

Quantitative Process Maps

A Concept for Prioritization of Business Process Improvement Projects

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Abstract: Modern large-scale companies are facing the challenge of how to prioritize improvement projects for business processes. This article offers a concept on how to approach this challenge using quantitative process maps. For the process maps treemaps are used, visualizing the most important processes of a company and the degree of needed change. Inside the article, the way to build up the process map, deriving important processes from the strategy and evaluating them regarding risks, maturity level, key performance indicators and given improvement ideas from idea management, is described. The paper also offers a concept for building up responsibilities and structuring the yearly process for process optimization.

1 INTRODUCTION

Process optimization is part of the continuous and discontinuous improvement of all companies. Within the companies there is the question of how to prioritize process optimization in order to efficiently and effectively use existing resources to conduct process improvement projects. This paper presents the concept of quantitative process maps to support companies to prioritize process improvements.

The next paragraph explains what would be needed to set up a quantitative process map. Starting with the prioritization of process improvements in the first step transparency over the processes of the company is needed. But actual process maps, giving an overview over the processes of a company on top level, are often unstructured and in many cases they contain functions instead of processes. And even if the process map contains processes those processes often do not include the relevant interfaces, which is a lack of structure.

In the second step the most important processes have to be derived. There are some methods for identification of core processes based on strategy and risks, but the connection to the process map is missing in general. Besides most methods focus on core processes in terms of value adding processes, but support and management processes might also be highly relevant.

The third step contains an evaluation of the

processes to identify the needed degree of change. Existing methods for evaluation do consider maturity level, key performance indicators and needs for improvement out of the idea management but separated and not as an integrated top-down and bottom-up concept.

Within the fourth step the results are visualized. The visualization for example using a state of the art process map is only qualitative but quantitative aspects are missing. Therefore the concept presented in this article is using a treemap for quantitative visualization.

2 STATE OF THE ART

Within this section the requirements of companies and their existing concepts for prioritization of process improvements are described. Afterwards the concepts, that can be found in literature, are described and evaluated regarding the fulfilment of the requirements of the companies.

2.1 Requirements and Concepts of Companies

The concept presented in this article is a result of research done at the author's institute including the recently finished benchmarking study on lean

administration and different industrial projects. Within the benchmarking study the lean, continuous improvement and process management staff units of mostly large-scale companies were examined. In total 56 companies did take part via questionnaire. 12 companies were interviewed by phone and 6 companies were visited personally for information exchange.

One of the main challenges of those staff units in indirect areas is the improvement of processes. There are different concepts used for improvements. A few highly developed companies use adequate process maps in combination with maturity models and process monitoring tools. But in most of the companies the decision for process improvement is driven by problems within daily business. It can be stated, that structured concepts for prioritization of process optimizations are missing within industry.

Figure 1 gives an example for a process map of a high developed company out of the benchmarking study. The process map is structured into management, core and support processes and contains end-to-end processes.

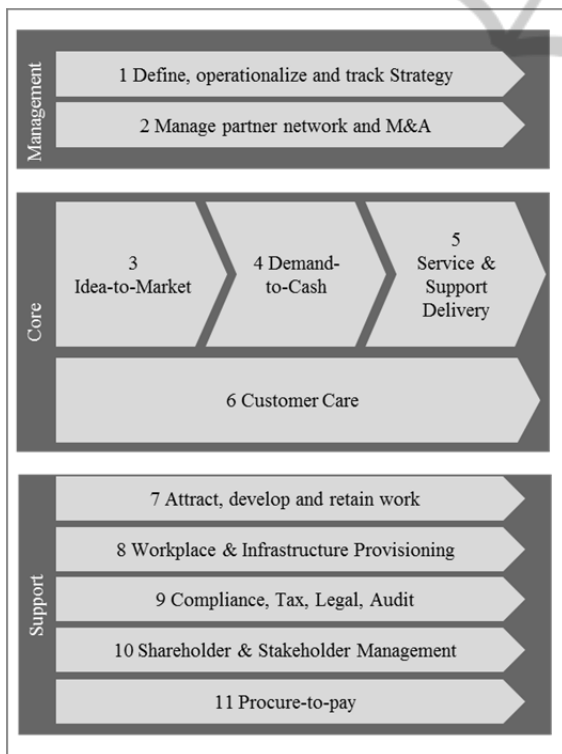


Figure 1: Process Map (Benchmarking Lean Administration, 2014).

In praxis, companies are evaluating opportunities and risks as part of the annual report. Out of those opportunities and risks the requirements for process

changes can be derived. For example Bayer is describing in its annual report the opportunities of the company’s innovation capability (Bayer, 2012) which should result in the optimization of the development and time-to-market process. On the other hand there are risks mentioned. There are legal, financial, IT, regulatory and other risks described. Those risks might also be taken into account when thinking about process changes. But often, companies do change processes because there are problems occurring in daily business. Priorities for optimization should consider top down input.

Within the last years, shopfloor management concepts including regular, at least weekly, meetings and visual management as well as problem solving processes, were implemented into indirect areas. But most often the connection to process improvements is missing. There is a good opportunity to include bottom up input also from idea management.

The benchmarking study also showed, that most of the successful companies did already set up staff units for improvement activities but the focus on business process improvement is often missing.

The requirements from companies regarding the prioritization of process optimization projects are summed up in figure 2:

	Companies would like to know how to select the right processes for optimization • Which processes are important? • Which processes are critical?
	Companies would like to derive processes for improvement from strategy • What is the strategy? • How are processes connected to strategy?
	In order to have transparency companies want to have process maps on top level • What should a process map look like?
	Companies want to have concepts for evaluation of processes • How can processes be evaluated in order to prioritize for improvement?
	Companies want to include bottom up input • Which bottom up input can be used? • How can it be used?
	Companies want to create responsibilities with specific process management tasks • What does my staff unit has to look like?

Figure 2: Requirements of companies (Benchmarking Lean Administration, 2014).

2.2 Concepts in Literature

The relevant literature has been analysed regarding the requirements of the companies. There is only little academic research in the area of process maps

for whole companies (Dumas, 2013) but there are different concepts which can be used for structuring companies by processes. One of the most popular concepts is the Value Chain by Porter (Porter, 1985), differentiating between core and support processes. There are other concepts taking also into account the environment of the company. One of those concepts is the New St.Galler Management Model (Bleicher, 2011), which is considering different stakeholders and other categories. This concept is especially useful, because it offers the possibility to connect the processes to the strategy. And of course the strategy of a company is one major driver for process changes and improvements. If for example a competitor is getting better and better regarding delivery times, out of the risk of losing market shares the strategy of the company might result in also shortening delivery times considering an optimization of the order fulfillment process.

In addition to the top level approaches, there are different concepts for process improvements including reengineering concepts. These concepts are not directly focussing on prioritization of process optimizations, but they do partly contain process selection and process derivation from strategy.

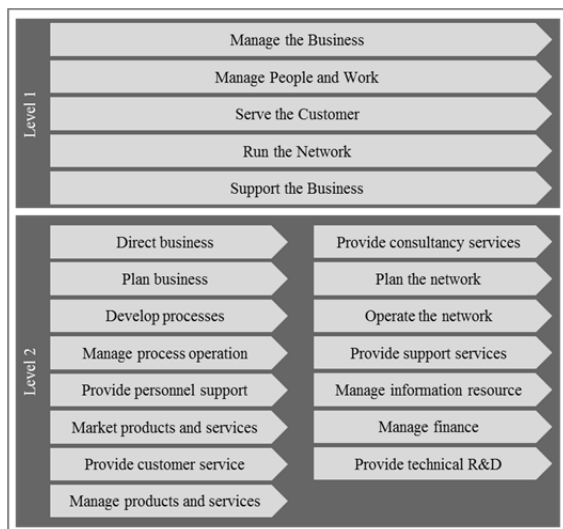


Figure 3: Key business processes of British Telecom (Davenport, 1993).

Within the concept of process innovation (Davenport, 1993) the appropriate number of major processes is set between 10 and 20 in order to make each process small enough to be understood. This range also allows to distinguish into operational and management processes, which might be redesigned in a different way. Davenport gives an example of key business processes of British Telecom on level 1

and level 2, which can be seen in Figure 3.

Davenport describes the need for transparency and structure about processes on top level, but does not give any information on how to reach it.

The concept of business reengineering (Hammer und Champy, 1993) states, that decision for the right processes for optimization is not easy but it is important, because no company can improve all relevant processes at the same time. Therefore, three criteria for selecting the right processes for reengineering are used:

- processes with problems
- processes with high importance to the customers
- processes where redesign is feasible

The following examples are given: A product development process which has developed no new products for five years is dysfunctional. The bigger the process and the higher the costs are the more likely it is, that the reengineering fails. It is stated that there is no description of a formal approach for selection of processes for reengineering and that management could also ask other questions, for example regarding the strategic relevance of a process or the importance for customer satisfaction or regarding performance in comparison to other competitors (Hammer und Champy, 1993). Within the concept of business reengineering the selection of processes has to be done mainly based on experience.

Davenport says, that the selection process is crucial to the success of innovation efforts (Davenport, 1993). He names five key activities in identifying processes:

- Enumerate major processes
- Determine process boundaries
- Assess strategic relevance of each process
- Render high-level judgements of the "health" of each process
- Qualify the culture and politics of each process

The first two steps can be understood as creating transparency about existing processes. The third step "assess strategic relevance of each process" is the first part of process selection. Within process selection Davenport names four criteria:

- The process's centrality to the execution of the firm's business strategy
- process health
- process qualification and
- manageable project scope

He also gives some examples:

If the strategy of a company is the improvement of relationships with customers. The company will

want to provide superior customer service, and therefor will select processes at the customer interface for innovation.

The selection on basis of health includes evaluation of work-in-process, responsibilities and number of interfaces.

The last point in process selection is the process qualification, where the cultural and political climate of a target process is evaluated. There should be a sponsor and real business need for improvement (Davenport, 1993).

Davenport also, like Hammer and Champy, states, that it is important to take an organization's capabilities and resources into account. He says, that most companies cannot successfully deal with several process innovation projects at the same time (Davenport, 1993).

In comparison to Hammer and Champy, Davenport lays a stronger focus on evaluation of processes and bottom up input for process selection.

The concept of business process reengineering by Johansson focusses on process selection within the discover phase (Johansson, 1993). The phase consists of the four steps: mobilize, assess, select and engage.

After Johansson a multifunctional team has to be set up, then the strategy has to be confirmed, identifying, what is driving the competitive advantage. To achieve transparency process mapping needs to be done getting a high level definition of core business processes and key supporting processes. Afterwards the appraisal of current performance and assessment of culture have to be done. The decision on core business processes for change is then driven by high-level vision "where we'd like to be" and what core business processes are the key drivers to get there?

Johansson names a number of tools to filter out high payoff process improvements from the high level process map. These include such internal evaluations as value-added analysis, a first-level quality function deployment, profitability analysis, and marginal costing. In addition, the company needs to get the voice of the customer, and might use benchmarking.

In comparison to the other authors, for Johansson a team with central responsibility is important, although he does not name its tasks in detail. Johansson sums up some tools to be used for process evaluation, showing that there is some need for structured process evaluation.

In literature it is stated, that it is important to select the right processes for optimization, but that it is not easy and that there is no structured approach

to do so. Figure 4 shows the evaluation of the existing concepts from literature.

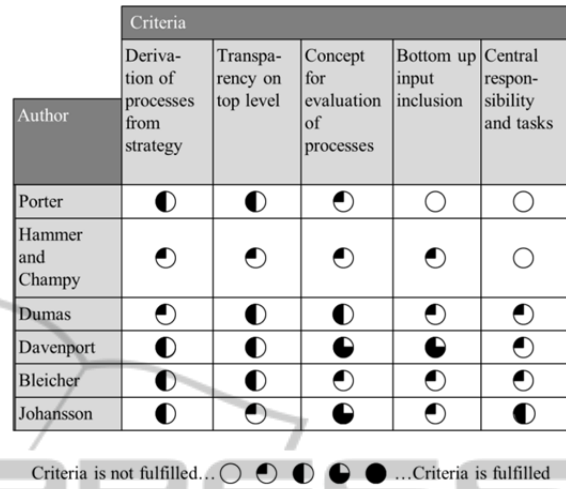


Figure 4: Evaluation of concepts from literature.

There is no approach fully fulfilling the requirements: The derivation of processes for improvement from strategy is not clear. The transparency on top level in terms of a process map is only partly described. Concepts for evaluation of processes are named and some specific examples are given, but a structured concept is missing. Problems, process qualification or health assessment might be interpreted as bottom up input, but again details are missing. To sum up: There is no structured approach for the selection of processes in literature. In addition there are only very few suggestions for the responsibilities to be installed, driving the process of prioritization and improvement.

3 QUANTITATIVE PROCESS MAPS

Based on the requirements of the companies and the evaluation of existing concepts from literature, the concept of quantitative process maps is set up. This subsection describes the four steps of the approach. Those four steps are the guideline on how to implement the concept of quantitative process maps to a company, not to be mixed up with the four steps from introduction, which explain how the treemap itself is set up.

- (1) Set up a central responsibility for process improvements and description of its tasks
- (2) Definition of the process for strategic input from top management

- (3) Definition of the process for bottom up input from employees
- (4) Implementation of the quantitative process map

The first step is to set up a central responsibility - the chief process office (CPO). A chief process office is a staff unit responsible for the business process management system. Within the chief process office the people are responsible to implement the strategy into processes, to perform process optimization projects, to evaluate processes and to take care of the idea management. In addition the chief process office is offering process governance in terms of standards for process management regarding design, measurement and improvement of processes.

Strategy implementation into processes means to analyze processes regarding their contribution to strategy and if necessary improving processes in order to reach strategic targets.

Process optimization projects are based on evaluation and strategic as well as bottom up input. The chief process office offers different optimization methods regarding intensity of process optimization and based on maturity level of processes.

Evaluation of processes contains process monitoring and maturity level assessment.

After the CPO is set up and its tasks are described, the processes for top down and bottom up input have to be defined. The combination of top down and bottom up input as well as CPO tasks are shown in figure 5.

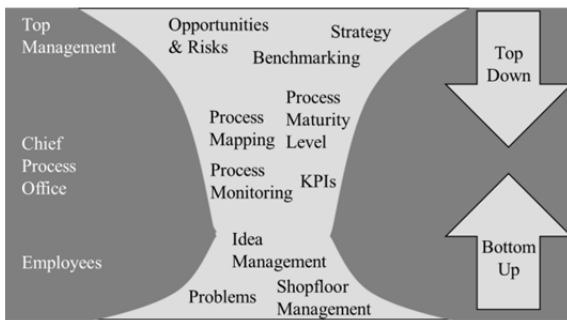


Figure 5: Process selection.

The chief process office has the task to implement strategy into processes. Therefore there is on one hand side some top down input to process selection from top management to the chief process office. This input should consider opportunities and risks as well as general strategic decisions and information out of benchmarking activities. The structured approach suggests to define on a yearly basis the strategic driven change projects as top

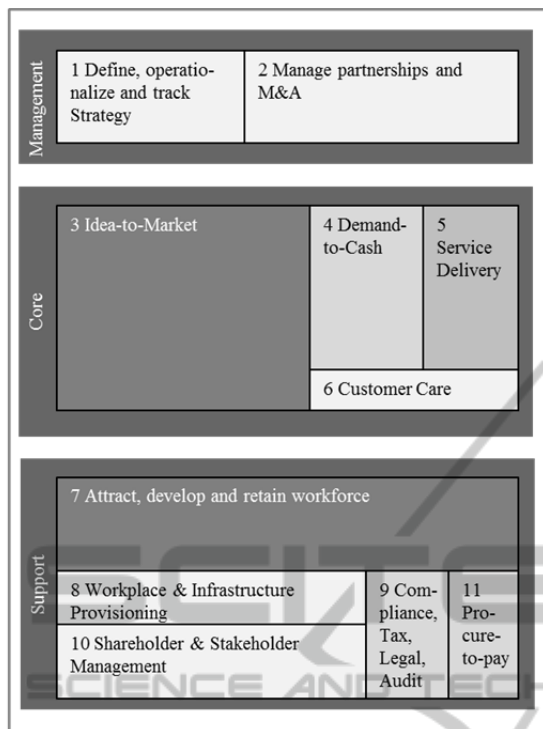
down input from top management to the chief process office.

On the other hand there is information available from the employees regarding concrete problems in processes. Those problems or improvement ideas can be considered for process selection as bottom up input. The presented approach of this article suggests to use an idea management driven by the chief process office to generate and evaluate ideas. It is also recommended to use a standardized meeting structure like shopfloor management to identify problems in daily business.

The chief process office itself generates knowledge about needed process optimization via process mapping, process monitoring including KPIs and the tracking of process maturity levels. Process maturity levels are only useful in combination with performance indicators. Otherwise there would be the risk of over-engineering. Not every process has to reach highest maturity level. There also might be processes, which are on highest maturity level but do not fulfill required performance indicators. In this case a radical process improvement, for example using design thinking, is indicated.

The results from top down, bottom up and CPO process evaluation are used to build up the quantitative process map. The most important processes are derived from top management input, the performance is deduced from bottom up input. The CPO brings the information together and does additional evaluations regarding key performance indicators and process maturity level, taking current projects and available resource into account. The CPO sets up the quantitative process map as shown in figure 6.

The shown process map contains the eleven most important processes of the company. Within the map the processes are divided into management, core and support processes, representing the structure of the company. The three different sections include end-to-end processes on the highest level of abstraction. Those processes were evaluated by importance to the company and performance. The bigger the boxes of each process are, the more important the process is for the company. The color of the boxes implies the performance of the processes. For example the core process idea-to-market is the biggest box and is colored dark. This means it is important but its performance is low. If a decision for process improvement has to be taken, processes number 3 and 7 would be the first to be optimized. Based on the quantitative process map the CPO decides on processes for optimization.



Size of box \triangleq importance; color \triangleq performance, light color \triangleq high, dark color \triangleq low performance

Figure 6: Quantitative Process Map.

4 CONCLUSIONS

The described concept offers an approach for companies to prioritize process optimization projects in order to effectively and efficiently employ chief process office resources. The approach is considering top down as well as bottom up input and defining tasks of chief process offices. The developed quantitative process map visualizes the results of process evaluation and supports management decisions regarding process optimizations. Further research will be done to successfully implement the concept in companies. Future work contains detailing of the different steps. Especially the evaluations of the processes to build up the quantitative map have to be concretized. A validation of the concept is planned for 2014/2015 together with several companies.

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