of the study is a decision support tool for leaders to cope with levels of employee absence. The framework is holistic and can prove to be a valuable tool to take a bearing of where to focus future initiatives.

Originality/value – Gathering former observational studies in a complete overview embracing many relevant factors that influence sickness absence has not yet been attempted. Hospital management is provided with valuable information when given insight into the factors that control employee absence behaviour. Having this insight will enable the managers to promote a healthy working environment, thus lowering employee absence rates to a minimum.
Identifying the potential of changes to blood sample logistics using simulation

Using simulation as an approach to display and improve internal logistics at hospitals has great potential. This study shows how a simulation model displaying the morning blood-taking round at a Danish public hospital can be developed and utilized with the aim of improving the logistics. The focus of the simulation was to evaluate changes made to the transportation of blood samples between wards and the laboratory. The average- (AWT) and maximum waiting time (MWT) from a blood sample was drawn at the ward until it was received at the laboratory, and the distribution of arrivals of blood samples in the laboratory were used as the evaluation criteria. Four different scenarios were tested and compared with the current approach: (1) Using AGVs (mobile robots), (2) using a pneumatic tube system, (3) using porters that are called upon, or (4) using porters that come to the wards every 45 minutes. Furthermore, each of the scenarios was tested in terms of what amount of resources would give the optimal result. The simulations showed a big improvement potential in implementing a new technology/mean for transporting the blood samples. The pneumatic tube system showed the biggest potential lowering the AWT and MWT with approx. 36% and 18%, respectively. Additionally, all of the scenarios had a more even distribution of arrivals except for porters coming to the wards every 45 min. As a consequence of the results obtained in the study, the hospital decided to implement a pneumatic tube system.

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Authors: Jørgensen, P. M. T. (Intern), Jacobsen, P. (Intern), Poulsen, J. H. (Forskerdatabase)
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Interactive simulation of technology management foresight

Two of the main foresight challenges are how to handle complexity and uncertainty of
evolving technology tracks, which may merge and create new challenges for the management of a company in order to avoid sub-optimization. Complexity refers to the difficulty of identifying and quantifying causal links between a multitude of technology tracks and the degree of interdependency between these tracks. The nature of this challenge can be traced back to several factors such as variable delay periods between causes and effects, increasing synergisms between hitherto separated technology tracks as well as a number of intervening stakeholders at different levels of technology management in an organization. Uncertainty comprises lack of knowledge in addition to variable responses of management to identical technological tracks. The purpose of this paper is to identify and reflect on the obstacles and possibilities of using the combination of narrative and numerical simulation to explore uncertainties and complexities of technology development and implementation in companies. Foresight as a method to develop technology management strategies can hardly be organized as a separated step by step procedure of either qualitative or quantitative processes due to the complexity and uncertainty of the more or less interrelated technology tracks. Accordingly, the foresight approach must allow for interaction between the real-world system and the model builders, for example by using an interacting narrative and numerical simulation approach. This combined simulation approach (CSA) can support strategic decision making by providing different scenarios in combination with computer simulation. CSA is a way to evaluate complexities and risks by addressing possible future events in a more systematically way than is often occurring in companies. The use of CSA makes it possible for management to close the often experienced knowledge and activity gaps between the strategic, tactical and operational levels in a company. The outcome of developing and using CSA is a generic approach that enables the interaction between narrative simulation (scenarios) and numerical simulation. These interactive processes can take place on the strategic, tactical and operational levels of an organization and thus contribute to close the gaps that often exist between these levels. The combined foresight simulation approach is, however, not without practical and epistemological challenges, which will be discussed in this paper, based on the authors’ knowledge and practical experience gained by using CSA in a real-world company context. The contribution of this paper to the field is a further development of the existing foresight knowledge about the use of a combined narrative and numerical simulation with the main purpose to provide more consistency between the strategic, tactical and operational plans and activities occurring in a company with special focus on technology management.

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Optimal scheduling of complex processes through stochastic model checking: An example from the baked goods industry

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"Social capital" can help to fight absenteeism

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Technology in health care logistics
In most of the developed countries hospitals are facing a major challenge – they have to provide more health care using the same resources. Due to the demographic trend and the increasing share of the population being in a more health-demanding age, the hospitals will have to deal with more patients in the future. It is therefore essential that the hospitals are more efficient in order to meet the requirement of providing more health for the same or less resources. Studies have shown that more than 30% of hospital expenditures are related to various logistics cost, making the logistics an area with huge efficiency potential. However, hospital logistics are facing two problems. 1) Hospital logistics have to a large extent been dealt with using a departmental approach resulting in sub-optimised logistics. 2) In industry, the use of different technological solutions to perform and control the logistical processes is very common. This has however not to the same extent been the case within hospitals, where technology primarily has been used within the clinical settings. There is therefore a large potential in using technology to improve the logistics. Based on these considerations the research presents an analytical model that can analyse the logistical system using a holistic approach, and explore the possibility of using technology to improve the current system. A logistical system is one of the different flows happening at a hospital. Included in the analytical model is a performance assessment tool, which has been designed to assess the performance of the logistical system, thereby pinpointing where the system is performing poorly. Additionally the model and tool makes it possible to evaluate various technologies that can be used to improve and optimise the existing system. The analytical model and performance measurement tool thus makes it possible for the hospital management to analyse the various logistical systems, and gain an insight of which parts of the logistical system will have the largest benefit from implementing new technology. Concurrently the model makes it possible to continuously assess the logistical systems in order to ensure continuous improvement and efficiency of the hospital. As a consequence of the project new technologies have been implemented in one case, and implementing technology is in the preliminary phases for other cases. The thesis is based on six scientific articles, and the main contributions and conclusions from the articles are presented in the thesis. The articles present the development of the results throughout the study, and how the results have been adjusted and adapted, as the model was tested and validated. The articles consist of three papers presented at scientific conferences, and three articles submitted to scientific journals. In addition to the results, the thesis presents a detailed description of the scientific approach taken, as well as considerations in relation to the scientific approach and the achieved results.
Using facilitative skills in project management

Project management can be seen as a profession, discipline and conceptual framework. It has been developed from different fields, including military engineering, mechanical engineering, social sciences and construction. During recent decades, there has been a number of challenges as to its efficacy, for example disappointing project performance and lack of an appropriate project cooperation method due to new forms of cooperation possibilities. More and more organizations are engaged in contractual joint ventures, alliances and other forms of inter-organizational relationships. In addition, virtual cooperation, mediated by interconnected and diversified systems, is becoming more and more common. These relatively new forms of interaction imply new demands on skills and methods facilitating project cooperation within and among various organizations. Given the pervasiveness of these demands, project managers are frequently finding themselves in situations where using facilitating skills is not an option, but a requirement. Facilitation is to be viewed as a process of ‘obstetric’ aid to meet the challenges of coping with the changing conditions for project management described briefly above. The outcome of facilitation depends on at least four interrelated sets of conditions: a) The available time and resources in comparison to the complexity of the aim(s), b) the composition of the participants, c) the skills of the facilitator and d) the methods available to the facilitator. In this paper facilitating skills are identified and discussed in relation to the changing circumstances for project management. The approach used to achieve this paper’s objective includes a literature review, model building and reflection on facilitation skills based on the author’s experiences from facilitating workshops for company managers, public administrators, NGO’s and university professors / students around the world. In addition, this paper is based on the author’s many years of experience in supervising engineering students from for instance China, South Korea, Canada, US, Ghana and various European countries who have come to learn and practise facilitating skills as international students at Technical University of Denmark. The paper identifies facilitation skills at three different levels: the intellectual, emotional and synergistic level. An analysis is conducted based on a practical example of how engineering students are able to learn facilitative skills. The contributions of this paper to the field are an extension and a deepening of existing knowledge of facilitation skills at different levels. In addition, the paper includes a model regarding effective ways of combining various ways of knowing in a facilitation course for university students and future project managers.
What Drives Emergency Department Patient Satisfaction? An Empirical Test using Structural Equation Modeling

Patient satisfaction determinants in emergency departments (EDs) have for decades been heavily investigated. Despite great focus, a lack of consensus about which parameters are deemed most important remains. This study proposes an integrated framework for ED patient satisfaction, testing four key hypotheses concerning effects between the latent constructs wait time, information delivery, safety, and infrastructure. The framework allow ED decision makers insight into the magnitude of the latent constructs’ importance with appertaining statistical significance based on an ample empirical sample. Such information is valuable to illuminate where to launch high impact initiatives to increase current ED patient satisfaction levels.

Assessing technology in hospital logistical settings: Comparing Danish and Japanese healthcare

In order to cope with the future challenges of health care sectors all around the world, there is a need for monitoring and improving efficiency at the hospitals. This study presents a framework capable of measuring the performance of supporting logistical flows at hospitals as well as assessing the potential of implementing new technology. The framework has been constructed as a holistic tool both addressing the performance of the overall flow as well as that of the individual processes.

The framework has been developed and tested in both Denmark and Japan securing that the framework is applicable to health care institutions with very different backgrounds. Additionally the differences in-between the Danish and Japanese health care system have been identified as part of the process of developing and testing the framework. The study
showed that there are big differences in-between the health care systems, which has a large affect the use of technology.

**Implementing lean in surgery – lessons and implications**

The principles of lean production originating from the Toyota production system has spread from manufacturing to healthcare. Needless to say, this raises concern whether such principles are actually applicable where the product are humans in need of medical care and what are the consequences for the medical staff. The literature on lean does not suggest that lean should not be applicable in healthcare. Still this paper begins by discussing if the principles of lean from a theoretical perspective can be expected to work in healthcare. It is found that that it will be useful in certain types of settings but it is not a universal tool that may be applied to all aspects of healthcare. A case of lean in a surgical ward is presented and it is observed that patients have been split in to two flows, which can be described as a lean and a normal flow.
Improving blood sample logistics using simulation

Using simulation as an approach to display and improve internal logistics and handling at hospitals has great potential. This research will show how a simulation model can be used to evaluate changes made to two different cases of transportation of blood samples at a hospital, by evaluating different scenarios against the current situation. The simulation showed that big potential could be obtained by changing the current approach, implementing a pneumatic tube system showed that a reduction in transportation of up to 35% could be obtained.

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Strategic Simulation - Support of Innovation and Operation in Distribution and production Networks

Today's business environment is characterized by global competition, changing conditions, and uncertainty. Many Western companies have responded by developing global distribution and production networks. The increasingly challenging business environment and the more complex structure of companies put great emphasis on organisations ability to proactively develop and implement strategies that are dynamic and make it possible for the company to adapt to and plan for the changing circumstances.

Many approaches to strategy development exist, but most of them are based on either qualitative or quantitative approaches. Strategic simulation is the combination of narrative and numerical simulation and can be used as a tool to support strategic decision making by providing different scenarios in combination with computer modelling. The core of the combined simulation approach (CSA) is to make it possible for decision makers to systematically test several different outputs of possible solutions in order to prepare for future consequences. This systematic testing can make the strategy development more robust and create a more reflective and creative base for decision making.

The empirical part of the project was carried out as a case in GN Resound which is a Danish manufacturer of hearing aids. The project looked into how the supply chain could be further developed within distribution and production. Three new scenarios and strategies for the future distribution were examined in order to determine which one was the most cost efficient. It was found that the CSA could be used to investigate the different possible futures as well as give the researcher a deeper look into the organisation. The outsourcing and offshoring of production was also examined in order to define the total costs of the current outsourcing/offshoring strategy as well as the possible strategies. It was found that there were hidden costs in relation to outsourcing/offshoring that are significant and important to consider when making decisions. Especially the quality and the costs of poor quality must be taken into consideration.

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**Management-By-Objectives in Healthcare**

Concurrent to the hasty development within the medical, technological and organizational areas of healthcare, new initiatives are continuously implemented to improve quality of delivered care. To evaluate the effect of these initiatives, the application of performance measurement has become common practice for modern healthcare organizations. During the last decade, vast amounts of quality indicators, accreditation audits, satisfaction surveys etc. have become an integrated part of healthcare professionals’ daily work. Most of these measurement structures are well documented and well executed; collectively, however, they pose a significant drawback. The vast selection of self-contained initiatives limits the overview for decision makers and imposes an escalating administrative burden on operational staff members. Contrary to the initial objective, the expanding informational burden limits the overview and transparency for healthcare decision makers; as a result, well-documented initiatives fail to become integrated support in operational decision-making processes. This research work has thus striven to design a holistic Management-By-Objectives framework that can enable managers and operational personnel to assess performance in relation to the organizational expectations. The work concludes that by integrating all meaningful indicators into a “Performance Account”, an overview is established without losing the strength of detailed measures. The design of the Performance Account signifies that managers are able to incorporate those indicators they find useful in their department, and thus secure sufficient informational support for the department's decision-making processes. The Performance Account thereby eases the identification of areas suited for corrective actions, and provides the decision maker with a reliable informational foundation. The account has merits in a hectic environment, where the administrative burden consumes important time from the clinical work. The dissertation is composed of five scientific articles, together with a synopsis describing the most vital contributions and conclusions. Two articles have been presented at international scientific conferences, and three articles have been submitted to scientific journals. The papers present the development of the research study and successively describe the proposals. The synopsis describes in detail the scientific approach that has guided the study.

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**Combining Narrative and Numerical Simulation: A Supply Chain Case**

Strategic simulation is the combination of narrative and numerical simulation and can be used as a tool to support strategic decision making by providing different scenarios in combination with computer modelling. The core of the combined simulation approach (CSA) is to make it possible for decision makers to systematically test several different outputs of possible solutions in order to prepare for future consequences. The CSA can be a way to evaluate risks and address possible unforeseen problems in a more methodical way than either guessing or forecasting. This paper contributes to the decision making in operations and production management by providing new insights into modelling and simulation based on the combined narrative and numerical simulation approach as a tool for strategy making. The research question asks, “How can the CSA be applied in a practical context to support strategy making?” The paper uses a case study where interviews and observations were carried out in a Danish corporation. The CSA is a new way to address decision making and has both practical value and further expands the use of strategic simulation as a management tool.
Improving Hospital Logistics by Rethinking Technology Assessment

In order to cope with the future challenges of the health care sector, there is an urgent need for improving efficiency at hospitals. The study presents a framework enabling health care managers of improving the in-house logistics. The distinctiveness of the framework is the way in which it relates technology, logistics, structure and procedures to efficiency. Changing one factor, e.g., technology, initiates an iterative loop focusing on change in the related factors in order to obtain the optimal efficiency. The search for an optimal efficient solution is the driving force of the framework, and will secure one iterative circle followed by another in an endless journey. The framework represents innovation as a broad solution where iteration between important factors secures an optimal solution. The study is performed as a case study with close relations to the staff at an emergency department at a Danish hospital. The framework is tested on the blood sample logistics between the emergency department and laboratory with the goal of enhancing the efficiency of the emergency department.

Benchmarking in Healthcare Using Aggregated Indicators

Benchmarking has become a fundamental part of modern health care systems, but unfortunately, no benchmarking framework is unanimously accepted for assessing both quality and performance. The aim of this paper is to present a benchmarking model that is able to take different stakeholder perspectives into account. By presenting performance as a function of a patient perspective, an operations management perspective, and an employee perspective, a more holistic approach in benchmarking is proposed. By collecting statistical information from several national and regional agencies and internal databases, the model is constructed as a comprehensive hierarchy of indicators. By aggregating the outcome of each indicator, the model is able to benchmark healthcare providing units. By assessing performance deeper in the hierarchy, a more detailed view of performance is obtained. The validity test of the model is performed at a Danish non-profit hospital, where four radiological sites are benchmarked against each other. Because of the multifaceted perspective on performance, the model proved valuable both as a benchmarking tool and as an internal decision support system.
Operational benchmarking of Japanese and Danish hospitals
This benchmarking model is designed as an integration of three organizational dimensions suited for the healthcare sector. The model incorporates posterior operational indicators, and evaluates upon aggregation of performance. The model is tested upon seven cases from Japan and Denmark. Japanese hospitals focus on productivity and reducing errors provide operational benefits, which primarily is achieved by high degree of overwork among staff. Danish hospitals on the contrary pay the price of productivity, with focus on pleasing caring needs of the patient and limiting overwork among employees.
The sustainable utilization of human resources in global product development

This empirical paper investigates the challenges global product development faces in regard to a sustainable utilization of resources through case studies and interviews in six Danish multinational corporations. Findings revealed 3 key challenges, which relates to increased rework in product development and production, overlapping work and a lack of utilization of knowledge and information at the supplier or subsidiary. The authors suggest the use of strategic simulation in order to gain greater transparency in the global network and thus utilize resources better. Strategic simulation is the combination of numerical and narrative simulation and can be used as a tool to support strategic decisions regarding different scenarios. The use of this method promotes an ongoing iterative process to constantly clarify points of uncertainty and enhance adaptability in order to promote a sustainable process.

The sustainable utilization of human resources in global product development

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General information
State: Published
Organisations: Work, Technology and Organisation, Department of Management Engineering, Operations Management, Det Nationale Forskningscenter for Arbejdsmiljø, Aalborg University
Authors: Møller, N. (Intern), Pejtersen, J. H. (Ekstern), Nielsen, J. S. (Ekstern), Jacobsen, P. (Intern)
Number of pages: 232
Pages: 85-111
Publication date: 2010
Host publication information
Title of host publication: Lean og arbejdsmiljø - et dynamisk spændingsfelt
Place of publication: København
Publisher: L&R Business
ISBN (Print): 978-87-1142-644-9
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 269143
Publication: Education - peer-review › Book chapter – Annual report year: 2010

The sustainable utilization of human resources in global product development

This empirical paper investigates the challenges global product development faces in regard to a sustainable utilization of resources through case studies and interviews in six Danish multinational corporations. Findings revealed 3 key challenges, which relates to increased rework in product development and production, overlapping work and a lack of utilization of knowledge and information at the supplier or subsidiary. The authors suggest the use of strategic simulation in order to gain greater transparency in the global network and thus utilize resources better. Strategic simulation is the combination of numerical and narrative simulation and can be used as a tool to support strategic decisions regarding different scenarios. The use of this method promotes an ongoing iterative process to constantly clarify points of uncertainty and enhance adaptability in order to promote a sustainable process.

General information
State: Published
Organisations: Work, Technology and Organisation, Department of Management Engineering, Engineering Design and Product Development, Operations Management
Authors: Hansen, Z. N. L. (Intern), Rasmussen, L. B. (Intern), Hansen, M. S. (Intern), Ahmed-Kristensen, S. (Intern), Jacobsen, P. (Intern)
Publication date: 2010
Host publication information
Title of host publication: Proceedings for APMS conference
Main Research Area: Technical/natural sciences

Påvirker lean det psykosociale arbejdsmiljø?

General information
State: Published
Organisations: Work, Technology and Organisation, Department of Management Engineering, Operations Management, Det Nationale Forskningscenter for Arbejdsmiljø, Aalborg University
Authors: Møller, N. (Intern), Pejtersen, J. H. (Ekstern), Nielsen, J. S. (Ekstern), Jacobsen, P. (Intern)
Number of pages: 232
Pages: 85-111
Publication date: 2010
Host publication information
Title of host publication: Lean og arbejdsmiljø - et dynamisk spændingsfelt
Place of publication: København
Publisher: L&R Business
ISBN (Print): 978-87-1142-644-9
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 269143
Publication: Education - peer-review › Book chapter – Annual report year: 2010

Påvirker lean det psykosociale arbejdsmiljø?

General information
State: Published
Organisations: Work, Technology and Organisation, Department of Management Engineering, Operations Management, Det Nationale Forskningscenter for Arbejdsmiljø, Aalborg University
Authors: Møller, N. (Intern), Pejtersen, J. H. (Ekstern), Nielsen, J. S. (Ekstern), Jacobsen, P. (Intern)
Number of pages: 232
Pages: 85-111
Publication date: 2010
Host publication information
Title of host publication: Lean og arbejdsmiljø - et dynamisk spændingsfelt
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Publisher: L&R Business
ISBN (Print): 978-87-1142-644-9
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 269143
Publication: Education - peer-review › Book chapter – Annual report year: 2010

The sustainable utilization of human resources in global product development

This empirical paper investigates the challenges global product development faces in regard to a sustainable utilization of resources through case studies and interviews in six Danish multinational corporations. Findings revealed 3 key challenges, which relates to increased rework in product development and production, overlapping work and a lack of utilization of knowledge and information at the supplier or subsidiary. The authors suggest the use of strategic simulation in order to gain greater transparency in the global network and thus utilize resources better. Strategic simulation is the combination of numerical and narrative simulation and can be used as a tool to support strategic decisions regarding different scenarios. The use of this method promotes an ongoing iterative process to constantly clarify points of uncertainty and enhance adaptability in order to promote a sustainable process.

General information
State: Published
Organisations: Work, Technology and Organisation, Department of Management Engineering, Engineering Design and Product Development, Operations Management
Authors: Hansen, Z. N. L. (Intern), Rasmussen, L. B. (Intern), Hansen, M. S. (Intern), Ahmed-Kristensen, S. (Intern), Jacobsen, P. (Intern)
Publication date: 2010
Host publication information
Title of host publication: Proceedings for APMS conference
Main Research Area: Technical/natural sciences
A new approach for translating strategic healthcare objectives into operational indicators

The purpose of this paper is to propose a new performance measurement approach which enables healthcare managers to design a performance management system tailored for their individual settings. The model is based on the strategic goal of the individual health care facility. It has been developed over the last two years in cooperation with the radiology department at the Danish Hospital of Southern Jutland. The approach is aiming at compensating for some of the encountered shortcomings in the current strategic development process. By incorporating indicators at both tactical and operational level, a detailed and well-defined performance measurement structure is connected to the overall strategic plan. The increasing complexity in modern healthcare requires new improved performance management systems for healthcare institutions. The process of translating strategic objectives into a useful set of operational indicators is a difficult and hard task. In the healthcare area this is further complicated by the diverse interest of the three main stakeholders, i.e. the grant giving authorities, the patient and finally the employee. To be able to coordinate and manage these different requirements, a performance management system, encompassing performance indicators from all the three stakeholder groups is needed. Our approach was derived using the action research methodology. The work is based on a two year study, where information are collected from various data sources, including literary material, interviews, workshops and informal conversations with hospital staff. The indicator has to be described by following template. The template consists of Indicator name, Purpose, Responsible, Field of application, Indicator description, Displaying guidance, Data foundation, Indicator goal, Timeframe, Guiding documents, Benchmark and References. This structure is compatible with the reporting structure to the National Indicator Project (NIP) which is a mandatory for Danish hospitals. The indicator development approach is based on a hieratical step by step approach obeying the following two rules. 1. Indicators should not be assigned to individuals, which does not have organizational power to enforce, or full impact on the outcome. 2. Indicators should not be assigned to individuals, where the employee does not have the professional competencies to influence the outcome. The indicators would be developed through the organization, until one of the rules is violated. This means that it is an iterative process, where next indicator is confirmed by the two rules. If one of the rules are violated, the indicator line, are either stopped, or transformed into proxy indicators. This process of continuously repeating the rules, secures that indicators aren’t forced to deep in the organization. This approach was tested at the radiology department, and a detailed and refined 3-dimensional indicator landscape was constructed. The first axis indicates the four Balanced Scorecard areas, the second indicates the twelve strategic goals developed by hospital management, Abstract for EurOMA Conference Page 2/2 and third axis representing the planning levels. By using the proposed approach in the construction of performance indicators landscape, about 40 – 50 % of the indicators never reach the operational level. Meaning that there were seen a significantly decrease in indicators for local managers, which will lead to a more focussed management. The model also gives a more transparent and organization specific structure. Besides the models also provides each organizational level with the possibility to evaluate its own impact on overall strategic objectives.
Styring, kvalitet og design i sundhedssektoren

General information
State: Published
Authors: Restrepo-Giraldo, J. D. (Intern), Bansler, J. P. (Intern), Jacobsen, P. (Intern), Andersen, H. B. (Intern)
Number of pages: 17
Publication date: 2009

Publication information
Place of publication: Kgs. Lyngby
Publisher: DTU Management
Original language: Danish

Series: DTU Management 2009
Number: 4
Main Research Area: Technical/natural sciences
Electronic versions:
Restrepo-Giraldo et al 2009.pdf
Source: orbit
Source-ID: 248093
Publication: Research › Report – Annual report year: 2009

Optimization of the raw material use at Danish slaughterhouses

General information
State: Published
Organisations: Operations Research, Department of Management Engineering, Operations Management
Authors: Kjærgaard, N. C. (Intern), Clausen, J. (Intern), Jacobsen, P. (Intern)
Publication date: Sep 2008

Publication information
Original language: English

Series: IMM-PHD-2008-197
Main Research Area: Technical/natural sciences
Electronic versions:

Bibliographical note
PhD thesis published by DTU Management
Source: orbit
Source-ID: 220436
Publication: Research › Ph. D. thesis – Annual report year: 2008
Implementing lean in a surgical ward.

Using the well-known principles from lean management in an orthopedic surgical ward at a major Danish hospital reorganized their work-flow and processes. The ward has ten operating rooms and performs the complete range of the orthopedic procedures ranging from patients that need simple standard procedures to patients in need of complex emergency procedures. The primary result of the lean project has been to split the flow of patients in two. The first flow is concerned with highly standardized and non-emergency procedures, e.g., minor knee surgery. These surgeries are routine, predictable and can be planned in advance and meet the prerequisites for lean management. Two of ten operating rooms have been allocated to this flow. Selected surgeons, nurses and porters have been allocated to the two operating rooms and they remain in the sterile environment for the duration of the workday. The effect of the lean implementation has been a 33% increase in patient throughput. The second flow is unchanged and concerned with non-standard and emergency procedures, e.g., major hip surgery on old people or surgery on traffic victims. The surgeries within this flow are non-routine, unpredictable and cannot be planned (in detail) in advance. The remaining operating rooms are allocated to this flow and there have been no significant changes to the organization of work in these theaters. Lean management is derived from the Toyota production system and is a comprehensive system of tools and techniques for productivity improvement. Lean management has its origins in industrial production, but it is now being transferred to many other sectors, e.g., health care. Two important prerequisites exist for implementing lean management: Firstly, stable and standardized processes and secondly leveling of production. Stable and standardized processes ensure quality and predictability (e.g., process time). Leveling of production is essential for production planning. Based on the results of the case study of the surgical ward this paper will discuss three issues or challenges that emerged from the implementation of lean management. Firstly, is lean a suitable tool to increase productivity in the health care sector. Secondly, what are the major challenges associated with implementing lean in the health care sector. Special emphasis will be given to a discussion of the implementation of lean in a professional bureaucracy as a hospital ward and the preconditions for a successful implementation of lean in this particular environment? Thirdly, what are the effects of implementing lean on the work environment and can lean principles be applied without deteriorating the work environment of the employees? These three challenges will be analyzed and discussed using a number of different theoretical perspectives from, e.g., organization theory, lean and manufacturing management. The paper will conclude by outlining a number of recommendations for the successful implementation of lean in the health care sector.
hospital. This vision and strategic plan was the underlying basis of the work in the Master Thesis. The strategic plan consists of 4 strategic perspectives 1) Satisfied patients, 2) Creative development, 3) Healthy economy and finally 4) Good colleagues, which each of the hospitals departments should work against. The X-ray department subdivided perspectives into 14 strategic goals, which where more operational minded. First step in the development of KPI’s was to relate the competence areas with the 14 strategic goals. The developed measures are assumed to reflect the organizations performance towards the 14 strategic goals. The way the performance is presented is through a web based interactive version, where employees will have access to through the hospitals internal IT system. By displaying all KPI’s in an interactive environment, the individuals have the option of choosing exactly those indicators which catches the interest. Each one is not bound to look through all indicators, but should only click his or hers way right to the nerve. The same is the case for the department management could use this interactive tool, as a way of increasing efficiency of meetings, because they could just click onto those indicators of interest. Instead of printing out 25 indicators and going through each of them, it is possible to take a look at the 15 indicators of highest interest. The model where it stands today is not ready for implementation, because there still are a series of problem connected to implementing the model at the X-ray department at the Hospital of Southern Jutland. In the summer of 2008, the X-ray department is starting up a pilot project where the objective is to implement the first prototype based on the work in the Master thesis.

General information
State: Published
Organisations: Operations Management, Department of Management Engineering
Authors: Traberg, A. (Intern), Jacobsen, P. (Intern)
Publication date: 2008
Event: Poster session presented at ISQua conference 2008 : Healthcare Quality and Safety: Meeting the Next Challenges, Copenhagen, Denmark.
Main Research Area: Technical/natural sciences
Electronic versions:
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Source: orbit
Source-ID: 248041
Publication: Research - peer-review › Poster – Annual report year: 2008

Safety in the design of production lines

General information
State: Published
Organisations: Department of Management Engineering
Authors: Dyhrberg, M. B. (Intern), Broberg, O. (Intern), Jacobsen, P. (Intern)
Publication date: 2006

Host publication information
Title of host publication: Proceedings IEA2006 Congress : Meeting Diversity in Ergonomics
Main Research Area: Technical/natural sciences
Conference: Safety in the redesigning of production lines, Maastricht, 01/01/2006
Source: orbit
Source-ID: 190779
Publication: Research - peer-review › Article in proceedings – Annual report year: 2006

Safety in the redesigning of production lines
This paper is a case study report on how safety considerations were handled in the process of redesigning a production line. The design process was characterized as a specification and negotiation process between engineers from the company and the supplier organization. The new production line became safer, but not as a result of any intentional plan to integrate safety aspects into the design process. Instead, the supplier’s design of a new piece of equipment had a higher built-in safety level. The engineering team in the company was aware of the importance of safety aspects neither in the specification material nor in their face-to-face meetings with the supplier. Safety aspects were not part of their work practice. On this basis, it was suggested that formal guidelines or procedures for integrating safety in the design of production lines would have no effect. Instead, the researchers set up a ‘history workshop’ with the engineering team. The workshop clarified the sequence of events and discussions that took place during the design process and opened for a discussion of the role of safety aspects. During the workshop new insights emerged into the question of how to integrate safety aspects in the company’s future design processes.

General information
State: Published
Organisations: Department of Management Engineering
Authors: Dyhrberg, M. B. (Intern), Broberg, O. (Intern), Jacobsen, P. (Intern)
Number of pages: 6
Publication date: 2006
Some effects of integrated production planning in large-scale kitchens

Integrated production planning in large-scale kitchens proves advantageous for increasing the overall quality of the food produced and the flexibility in terms of a diverse food supply. The aim is to increase the flexibility and the variability in the production as well as the focus on freshness and nutritional status of the foods produced. Hence focus is turned to time and work planning in the production, as well as the use of semi prepared elements and the awareness that the production and distribution are means of satisfying the consumer at the time when the food is served. To do this, with out increases in production costs, the production must be highly planned and contain as few steps as possible. This can be obtained when basing the planning on the philosophies contained in Lean Thinking.

Some Effects of integrated Production Planning in Large-scale Kitchens

An integrated production system is a system that views the production, distribution, serving and ordering of meals as one uninterrupted supply chain stretching from the patient to the kitchen. To meet the stakeholders demands of flexibility, productivity, low cost, freshness etc. production must consist of as few steps as possible. When using the philosophies in Lean Manufacturing a concept obeying the above constraints can be created. The focus is turned to time and work planning in production, core competences in production and how to meet consumer demands. This means that the system is able to handle both consumer demands for flexible, freshly prepared menus and food service manager demands for up-to-date production systems.

Understanding a Firm in a Holonic Conceptual Framework

In history, production has been organized in mainly two different ways: Hierarchical or heterarchical (as network and/or modularized). However, a third way has been introduced by using the concept a holonic system of production (Brussel,
This concept is introduced and a model of a holonic system of production is used in analysing a concrete firm to demonstrate the advantages of this concept. Where the traditional analysis of a firm focus on capital, labour and raw material etc. (input) and the combination of these inputs in order of achieving a certain goal (output), the holonic approach sees machines and equipment as one of many artefacts where coordination and cooperation between human beings and between human beings and artefacts comes into focus. Analysing a production system using the holonic concept starts with the entity of a firm, the holon. The holon is defined as the smallest possible unit of production, which is able to produce on its own for a period of time, is self-regulating/autonomous and can communicate with other holons. The communication between holons in and outside a firm, ex stakeholders, is shown to be a very fruitful way to understand the existence of firms and why firms perform differently.

**General information**

State: Published
Organisations: Department of Management Engineering
Authors: Jensen, P. E. (Ekstern), Jacobsen, P. (Intern)
Publication date: 2005

**Host publication information**

Title of host publication: Understanding a Firm in a Holonic Conceptual Framework
Editor: P. E. J.
Main Research Area: Technical/natural sciences
Conference: PICMET '05, Portland, 05/11/1829
Links:
http://www.ipl.dtu.dk/publikation/9168/dk/
Source: orbit
Source-ID: 187849
Publication: Research - peer-review › Article in proceedings – Annual report year: 2005

**A new Perception of Product Definitions**

The purpose of this article is to describe how the term “product” has changed during the last 5 to 10 years in different branches and how this change has influenced the understanding and design of products as well as production systems. The global market place together with the development within computer technology has enforced the customers’ requirements of individual products and increased the content of knowledge in a product. To day, the physical embodiment of a product is becoming a smaller and smaller part of a products value chain. The product thus consists of a physical part and a large range of inbuilt services. Therefore, our perception of what a product is must change. The change will also influence the education of the engineers, as the concept for their work is changing.

**General information**

State: Published
Organisations: Department of Management Engineering
Authors: Jacobsen, P. (Intern)
Publication date: 2004

**Host publication information**

Title of host publication: IDMME 2004
Main Research Area: Technical/natural sciences
Conference: 5th International Conference on Integrgrated Design and Manufacturing in Mechanical Engineering, Bath, United Kingdom, 01/04/2004 - 01/04/2004
Links:
http://www.ipl.dtu.dk/publikation/8340/dk/
Source: orbit
Source-ID: 177938
Publication: Research - peer-review › Article in proceedings – Annual report year: 2004

**Meal Elements - a Way of optimising ready to eat Meals**

The aim of this project is to develop a concept for improvement of the quality of food produced in large-scale kitchens. Using meal elements in large-scale kitchens in combination with production planning and over-all structuring of activities generally improves the quality of the meal prepared.

**General information**

State: Published
Organisations: Food Biotechnology and Engineering Group, Department of Systems Biology, Department of Management Engineering
Authors: Engelund, E. H. (Intern), Friis, A. (Intern), Jacobsen, P. (Intern)
Number of pages: 150
Publication date: 2004
Production of Modularised Product Systems

Abstract: To day, more and more products are customized. Trends are not only to sell a product to the customer, but to sell a product system. The system can either be a combination of physical products or physical products together with some kind of service. Customers get in this way not a product but a solution. Modularisation is one tool used in designing the products. Designing and controlling a production system making customized products in an economical way is not an easy task. In order to fulfil the Lean and Agile manufacturing philosophies the production is often carried out in networks. Here the decoupling point has a central role. The scope for this article is therefore to analyse the possibilities for using modularisation in designing and controlling a production system. How will the development of modularised product systems influence the production system? In the paper, a case will be used to support the ideas.

Philosophy Regarding the Design of Production Systems

Design of Production Systems
MERIP Menneskelige ressourcer i produktionen

General information
State: Published
Organisations: Department of Management Engineering
Authors: Jacobsen, P. (Intern)
Number of pages: 85
Publication date: 2001

Publication information
Place of publication: Kgs. Lyngby, Danmark
Publisher: Danmarks Tekniske Universitet (DTU)
Original language: Danish
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 62790
Publication: Research › Report – Annual report year: 2001

Simulation

General information
State: Published
Organisations: Operations Management, Department of Management Engineering
Authors: Jacobsen, P. (Intern)
Number of pages: 41
Publication date: 2001

Publication information
Original language: English
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 62801
Publication: Education › Book – Annual report year: 2001

Computer Integrated Production: Text book for DTU Course no. 80206

General information
State: Published
Organisations: Department of Manufacturing Engineering
Authors: Langer, G. (Intern), Sørensen, C. (Intern), Schnell, J. (Intern), Larsen, M. H. (Intern), Jacobsen, P. (Intern), Lenau, T. A. (Intern)
Number of pages: 100
Publication date: 1999

Publication information
Place of publication: Lyngby
Publisher: IPT, DTU
Original language: English
Main Research Area: Technical/natural sciences
Links:
http://gilad.kpd.ipt.dtu.dk/80206/
Source: orbit
Source-ID: 174321
Publication: Research - peer-review › Book – Annual report year: 1999
Beskrivelse og modellering af produktionssystemer, Hillerød Sygehus: Hillerød Sygehus, Øre-næse-,halsafdelingen

General information
State: Published
Organisations: Department of Manufacturing Engineering
Authors: Jacobsen, P. (Intern)
Publication date: 1998

Publication information
Original language: Danish
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 168502
Publication: Research - peer-review › Report – Annual report year: 1998

MERIP - Design of Production Systems with focus on Human Resources

General information
State: Published
Organisations: Department of Manufacturing Engineering
Authors: Jacobsen, P. (Intern), Knudsen, M. K. L. (Intern)
Publication date: 1998

Host publication information
Title of host publication: MERIP - Design of Production Systems with focus on Human Resources
Main Research Area: Technical/natural sciences
Conference: 13th Integrated Productions Systems Research Seminar (IPS'98), Fuglsoe, Denmark, 01/01/1998
Source: orbit
Source-ID: 171933
Publication: Research - peer-review › Book chapter – Annual report year: 1998

Beskrivelse og modellering af produktionssystemer, Tulip: Tulip International A/S, farsbehandling

General information
State: Published
Organisations: Department of Manufacturing Engineering
Authors: Jacobsen, P. (Intern)
Publication date: 1997

Publication information
Original language: Danish
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 168501
Publication: Research - peer-review › Report – Annual report year: 1997

Description and modelling of structural properties of production systems

General information
State: Published
Organisations: Department of Manufacturing Engineering
Authors: Rudolph, C. (Intern), Jacobsen, P. (Intern), Bilberg, A. (Intern)
Publication date: 1997

Conference: 12th Integrated Productions Systems Research Seminar (IPS'97), Fuglsoe, Denmark, 01/01/1997
Main Research Area: Technical/natural sciences

Publication information
Journal: Passion for Integration in Manufacturing
Volume: 1
Issue number: 1
Original language: English
Source: orbit
Description, Modelling and Design of Production Systems

Design of production systems are rarely an activity in which decision makers in most production companies have much experience. In future, this activity is to be more recurrent due to more and more frequent changes in the production task. Consequently, the decision makers are in need of better management tools and methods for description and modelling of production systems supporting the decisions. In this article a structural framework to describe and model production systems will be introduced, and it is shown how the production system of a minor Danish manufacturer of electromechanical equipment has been described by use of the framework.

General information
State: Published
Organisations: Department of Manufacturing Engineering
Authors: Jacobsen, P. (Intern), Rudolph, C. (Intern)
Publication date: 1997

Host publication information
Title of host publication: 32th international Matador Conference
Publisher: Udefineret
Editor: A. K.
Main Research Area: Technical/natural sciences
Conference: The 32nd International Matador Conference, Manchester, 01/01/1997
Links:
http://www.ipl.dtu.dk/publikation/6880/dk/
Source: orbit
Source-ID: 186859
Publication: Research - peer-review › Article in proceedings – Annual report year: 1997

Description and modelling of structural properties of production systems

General information
State: Published
Organisations: Department of Manufacturing Engineering
Authors: Bilberg, A. (Intern), Jacobsen, P. (Intern)
Publication date: 1997

Host publication information
Title of host publication: Passion for Integration in Manufacturing
Place of publication: Aalborg
Publisher: Department of Production
Main Research Area: Technical/natural sciences
Conference: 12th Integrated Productions Systems Research Seminar (IPS’97), Fuglsoe, Denmark, 01/01/1997
Source: orbit
Source-ID: 165906
Publication: Research › Article in proceedings – Annual report year: 1997

Projects:

Supplier Relationship Management at FLSmidth

Department of Management Engineering
Period: 01/10/2017 → 30/09/2020
Number of participants: 4
Phd Student:
Piatto, Alberto (Intern)
Supervisor:
Herbert-Hansen, Zaza Nadja Lee (Intern)
Linder, Anders (Ekstern)
Main Supervisor:
Jacobsen, Peter (Intern)
Financing sources
Source: Internal funding (public)
Name of research programme: Industrial PhD
Project: PhD

Conceptual Modelling for Product Configuration Systems
Department of Management Engineering
Period: 01/05/2014 → 21/09/2017
Number of participants: 6
Phd Student:
Shafiee, Sara (Intern)
Supervisor:
Mortensen, Niels Henrik (Intern)
Main Supervisor:
Hvam, Lars (Intern)
Examiner:
Jacobsen, Peter (Intern)
Malis, Martin (Intern)
Vareilles, Elise (Ekstern)

Financing sources
Source: Internal funding (public)
Name of research programme: Industrial PhD
Project: PhD

Technology and Logistics in Health Care
Department of Management Engineering
Period: 01/01/2014 → 02/04/2017
Number of participants: 5
Phd Student:
Feibert, Diana Cordes (Intern)
Main Supervisor:
Jacobsen, Peter (Intern)
Examiner:
Hvam, Lars (Intern)
Hald, Kim Sundtoft (Ekstern)
Åhlström, Pär (Ekstern)

Financing sources
Source: Internal funding (public)
Name of research programme: Samfinansierede - Virksomhed

Relations
Publications:
Improving Healthcare Logistics Processes
Project: PhD

Patterns in Patients Behavior when reorganizing Out-of house Care in the Capital Region of Denmark
Department of Management Engineering
Period: 01/12/2013 → 31/01/2015
Number of participants: 3
Phd Student:
Duthiers, Nadia Monique (Intern)
Supervisor:
Lippert, Freddy (Ekstern)
Main Supervisor:
Jacobsen, Peter (Intern)
Financing sources
Source: Internal funding (public)
Name of research programme: Samfinansierede - Virksomhed
Project: PhD

Complexity Management
Department of Management Engineering
Period: 01/11/2013 → 18/05/2017
Number of participants: 6
Phd Student:
Myrodia, Anna (Intern)
Supervisor:
Mortensen, Niels Henrik (Intern)
Main Supervisor:
Hvam, Lars (Intern)
Examiner:
Jacobsen, Peter (Intern)
Malis, Martin (Intern)
Olhager, Jan Erik (Ekstern)

Financing sources
Source: Internal funding (public)
Name of research programme: Samfinansierede - Virksomhed
Project: PhD

Bæredygtig produktion og logistik baseret på Cradle to cradle princippet
Department of Management Engineering
Period: 01/02/2013 → 30/01/2017
Number of participants: 6
Phd Student:
Larsen, Samuel Brüning (Intern)
Supervisor:
Akkerman, Renzo (Intern)
Main Supervisor:
Jacobsen, Peter (Intern)
Examiner:
Hvam, Lars (Intern)
Bilberg, Arne (Intern)
Olhager, Jan Erik (Ekstern)

Financing sources
Source: Internal funding (public)
Name of research programme: Institut stipendie (DTU)
Project: PhD

Management of business processes for global ERP implementations
Department of Management Engineering
Period: 01/05/2012 → 01/09/2016
Number of participants: 7
Phd Student:
Rahimi, Fatemeh (Intern)
Supervisor:
Haug, Anders (Intern)
Møller, Charles (Ekstern)
Main Supervisor:
Hvam, Lars (Intern)
Examiner:
Jacobsen, Peter (Intern)
Drews, Paul (Ekstern)
Tambo, Torben (Ekstern)

Financing sources
Source: Internal funding (public)
Name of research programme: ErhvervsPhD-ordningen VTU
Project: PhD

Development of a Generic Performance Measurement Model in an Emergency Department

Department of Management Engineering
Period: 01/04/2012 → 18/06/2015
Number of participants: 7
Phd Student:
Sørup, Christian Michel (Intern)
Supervisor:
Forberg, Jakob Lundager (Ekstern)
Ravn, Lisbet Isenberg (Ekstern)
Main Supervisor:
Jacobsen, Peter (Intern)
Examiner:
Larsen, Jesper (Intern)
Ceglarek, Dariusz J. (Ekstern)
Laursen, Jens Ole (Ekstern)

Financing sources
Source: Internal funding (public)
Name of research programme: 1/3 FUU, 1/3 inst 1/3 Andet
Project: PhD

Advanced planning approaches for small- and medium-sized enterprises

Department of Management Engineering
Period: 01/12/2011 → 04/07/2016
Number of participants: 8
Phd Student:
Herczeg, Gabor (Intern)
Supervisor:
Akkerman, Renzo (Intern)
Jacobsen, Peter (Intern)
Jensen, Per Langaa (Intern)
Main Supervisor:
Hauschild, Michael Zwicky (Intern)
Examiner:
Hvam, Lars (Intern)
Govindan, Kannan (Ekstern)
Olhager, Jan Erik (Ekstern)

Financing sources
Source: Internal funding (public)
Name of research programme: Institut stipendie (DTU)
Project: PhD

Business Intelligence for Engineeringvirksomheder

Department of Management Engineering
Period: 15/10/2010 → 26/05/2014
Number of participants: 6
Phd Student:
Ulrikkeholm, Jeppe Bjerrum (Intern)
Brug af ny teknologi af logistik og servicesystemer i sundhedssektoren

Department of Management Engineering
Period: 01/06/2010 → 20/09/2013
Number of participants: 5
Phd Student:
Jørgensen, Pelle Morten Thomas (Intern)
Main Supervisor:
Jacobsen, Peter (Intern)
Examiner:
Hvam, Lars (Intern)
Bilberg, Arne (Intern)
Ceglarek, Darek J. (Ekstern)

Financing sources
Source: Internal funding (public)
Name of research programme: ErhvervsPhD-ordningen VTU
Project: PhD

Udvikling af systemleverancer hos entreprenører

Department of Management Engineering
Period: 01/01/2010 → 22/11/2013
Number of participants: 6
Phd Student:
Kudsk, Anders (Intern)
Supervisor:
Thuesen, Christian (Intern)
Main Supervisor:
Hvam, Lars (Intern)
Examiner:
Jacobsen, Peter (Intern)
Sunnersjö, Staffan C. (Ekstern)
Vibæk, Kasper Sánchez (Ekstern)

Financing sources
Source: Internal funding (public)
Name of research programme: Institut, samfinansiering
Project: PhD

Campaign Planning within the Pharmaceutical Industry

Department of Management Engineering
Period: 01/09/2009 → 03/11/2014
Number of participants: 4
Phd Student:
Oddsdottir, Thordis Anna (Intern)
New Product Start Up in Pharmaceutical Production

Department of Management Engineering
Period: 01/09/2009 → 21/02/2014
Number of participants: 8
PhD Student:
Hansen, Klaus Reinholdt Nyhuus (Intern)
Supervisor:
Akkerman, Renzo (Intern)
Gani, Rafiqul (Intern)
Grunow, Martin (Intern)
Main Supervisor:
Hvam, Lars (Intern)
Examiner:
Jacobsen, Peter (Intern)
Jósef, Váncza (Ekstern)
Olhager, Jan Erik (Ekstern)

Financing sources
Source: Internal funding (public)
Name of research programme: Institut stipendie (DTU)
Project: PhD

IT based management-by-objectives in hospitals

Department of Management Engineering
Period: 01/05/2008 → 28/09/2011
Number of participants: 5
PhD Student:
Traberg, Andreas (Intern)
Main Supervisor:
Jacobsen, Peter (Intern)
Examiner:
Rasmussen, Lauge Baungaard (Intern)
Ceglarek, Darek J. (Ekstern)
Jensen, Kenneth (Ekstern)

Financing sources
Source: Internal funding (public)
Name of research programme: Institut stipendie (DTU)
Project: PhD

Informationssvigt i forbindelse med patientoverførsel

Department of Management Engineering
Period: 01/04/2008 → 28/09/2011
Number of participants: 6
PhD Student:
Siemsen, Inger Margrete (Intern)
LEAN uden stress : Udvikling af et bæredygtigt produktionsprincip

Work, Technology and Organisation

Det Nationale Forskningscenter for Arbejdsmiljø

Aalborg University

Period: 01/10/2006 → 30/09/2009
Number of participants: 12
Project ID: 80748

Project participant:
Edwards, Kasper (Intern)
Jensen, Per Langaa (Intern)
Jacobsen, Peter (Intern)
Bramming, Pia (Intern)
Pejtersen, Jan (Intern)
Hasle, Peter (Intern)
Bojesen, Anders (Intern)
Nielsen, Jacob S. (Ekstern)
Nielsen, Anders Paaruo (Ekstern)
Matthiesen, Rikke (Ekstern)
Johansen, John (Ekstern)

Project Manager, organisational:
Møller, Niels (Intern)

Financing sources
Source: Forskningsrådene - Andre
Name of research programme: Forskningsrådene - Andre
Amount: 5,948,574.00 Danish Kroner

Relations
Activities:
Lean, arbejdsmiljø, social kapital og relationel koordinering: Erfaringer fra forskningsprojekter
Trivsel på arbejdspladsen – handlinger og muligheder
Lean og arbejdsmiljø
Lean without stres: The dangers and opportunities of lean
Social kapital – teori, begreber og cases

Press / Media items:
Lean kan løfte arbejdsglæden

Project

Udvikling af produktionsnetværk - Strategisk simulering til støtte af innovation og drift

Department of Management Engineering
Safety in design
The project examines how it is possible to include safety in the design of production lines.

Department of Management Engineering
Risø National Laboratory for Sustainable Energy
Arbejdsmiljøinstituttet
Period: 01/01/2005 → 01/07/2007
Number of participants: 5
Project participant:
Broberg, Ole (Intern)
Jacobsen, Peter (Intern)
Pedersen, Merete (Intern)
Bach, Elsa (Ekstern)
Project Manager, organisational:
Dyhrberg, Mette Bang (Intern)

Financing sources
Source: Udenfor rammen
Name of research programme: Ukendt
Amount: 2,800,000.00 Danish Kroner
Project

Optimal råvareanvendelse og ordreafvikling på svineslagterier
Department of Management Engineering
Period: 01/10/2004 → 24/09/2008
Number of participants: 7
Phd Student:
Kjærgaard, Niels Christian (Intern)
Supervisor:
Hagdrup, Claus (Ekstern)
Jacobsen, Peter (Intern)
Main Supervisor:
Clausen, Jens (Intern)
Examiner:
Juel, Henrik (Intern)
Rasmussen, Svend (Ekstern)
vander Betteray, Klemens (Ekstern)

Financing sources
Source: Internal funding (public)
Name of research programme: ErhvervsPhD-ordningen VTU
Application of Product Configuration Systems in Engineering Companies

Department of Management Engineering
Period: 01/05/2004 → 11/11/2009
Number of participants: 6
Phd Student:
Ladeby, Klaes Rohde (Intern)
Supervisor:
Pedersen, Niels (Ekstern)
Main Supervisor:
Pedersen, Jørgen Lindgaard (Intern)
Examiner:
Jacobsen, Peter (Intern)
Johannesson, Hans L. (Ekstern)
Møller, Charles (Ekstern)

Financing sources
Source: Internal funding (public)
Name of research programme: ErhvervsPhD-ordningen VTU
Project: PhD

Danish Micro Factory
Under preparation

Department of Management Engineering

Chempaq A/S
Byrum A/S
Microbotic A/S
Møller & Devicon A/S
Radiometer Medical ApS
Visiopharm
Widex A/S
Teknologisk Institut
Sensor Technology Center A/S

University of Southern Denmark
Period: 01/01/2004 → 01/12/2007
Number of participants: 17
Project participant:
Gegeckaite, Asta (Ekstern)
Fugl, Jimmy (Ekstern)
Gregersen, Johan (Ekstern)
Jacobsen, Peter (Intern)
Kjaer, Erik Michael (Intern)
Michelsen, Aage U (Intern)
Ulrik Darling Larsen (Ekstern)
Henrik Andersen (Ekstern)
Michael Munk (Ekstern)
Lars Juel Christensen (Ekstern)
Michael Grunkin (Ekstern)
Jørn Vestergaard (Ekstern)
Leif Hejslet Christensen (Ekstern)
Måltidselementer - Optimering af produktion af distribuerede måltider

National Food Institute
Period: 01/08/2003 → 30/04/2008
Number of participants: 6
Phd Student:
Engelund, Eva Høy (Intern)
Supervisor:
Jacobsen, Peter (Intern)
Main Supervisor:
Friis, Alan (Intern)
Examiner:
Nielsen, Jette (Intern)
Christiansen, Thomas Bøhm (Intern)
Creed, Philip (Ekstern)

Financing sources
Source: Internal funding (public)
Name of research programme: Offentlig finansiering
Project: PhD

Produktmodellering i virksomhedsnetværk

Department of Management Engineering
Period: 01/01/2001 → 09/01/2006
Number of participants: 5
Phd Student:
Malis, Martin (Intern)
Main Supervisor:
Hvam, Lars (Intern)
Examiner:
Jacobsen, Peter (Intern)
Jensen, Lars Jepsen (Ekstern)
Olsen, Rasmus Friis (Intern)

Financing sources
Source: Internal funding (public)
Name of research programme: Samarbejdsaftalefinans
Project: PhD

MERIP - Human Ressources in Production

The way in which the industry has involved the human resources in production systems, has changed in last decades. Previously the human resources were mainly considered as means to link together the technical systems, while today they are key resources responsible for development, planning and production. This development has been a continuous process, and it has been supported by several research- and development projects in cooperation with Danish Industry, CO Industry and The Technical University of Denmark. MERIP (Human ressources in production) is a continuation of this type of projects, aiming at increasing the competitive power of the companies. However MERIP scientists want to involve the human resources in the production in new ways. Therefore the objective of the project is to develop methods for design of production systems, that use every possibility in human resources supported by the technology aiming at increasing the competitive power of the companies. The project has contact to a number of companies who contribute with
data about construction and function of their production systems. Those "Case-companies" will form an important basis for the development of production systems, and they will function as sparring partners for the project. MERIP will in this way be able to inform the industry about new ways in development of production systems - and suggest how the industry could prepare themselves for competitive production systems of the future. A production system is surrounded by groups of partners with different interests in the design of the system. The interests sets the boundaries for the production system. Based on an analysis of these interests the production system will be designed on four subjects, · The structuring of production tasks, · Competence, · Technology · Information

Department of Applied Engineering Design and Production

Department of Management Engineering

Department of Mechanical Engineering

The Royal Danish School of Educational Studies

Copenhagen Business School

University of Copenhagen
Number of participants: 2
Project participant:
Barfod, Ari (Intern)

Project Manager, organisational:
Jacobsen, Peter (Intern)

Financing sources
Source: Unknown
Name of research programme: Ukendt
Amount: 7,500,000.00 Danish Kroner

MERIP - Human Resources in Production
The way in which the industry has involved the human resources in production systems, has changed in last decades. Previously the human resources were mainly considered as means to link together the technical systems, while today they are key resources responsible for development, planning and production. This development has been a continuous process, and it has been supported by several research- and development projects in cooperation with Danish Industry, COindustry and The Technical University of Denmark. MERIP (Human resources in production) is a continuation of this type of projects, aiming at increasing the competitive power of the companies. However MERIP scientists want to involve the human resources in the production in new ways. Therefore the objective of the project is to develop methods for design of production systems, that use every possibility in human resources supported by the technology aiming at increasing the competitive power of the companies. The project has contact to a number of companies who contribute with data about construction and function of their production systems. Those "Case-companies" will form an important basis for the development of production systems, and they will function as sparring partners for the project. MERIP will in this way be able to inform the industry about new ways in development of production systems - and suggest how the industry could prepare themselves for competitive production systems of the future. A production system is surrounded by groups of partners with different interests in the design of the system. The interests sets the boundaries for the production system. Based on an analysis of these interests the production system will be designed on four subjects, · The structuring of production tasks, · Competence, · Technology · Information

Department of Management Engineering

Department of Applied Engineering Design and Production

Department of Mechanical Engineering

The Royal Danish School of Educational Studies

Copenhagen Business School

University of Copenhagen
Number of participants: 4
Project participant:
Jacobsen, Peter (Intern)
Knudsen, Mads Kristian Lund (Intern)
Rudolph, Carsten (Intern)

Project Manager, organisational:
Design and Modelling of Production Systems
The mission of the project is to develop new ways of designing and modelling production systems. The project will compare the design of a production for an electro-mechanical production system with the design for a production system inside healthcare and non-mechanical production. The term production system should be defined widely. One goal for a production system is to minimize the throughput time with a minimal usage of resources. This goal should be obtained by fulfilling the specified mission and politics for the system. Simulation will be used as a tool to describe the different production systems. Possibilities for transferring theories developed inside traditional electro-mechanical production into areas such as healthcare will be investigated by analysing the result of the comparison. Specified companies will be used as cases.

Department of Applied Engineering Design and Production
Department of Management Engineering
Department of Mechanical Engineering
The Royal Danish School of Educational Studies
Copenhagen Business School
University of Copenhagen

Period: 01/03/1995 → 01/03/1998
Number of participants: 2
Project participant:
Barfod, Ari (Intern)
Project Manager, organisational:
Jacobsen, Peter (Intern)

Financing sources
Source: Unknown
Name of research programme: Ukendt
Amount: 7,500,000.00 Danish Kroner
Project