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CONNECTIVITY, SIMPLIFICATION, AND PERFORMANCE MEASUREMENT: GUIDELINES FOR BUSINESS PROCESS STRATEGISTS IN RE-ENGINEERING PROJECTS

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ABSTRACT

Nowadays, the alignment of business processes to corporate strategy is an important success factor. However, especially implemented business processes do not sufficiently incorporate business objectives. Process managers are facing the challenge on how to optimize already established workflows in organizations based on strategic goals. This contribution proposes a new modeling approach that links business objectives with flow objects of business processes in a combined Strategy Process Matrix. Three basic optimization rules are derived to give process owners concrete recommendations for actions to increase the strategy achievement of processes. This transparent optimization approach is evaluated as a case study in customer support of a manufacturing company from Switzerland and demonstrates its benefits.

KEYWORDS

Business Process Optimization, Business Process Redesign, Process Transparency Management, Strategy Process Matrix, Performance Measurement

1. MOTIVATION

The implementation of a business strategy by using business processes is considered as an important success factor for companies in theory and practice (Kaplan & Norton 2008; Wolf & Harmon, 2012). Therefore, the management of strategic objectives and the optimization of business processes should not be addressed separately (Gaitanides, 2007; Saaksvuori &

Immonen, 2004). However, two fundamental drawbacks make it difficult for managers to translate generic strategies into actual processes.

(1) First, there is still no sufficient graphical notation available for as-is modeling of workflows that overcomes the separation of business objectives and processes in a communicable diagram. Known approaches (cf. Gaitanides 2007; Saaksvuori & Immonen 2004) are developed for specific domains or demand for a complete redesign of business process, which goes beyond the decision-making power of a process manager located in the middle management. Moreover, known business-IT alignment approaches focus predominately on a strategic design of information systems (cf. Thevenet et al. 2009). From a process-oriented point of view, this neglects the fact that technology is only one possible resource of a business workflow. Approaches first focusing on processes and secondly on IT systems are mostly designed as a formal method (cf. Morrison et al. 2011) but not as a graphical representation. Anthony (2003) introduces a visual step-by-step approach to align processes with strategies that provides a solution for the introduction of new business process but not for already implemented workflows.

(2) Second, the pure combination or linkage of strategy and business process cannot solve the basic problem of a non-transparent strategy controlling. Many textbooks (e.g. Schwaiger 2008), studies (e.g., Fiedler et al. 2004; Earl, Sampler & Short 2000) and management guidelines (e.g., Galliers 2003) demand process reengineering projects to be aligned with strategic objectives. However, the present instructions and methods are mostly too general to support actual decision making.

These two methodical gaps in the business process lifecycle can explain the results of studies, which indicate that the strategy-oriented optimization of processes is one of the most difficult challenges for process owners (Minonne & Turner 2012; Sidorova & Isik 2010). This issue is particularly relevant for post-implementation business process re-design projects: strategy-oriented business process models are deployed and process teams as well as IT systems were designed to fulfill strategic objectives as best as possible. Studies show that due to several factors such as complexity, insufficient controlling, and a lack of tools, process instances tend to differ from pre-defined courses (Huber, Hilgarth & Schicker 2012). This lack of compliance can thus lead to a non-transparent and perhaps inefficient strategy implementation.

In summary, a graphical optimization approach is required to increase strategy implementation. To answer this research gap, the following research questions are addressed:

- **Q1**: Which modeling approach can be used to make the contribution to strategy achievement of business processes transparent?
- **Q2**: Which optimization rules based on the new modeling approach can be performed to increase strategy implementation?

2. METHODOLOGY

The research methodology follows a three-step approach: (1) Based on a literature review, the idea of a Strategy Process Matrix consisting of a process model and strategy map are outlined. Both elements are combined as a matrix, which links strategic objectives to activities of a business process. (2) Depending on this proposed visual connection, generic optimization rules for business process re-design are depicted. (3) Finally, these rules are tested in the scenario of a large-sized manufacturer from Switzerland.

3. MODELING APPROACH

3.1 Business Process

Since BPMN 2.0 (Object Management Group 2013) is one of the most known and widely used notations in business practice and offers a huge range of organizational elements (Recker 2006; Kocian 2011), it is used for this approach (see part A in Figure 1). To ensure a unique graphical association in the matrix, each activity in the business process control flow needs to be designed horizontally on a unique level in the model. This is due to the fact that activities are the only active flow nodes and therefore the only entity of the diagram able to contribute to strategic targets. If necessary, the modeler may of course display these nodes together with other elements (such as gateways, events, data, or documents) on the same horizontal level. According the BPMN standard, activities are modeled only using a describing name. In this notation, activities are enriched by a numerical identifier, a method or IT support (to describe which resources such artifacts and information systems, are crucial for strategy) as well as a role responsible for execution.

3.2 Strategy Map

Business strategies are often mostly informally (Eden & Ackermann 2013) and abstractly (e.g., by using corporate policies) documented. Analyzing various approaches (including e.g. Hoshin planning, program-based planning), the methodology of the strategy map by Kaplan & Norton (1996) seems to be most appropriate for this procedure model: The four perspectives of the Balanced Scorecard (financial, internal and external customer, business process and development) describe a set of focused and balanced strategic objectives. The map (see part B in Figure 1) visualizes these objectives using causal chains (William 2010). A strategy map offers the advantages that using different perspectives supports establishing a holistic view and that causal chains promote the interpretation of dependencies between objectives (Wolf & Harmon 2012; William 2010). It is necessary for this approach to model entries in the strategy map on unique vertical levels. Depending on the hierarchical level, the depicted objectives of the strategy map can stand for the entire company, certain business processes, departments or even single process instances.

3.2 Strategy Process Matrix

A graphical connection between strategic objectives and the process flow can be realized in two basic approaches.

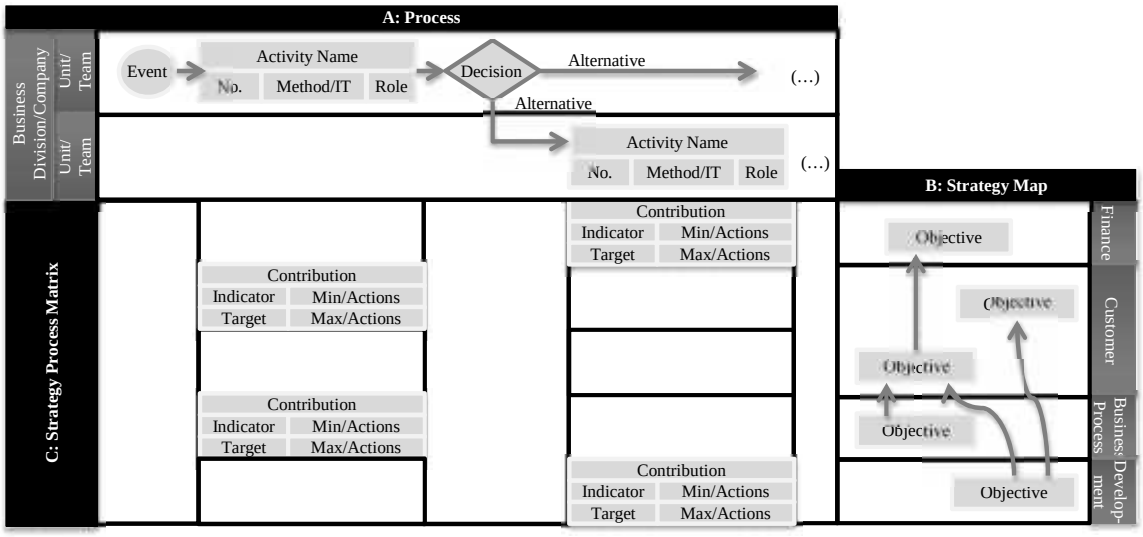

Figure 1. Schema of the Strategy Process Matrix

First, it is possible to visually complement strategic objectives into existing process models. The BPMN standard therefore already provides opportunities to enrich models by artifacts like annotations (e.g., comments) data objects (e.g., documents), and groups (e.g., graphical framing of elements). However, this approach has some essential drawbacks: Complex process models become increasingly difficult to understand when adding more and perhaps unfamiliar elements. This makes it especially difficult to use the complemented process models for re-design projects. Furthermore, strategic objectives can address multiple flow nodes, which can be graphically widely separated. Hence, groups seem not to be a feasible solution and artifacts tend to contain redundant strategic information in several places in the model.

Second, it is possible to arrange the components graphically diagonally. The resulting Strategy Process Matrix (see part C in Figure 1) combines each objective depicted in the strategy map (rows) with activities of the process flow, modeled with BPMN (columns). Although this approach tends to need much space, its benefits are confirmed in re-design case studies: The process and the strategy as individual components of the approach can be developed independently in teams and merged in workshops.

To overcome the disadvantages of too complex diagrams, this approach will not visually integrate strategic objectives in the process model directly. Instead the BPMN model and the strategy map are arranged diagonally.

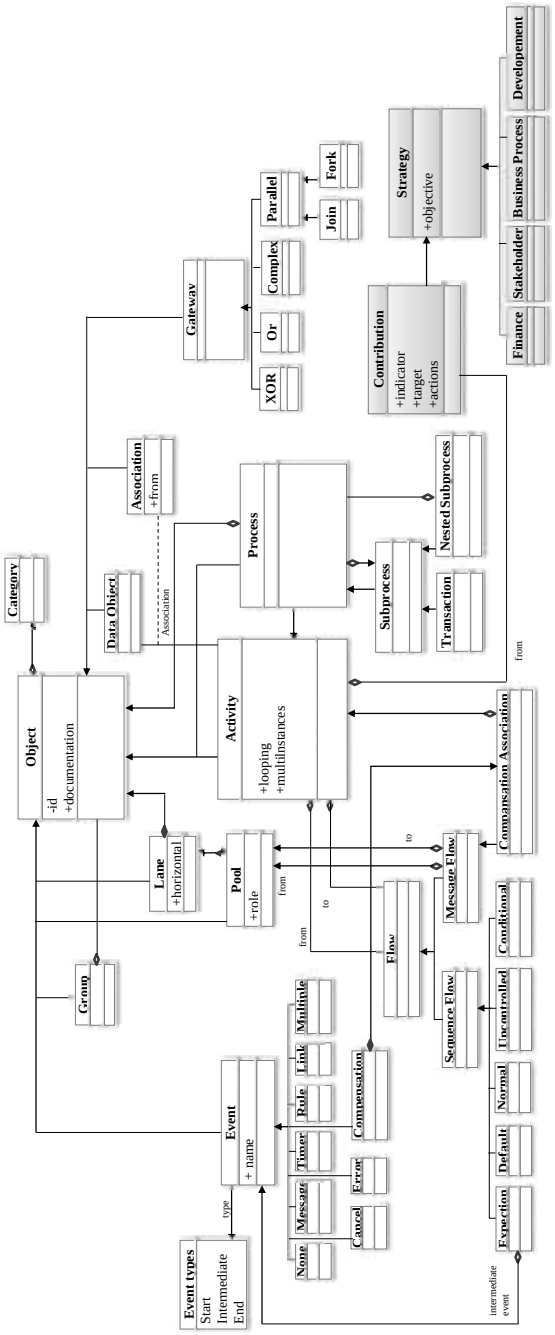

Figure 2. Meta model of the Strategy Process Matrix (Lederer, Schott & Keppler 2015)

Within each matrix field, the following information is proposed to be documented: (1) The *contribution* describes how strategy achievement can be facilitated by an activity. If, for example, the assigned objective to an approval activity is to "follow external formalities", the contribution may explain that the flow objects should guarantee a "clear identification of product liability issues". (2) By using key figures, the performance *indicator* represents the quantitative measure of the contribution. For the example, the "first pass yield" can be measured. By the aggregation of all key figures in a row the overall achievement of a strategic objective in a certain process can be assessed. (3) The *target* value for the performance indicator will be recorded together with acceptable deviations (e.g., an "increase in sales of minimum 7%"). (4) If a danger of missing a target value can be identified, specific actions (*min/max actions*) can be predefined. An example action may be a SCM team leader "sending an urgent mail to the supplier pointing out an inappropriate level of quality".

Figure 2 summarizes the meta-model of the extended modeling approach based on the BPMN meta-model (Object Management Group 2013). The constructs supplemented are highlighted: One activity may be associated with contributions including the information from the matrix fields. Assigned objectives can come from the perspectives form the Balanced Scorecard. Following the meta-model, users can model with the full set of available elements offered by BPMN. However, field studies show that models using significantly more elements than activities, gateways, and documents are not always understood correctly. Therefore it is recommended to in- or decrease the complexity of the process modeled according to the communication target.

4. OPTIMIZATION RULES

By now, the proposed Strategy Process Matrix is tested in different domains (e.g., product development, and logistics) for designing processes, to implement strategy controlling (e.g., reporting of strategy achievement based on aggregated figures of the matrix) and to develop incentive schemas for process teams (e.g., flexible income according to strategy achievement of roles). A validation in the automotive industry shows the comprehensibility, adequacy, and usability of the notation. This contribution extends the pure visualization by a component for business process re-engineering (Lederer, Schott & Keppler 2015; Lederer, Kurz & Lembcke 2014).

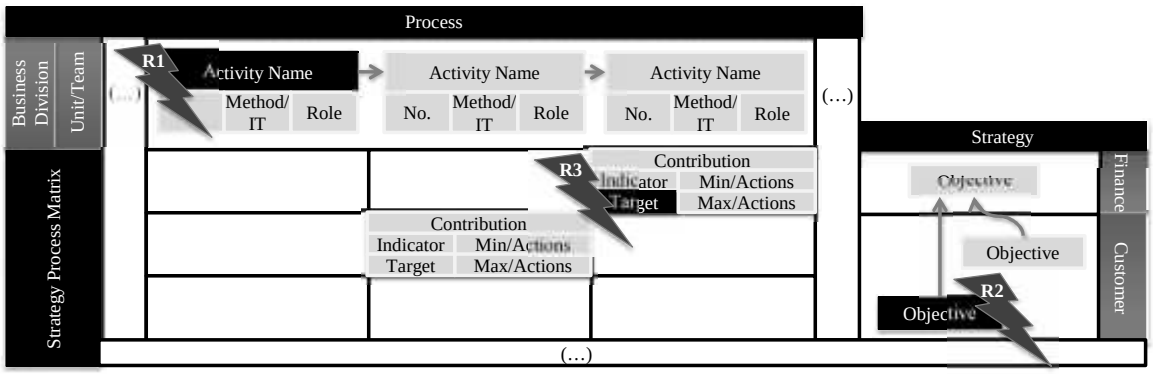

Figure 3. Schema of rule approaches

The optimization of business processes is a lifecycle step, which takes place after the as-is-modeling (Allweyer 2005). This means for re-engineering projects following this approach, an actual model of the implemented process following the Strategy Process Matrix needs to be given.

The proposed optimization rules are based on the hypothesis of top-down planning in the field of business process management as part of the traditional business process management paradigm. This means that the set targets (usually defined by the top management and possibly cascaded to specific processes) are not an issue to be changed during optimization. The three optimization rules (visualized in Figure 3 schematically) represent modular guidelines to adapt strategy-orientation in the business process by following the concepts of *connectivity*, *simplification*, and *performance measurement*:

- *Increasing connectivity* in business processes means to explicitly link performed work to overarching objectives (Chen, Daugherty & Roath 2009). Within re-engineering initiatives, the managers and modelers should ask the question whether a specific process step (e.g., activities in the case of BPMN diagrams) are suitable to reach a certain strategic objective. In product development processes, for instance, this view can help to focus on value-added activities. Thus it can be shown that the integration of customers in the definition of a new product (e.g., multiple idea workshops) may take a long time and result in higher costs, but strongly helps in achieving the goal of customer satisfaction. Necessary formal and administrative tasks (e.g., documentation steps, archiving activities, etc.) are however steps that usually serve no strategic target (except these tasks are supporting an objective like “increasing data quality” or “following external regulations”). These supporting steps should there be reconsidered in terms of resource endowments, so that only necessary and baseline efforts are made.
- *Simplification* describes the idea that processes need to be re-engineered to improve efficiency and effectiveness by questioning process models with respect to their relevance for company targets (Chen, Daugherty & Roath, 2009). In general, the strategic objectives of a process are cascaded from higher strategies (e.g., from a business division strategy, process group strategies). This implies that processes have a fixed set of strategic requirements which they have to satisfy. As a first step, the modeling of the objectives in a Strategy Process Matrix helps process managers to make strategic objectives explicit. In a second step, however, a re-engineering project needs to ensure that all targets are actually operationalized. In terms of processes, this means that process nodes are available that translate all targets (“What”) into adequate actions (“How”). Again, this rule can intuitively be understood in the context of product development processes: In the case of the traditional view on product development, an approach of closed innovation was widely prevalent. However, in order to meet the goal of “customer satisfaction”, more and more process managers ask themselves, which steps in a closed process can really help to increase customer satisfaction (e.g., customer acceptance of a new technology). By asking this question within the Strategy Process Matrix, one could recognize that adding actions such as systematic market studies (e.g. customer surveys) or even an open innovation approach (e.g. customer co-creation) is needed to efficiently operationalize the strategic objective.

- A process-oriented performance *measurement* intends to evaluate workflow performance by controlling quantitative as well as qualitative aspects (e.g., comparing target values of indicators with their actual value) (Glavan 2011). However, in a practical view it is not sufficient to measure the pure process performance on a workflow basis. Rather, it is crucial to measure the extent to which process instances implement certain strategic objectives. In the example, it is not sufficient to measure in the workflow, how many customers take part in an idea workshop or how satisfied the participants are in the workshop. Although these are common indicators for measuring the success of workshops, they cannot evaluate the degree of customer satisfaction for the product development process but only the value single process nodes (e.g., activities). Measuring and reviewing the indicators for contributions, it becomes possible to implement a strategic process measurement system and thereby to consider re-design initiatives in a business context.

Field tests show that the three resulting rules (R) can either be applied in their numerical sequence or according to the chronological process flow.

R1: Adaption of Activities without Strategy Contribution (Simplicity)

The Strategy Process Matrix can show activities without any strategic contribution (see R1 in Figure 3). This is indicated by an empty matrix column. In this case, two corrective actions are possible:

- **Removing activities**: First is to look closely at whether the activity depicted is necessary at all. If the activity does not help in achieving an objective, the analyst should ask the question whether the activity may bind resources, slow down the process time and produce handling costs and whether it has any right to exist.
- **Outlining support activities**: However, activities can also be performed due to internal requirements (e.g., data backup steps), dependencies to other process (e.g., documentation tasks in IT systems) or dependencies to other entities in the same process (e.g., automated preliminary data check before interpretation). These linkages should be recorded in the matrix field, because then it can visualize cross-functional dependencies, can stand for a process-oriented view on the organization and makes the resource allocation more transparent.

R2: Avoidance of Objectives without Operationalization (Connectivity)

If the matrix shows rows free of contributions, this can refer to the neglect of an objective (see R2 in Figure 3). Strategic objectives without contributions are not operationalized in the process observed. Since the process owner is expected to define suitable implementations in his/her range of responsibility, two implications are possible:

- **Complement of activities**: If the operationalization of the strategic objective should be performed by the process, additional activities or other entities (e.g. documents, decisions or databases) have to be added in a way that the process also focuses on the achievement of the strategic goal. The resulting contribution is to supplement the matrix fields including the presented contents.
- **Project-based implementation**: There are situations where the process to be optimized is not suitable for implementing a strategic objective. For example, interdisciplinary workshops to re-design software interfaces may help to speed up

processes and may support the objective of a short through-put time. Such initiatives show that objectives might only be achievable in projects outside of the pure process execution the owner is in charge of. In these cases the process owner has to clarify this by documenting the project-based implementation (e.g., by additional matrix fields with descriptions or by references to project plans).

R3: Adjustments of Matrix Fields with a permanent Non-Achievement of Contributions (Measurement)

The third rule focuses on strategy-process combinations which are given but which can constantly not be realized (see R3 in Figure 3). In contrast to the previous rules, this view does not focus on the creation or representation of strategy-orientation but address their actual achievement. This problem can be detected if target values in the matrix field cannot be achieved repeatedly. If the documented measures in the matrix fields have not been taken, they have to be realized first. If this does not lead to an acceptable range, the following four corrections for changing the process design are available:

- **Correct arrangement of actions**: First, it should be examined if the defined measures are described correctly, i.e. whether they are suitable to influence the performance indicator in a positive manner. Measures with an unclear effect on the indicator (and thus on the strategic objective), should be replaced by more appropriate actions. Moreover large actions (e.g., “one day staff training”) should also be split (e.g., into the individual contents of the training) to better identify the lack of effectiveness of individual components.
- **Correct contents of actions**: Furthermore it is necessary to examine whether the actions to be taken are equipped with too few or the wrong resources. In the case of staff resources, the motivation, the competences and the time availability need to be analyzed. IT resources (e.g., software tools and interfaces) must be examined focusing on their effectiveness.
- **Correct targets**: Usually the process owner is responsible for the design of the matrix, while the objectives of the Strategy Map are stipulated by his/her superiors or are developed with him/her. Therefore the documented targets need also to be examined critically. Optimizing this point, the matrix offers an innovative way: From the matrix it is quickly apparent which contributions are also involved in the affected objective. Sometimes less expensive, faster or easier-to-handle actions in the same row can be taken. Thus, the matrix can support a more efficient allocation of resources.
- **Correct indicator**: The indicator should also be checked for typical quality criteria. Thus, the process owner should carefully determine whether the implemented performance indicator is strategy-oriented, meaningful, actionable, and traceable. Inappropriate indicators are to be replaced.

5. CASE STUDY

5.1 Initial Situation and Approach

The proposed optimization rules were applied in the context of a comprehensive business process re-design project. Due to confidentiality, the name of the company is not mentioned and some contents were anonymized. This case study is intended to serve the practical understanding of the contribution.

The process owner, responsible for customer support processes in a global company located in Switzerland with an annual turnover of 59 million Euros, was facing the challenge to optimize the implemented workflows in accordance with business objectives. The company has about 300 employees and sells complex tools for road construction works to business customers. Due to the complexity of some products, the company provides a comprehensive customer support via phone and e-mail (e.g., clients can report complaints and warranty issues). The processes in the customer support were designed about five years ago and have been grown historically. A major problem to work on was the fact that the process performance has not yet been systematically collected with figures. Although the communicated mission of the company was to become leader in innovation, the customer inquiries were processed so that this objective was not achieved systematically. Other given strategic objectives from the top management to the customer support forced the sales of additional products and services and secure a fast support handling. Due to the historical development, the process team was internally seen to be not informed enough. Therefore the process owner added the objective to increase the internal reputation beyond the external customer satisfaction.

5.2 Execution

5.2.1 As-Is-Analysis

After the corporate strategy cascaded in two workshops to the customer support, the project team used different methods (e.g., on-the-job-observation and interviews) to determine the actual process workflow. Eight fundamental processes were identified and in all cases neither performance indicators were documented, nor were strategic objectives explicitly modeled.

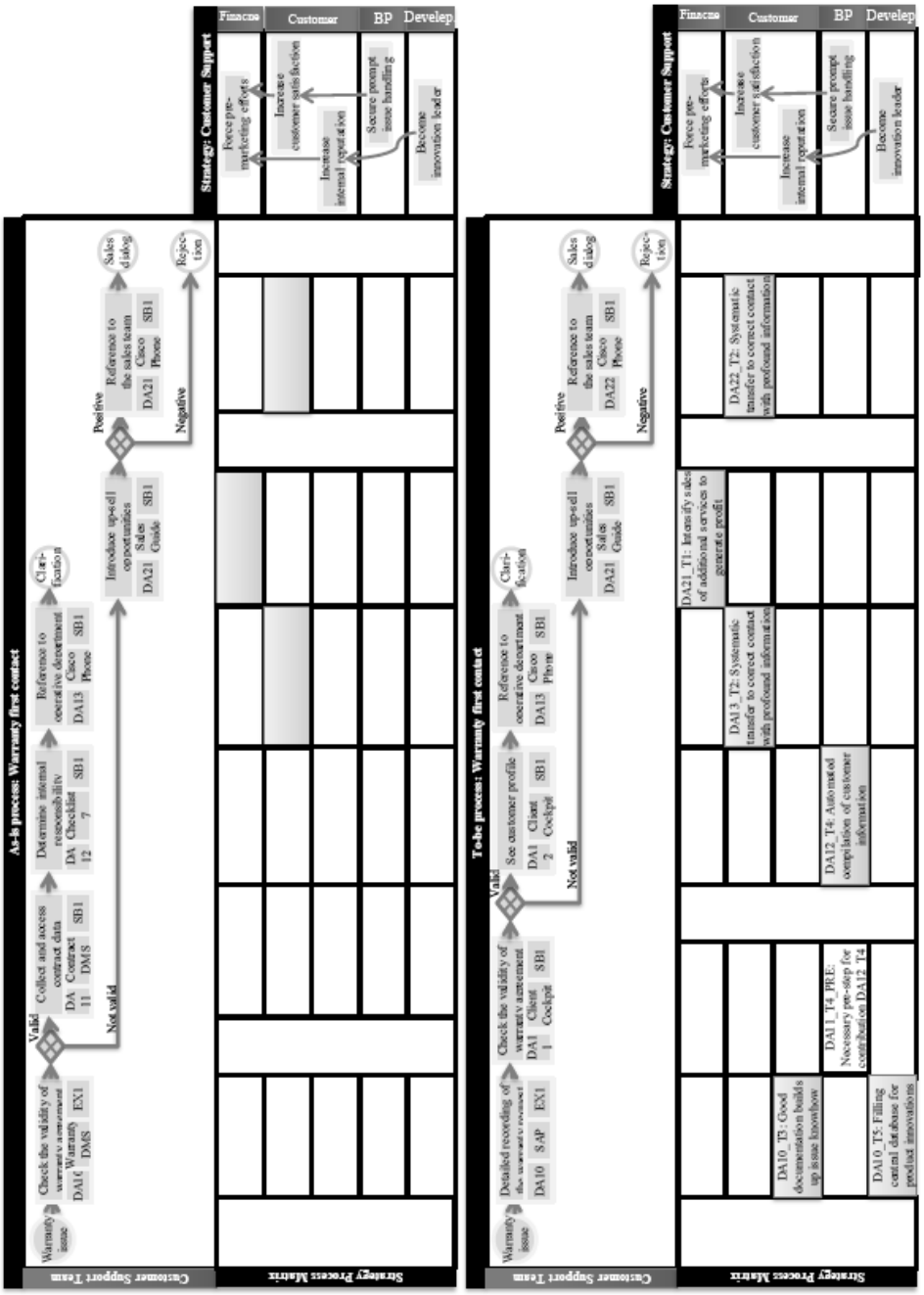

Figure 4. As-is and to-be-modeling of the sample scenario

The process warranty first contact (see Figure 4) as a small part of the process group is very well suited to illustrate the optimization rules. The process starts when the clerk realizes that the customer call refers to a warranty request. The support first checks whether the guarantee agreement is still valid. In the positive case, the clerk collects the relevant contract details and determines the internal contact person in the operative department. If a guarantee agreement is no longer valid, the customer has the opportunity to book an additional but more expensive guarantee agreement to regulate his/her damage. This pre-sales activity is performed by the customer support team and if the client is willing to upgrade his contract, he/she is put through to the sales team.

The Strategy Process Matrix of the as-is-model (see Figure 4) showed that only two of the five given strategic objectives were supported systematically in the process (starting point for R2). Moreover, it became obvious that after the validity check, two actions follow which did not serve any strategic target (starting point for R1). In a detailed analysis, it became also transparent that the up-selling services of the support team were rarely successfully (starting point for R3). Since only few indicators were available in the case study, the positive matrix fields in the as-is-model are only marked by using a color.

5.2.2 To-be-Modeling

In workshops, the optimization rules were applied step by step based on the chronological sequence of all processes. In the meetings, two employees of the support team, an external consultant and the process owner were involved. One major adjustment in the re-designed process was the introduction of a documentation step before the guarantee agreement is checked. With this new documentation, the process owner is now in the position to give a detailed report on deficiencies and desires of the customers and can thus serve profound ideas for innovative solutions (indicator: share of innovative solutions from the data base that lead to a proof of concept). Ad-hoc requests from other internal positions, which often arise in the regulation of damages, can be answered well-founded. This leads to a positive image of the customer support team (indicator: agreement rate to the statement that the customer support is a competent partner). A new IT system is able to display all relevant contract data of the customer based on the warranty agreement information. This allows a faster subsequent processing. To address the poor figures of up-selling activities, comprehensive measures are planned in the accompanying documents (an excerpt can be found in Table 1).

Table1. Excerpt of the accompanying matrix documentation

Intensify sales of additional services to generate profit – DA21_T1 *(internal no. scheme for a clear assignment)*		
Performance indicator	I1: Percentage of customer dialogues which lead to contact with the sales team (annual review) I2: Percentage of up-selling offers which result in premium after sales products (quarterly review)	
Target	I1: 17%; Falling down to 15% is acceptable. I2: 5%; Falling down to 4% is acceptable.	
Actions (excerpt)	*In case of falling below*	▪ Building pair teams for dialog situations (support team and sales agent at the phone) ▪ Training on the training guide for presenting the value proposition ▪ Fictitious test calls to ensure compliance
Running project-based implementation	▪ Annual workshop to redesign the interview guidelines together with ▪ Weekly work on the whiteboard with the best tips and tricks for sales talk	

5.3 Results

The application of the optimization approach increases the strategic focus in all eight process groups. The process owner uses the matrix for his monitoring of activities, whereas the metrics-based management of strategic objectives can be used for the communication to the top management. The process team understands the adjustments based on the matrix as a communication tool very well and is more motivated to align actions with the underlying objectives. The very positive evaluation of the whole approach by all stakeholders for the everyday process execution and as well as for new optimization rounds is particularly due to the understandable and visual approach. Further applications of the approach in other processes as well as further developments such as personal scorecards and integrated incentive systems are being considered.

6. CONCLUSION

The motivation for the proposed optimization approach is to develop a comprehensive way to align re-design projects with corporate strategy. The approach contributes to aligning business processes with corporate strategy by first modeling the Strategy Process Matrix and then by redrawing workflows according to the optimization rules on the basis of graphical diagrams. Moreover the approach is suitable to strategically manage a process team as well as for reporting to the top management. The process owner is in the position to justify his/her redesign activities by assigning them to the given business strategy. However, the evaluation of the approach with one illustrative case study primarily bases on qualitative statements and needs to be supplemented in further research by quantitatively measurable evidences. The proposed contents of the matrix fields are accepted positively in the case studies. For further research, concepts and theories of middle managers need to be used to systematically identify additional information to be documented in each matrix field. The example of the described case study already shows that the matrix and the optimization rules tend to become quite complex for large process models. Therefore, an IT-based solution for creating and managing the matrix is necessary to introduce the procedure enterprise-wide.

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