



Research Center  
Finance & Information Management



Project Group  
Business & Information  
Systems Engineering

## Customer Experience Versus Process Efficiency: Towards an Analytical Framework About Ambidextrous BPM<sup>1</sup>

by

Patrick Afflerbach, Leonhard Frank

in: 37th International Conference on Information Systems (ICIS), Dublin,  
Ireland, December 2016

<sup>1</sup> We are grateful to the University of Augsburg Research Center for Global Business Management for its financial support.

WI-620

University of Augsburg, D-86135 Augsburg  
Visitors: Universitätsstr. 12, 86159 Augsburg  
Phone: +49 821 598-4801 (Fax: -4899)

University of Bayreuth, D-95440 Bayreuth  
Visitors: Wittelsbacherring 10, 95444 Bayreuth  
Phone: +49 921 55-4711 (Fax: - 844710)



# Customer Experience Versus Process Efficiency: Towards an Analytical Framework About Ambidextrous BPM

*Completed Research Paper*

**Patrick Afflerbach**  
FIM Research Center  
University of Augsburg  
Universitaetsstraße 12  
86159 Augsburg, Germany  
patrick.afflerbach@fim-rc.de

**Leonhard Frank**  
FIM Research Center  
University of Augsburg  
Universitaetsstraße 12  
86159 Augsburg, Germany  
leonhard.frank@fim-rc.de

## Abstract

*Digitalization forces organizations to rethink classic operating models and develop completely new ways about how to run business. This revolution also spills over to the management and design of business processes. New market transparency and the increasing interconnectedness of customers define customer satisfaction and operational efficiency as two equal strategic objectives. Ambidextrous business process management (BPM) demands the symbiosis of exploitative BPM to ensure organizational efficiency and explorative BPM to create process designs that truly excite customers. A key challenge is to properly balance the different capabilities. Therefore, we propose an analytical framework providing an in-depth understanding about effects and interdependencies of this challenge. As justificatory knowledge, we drew from literature on value-based BPM and customer confirmation/disconfirmation paradigm to unite the different perspectives. Based on our framework, we match process and customer types to generic design principles and provide concrete guidance on the establishment of ambidextrous BPM.*

**Keywords:** Value-based Business Process Management, Ambidextrous Business Process Management, Business Process Redesign, Customer Satisfaction, Customer Process Management

## Introduction

Digitalization imposes new challenges to modern business process management (BPM) and customer relationship management (CRM) (Bharadwaj et al. 2013). While the high relevance of customer satisfaction for an organization's profitability is widely accepted (Anderson and Mittal 2000; Gruca and Rego 2005; Heskett et al. 1994), its importance is even increasing with customers becoming ever more interconnected. An impressive example of technology-enabled interconnection is online social networks. About 65 percent of American adults were using at least one social networking site in 2015 compared to only 7 percent in 2005 (Aperrin 2015). This increasing interconnectedness leads to a mutual suggestibility among customers, the so called word-of-mouth-effect (Relling et al. 2016). Positive and negative experiences of customers may cascade through the entire customer base of an organization making customer satisfaction a topic of utmost relevance. In addition, increased market transparency exposes organizations to a more intense competitive pressure on the offered price and therefore also on process efficiencies (Soh et al. 2006). Both developments together confront organizations with a dilemma: Whereas interconnectedness requires organizations to please customers at any costs, transparency demands them to improve process efficiency. We define this issue as the "experience-efficiency trade-off" (E-E trade-off) of process design. In order to survive in this contradictory environment, organizations need an integrated customer-process-strategy and have to design their process portfolio according to these challenges.

Against the background of the described digital challenges, strategic alignment as one success factor of BPM is crucial and new research questions enter the agenda of the BPM discipline (Rosemann and vom Brocke 2015). In this context, Michael Rosemann (2014) emphasizes the need for *ambidextrous BPM* to solve the E-E trade-off. Rosemann (2014) argues that organizations have to stimulate exploitative as well as explorative strengths at the same time. Thereby, exploitation demands cost- and time- efficient fulfillments of basic customer needs (Rosemann 2014). Exploration aims at the development of new and digital "process designs that truly excite customers" (Kohlborn et al. 2014, p. 636). In order to establish the right balance between both paradigms within their process landscape, organizations need to determine the strategic design orientation (customer-centric versus efficient) for every process separately. Even increasing complexity, they additionally have to decide between risk-averse designs following the principle of "better safe than sorry" and risk-taking designs pursuing the idea of "nothing ventured is nothing gained" (Alexandrov 2015, p. 3001). Processes can either be designed "safe" with only few variation in their outputs, often associated with high costs for quality control or they can be designed risk-taking accepting a wider range of output quality. We define this design question as the "risk trade-off" of process design. Summing up, organizations are continuously facing the question, how to (re-)design their processes. Therefore four archetype strategies exist: 1) *risk-taking and efficient*, 2) *risk-taking and customer-centric*, 3) *risk-averse and efficient* and 4) *risk-averse and customer-centric*. An ambidextrous process design strategy, defined as the planned coexistence of the 4 archetype strategies reflecting the needs of the organizations business model, as a solution to this dimensional plurality, requires the ex-ante definition of strategic targets for every process. To the best of our knowledge the current state of literature does express the need for ambidextrous BPM, but it does not address the separate prioritization of design targets with respect to ambidextrous BPM. Supported by the high relevance of the topic given the impact of digitalization, we formulate the following research question:

*How do risk- and E-E trade-off affect strategic orientation in business process design?*

When approaching this research question, one key challenge emerges: Solving the two design trade-offs requires a deep understanding of their mechanics and interdependencies. Therefore it is essential to combine two related, but still different research disciplines: Knowledge from CRM about the effects of customer satisfaction and process design competencies from BPM need to be harmonized. Following this integrative approach, we use analytical modelling and mathematical-deductive analyses as our research method. Thereby, we set up an analytical framework using established CRM and BPM components. By means of this framework, we analyze the interplay of different process and customer types. Finally, we match such process profiles to exploitative and explorative design principles to answer our research question.

Our analyses propose a differentiation into basic-, performance- and excitement processes. Thereby risk-taking designs are beneficial for excitement processes whereas risk-averse designs are favorable for basic and performance processes. For the E-E trade-off, we conclude customer-centric designs for excitement

processes if a corresponding redesign can exploit their upside potential and really excite customers. For basic processes, we propose customer-centric designs until an acceptable performance is promised to control for extreme disappointments. Finally, performance processes do not have a “one fits it all” solution and require case-specific analyses. Thus, our article contributes to literature in two ways. First, we provide insights into the interplay of the E-E trade-off and the risk trade-off and point out the importance of an ambidextrous strategy in process design. Second, we derive recommendations for design decisions within the four archetype strategies, providing organizations with concrete strategic guidance on how to design their processes.

The remainder of this paper is structured as follows. After the brief motivation of our research question, we provide the theoretical background on the relevant BPM and CRM theories in Section 2. On this foundation, we elaborate our framework in Section 3. Section 4 theoretically analyzes and discusses the E-E trade-off and the risk trade-off within the environment of the framework. Finally, we summarize our results, point out limitations and provide opportunities for future research in the concluding Section 5.

## **Theoretical Background**

### ***Ambidextrous BPM***

The BPM Lifecycle as probably the most popular management concept of the research discipline can be classified into six phases: identification, discovery, analysis, redesign, implementation and monitoring (Dumas et al. 2013). While every phase has a significant contribution to the success of BPM, the prevalent opinion in literature assigns process redesign the highest value (Zellner 2011). Thereby, the interpretation of the term process design varies with respect to the level of abstraction. It ranges from very high-level interpretations as definitions of how work is performed (Dumas et al. 2013) to very detailed interpretations as process models. According to the strategic scope of this paper, we follow a high-level interpretation of process design. Not surprisingly given the high relevance of this management task, the BPM community developed several different methods to support business process redesign (Harmon and Wolf 2014; van der Aalst 2013; Vanwersch et al. 2015). Despite the diversity of the redesign tool kit, almost every approach begins with setting strategic process objectives (Limam Mansar et al. 2009). Therefore, our framework for strategic process orientation does not add a new mosaic piece to the redesign-literature, but it rather enhances existing approaches to a more holistic concept.

To realize the presumably high value from process design, the set of strategic process objectives have to be in line with the corporate strategy (vom Brocke et al. 2014). When classifying generic corporate strategies, Porter (1980) differentiates between cost leadership and differentiation. In a succeeding paper, Porter and Millar (1985) substantiate these generic strategies for the process level. Cost leadership is the process strategy to sustainably produce on – compared to competitors – lower cost levels, mostly realized by technological advantages in production or by learning effects. In contrast, the differentiation strategy aims at producing superior product quality or product variety. In the past, organizations could choose between these two archetypes or decide for a niche strategy between the both extremes. Today, organizations need to execute them in parallel and follow ambidextrous strategies. Due to lower switching costs, customer loyalty is hard to achieve (Valvi and Fragkos 2012). Thus, differentiation appears as a promising answer. Moreover, the current trend of digitalization enables customers to be highly interconnected leading to higher market transparency and ultimately to higher competitive pressure. Cost leadership appears beneficial against this development. Strategic singularity is therefore not possible to survive today’s extreme situation and ambidexterity becomes mandatory.

Although, ambidexterity is not new to IS literature (Markides 2013; Mithas and Rust 2016; Raisch and Birkinshaw 2008), there is only little attention on ambidexterity in BPM. However, the emergence of the E-E trade-off between customer-centric designs (explorative BPM) and efficient designs (exploitative BPM) exactly requires such an ambidextrous thinking. According to the paradigm of strategic alignment, ambidexterity can only be established on the corporate level when the process designs reflect such a proper mix. Looking at the current focus of BPM research with respect to strategic orientation, most redesign approaches put process performance as their objectives. Thereby, process performance is often considered as a multi-dimensional construct (Limam Mansar and Reijers 2005). As a very popular example, the framework of the devil’s quadrangle groups different performance measures into the dimensions time, cost, quality and flexibility and thus, enables a clear analysis of different process redesign alternatives (Limam

Mansar and Reijers 2007). The name of the framework reflects the issue that improving process performance in one dimension is always accompanied with impairing in at least one of the other dimensions. The considered dimensions have a strong focus on process-internal dimensions and customers are only addressed indirectly. Whereas process time and costs can be classified as efficiency objectives, process flexibility and quality are at least partly customer-centric. Process flexibility is the ability of a process to cope with contextual changes by adapting its structure and behavior in a goal-oriented manner (Wagner et al. 2011). From an operational perspective, process flexibility splits into functional and volume flexibility (Afflerbach et al. 2014). While volume flexibility enables increasing or decreasing the amount of the process output above or below installed capacity (Goyal and Netessine 2011) and thus follows an efficiency-related interpretation, functional flexibility enables delivering the output variety demanded by the organization's customers (Anupindi et al. 2012) and relates to customer-centric objectives (Hall and Johnson 2009; Hammer and Stanton 1999). Also process quality can be interpreted as internal process quality and consider error rates or it can follow an external interpretation in terms of quality perceived by customers. As process error rates are more intuitive for operationalization, the internal interpretation is rather dominating. Rosemann (2014) underscores the outlined underrepresentation of explorative components in BPM. Thereby, he criticizes that opportunities of explorative strategies are often neglected and future revenues from innovative, IT-enabled processes are outside the design focus. Due to digitalization, explorative strategies are gaining importance and redesigning processes needs a strategic rethinking towards the co-existence of customer-centric and efficient process designs. In terms of the risk trade-off between safe and unstable process designs, BPM mainly commits to a risk-averse orientation. This commitment is supported by famous concepts like six-sigma (Conger 2010) or value-based BPM (Bolsinger et al. 2011). However, Alexandrov (2015) shows that it is rational for organizations to balance their strategies with risk-taking and risk-averse components. Thus, a strategic rethinking is again required.

### ***Value-based Management as Integration Frame***

With this paper we want to take up Rosemann's (2014) thoughts and develop a quantitative model on how to position within the tension field between exploitative and explorative design. The main challenge of this research objective is to integrate the different but related approaches from CRM and BPM on a common basis. To overcome this challenge, we start with value-based BPM as an accepted research stream in BPM on process design. This stream typically aims at optimizing process cash flows in redesigning processes (Bolsinger 2015). As extension, we ascribe revenues as an essential component of process cash flows to an organization's customers who generate revenues and integrate insights from the Kano model (Kano et al. 1984). Depending on how the process output fulfills the needs of the customers, overall customer satisfaction and simultaneously customer profitability or revenues accordingly increase or decrease (Kano et al. 1984). Especially relevant for this basic idea, is Kano et al.'s (1984) differentiation between three types of customers with respect to the underlying relationships between customer satisfaction and the fulfillment of expectations. For our purpose of connecting Kano et al. (1984) over their results on customer perceptions and process revenues from value-based BPM, we transfer this differentiation concept of customers to processes with respect to their outputs. Thus, so called basic processes should perform with low deviation in their output to avoid dissatisfaction of the customers. Dissatisfaction would lead to a lower retention of the customers and therefore to reduced revenues (Anderson and Mittal 2000; Heskett et al. 1997). Excitement processes may differ in their output variety as they can only positively affect customer satisfaction and therefore have a high contribution to corporate revenues. This early discussion already shows that customer-centric analyses have also implication on the proper riskiness of the ideal process design. Consequentially, the risk trade-off is not orthogonal to the E-E trade-off but both decisions mutually influence each other. This interdependencies are a key challenge demanding the integration of customer and process perspectives in order to find the right ambidexterity.

Such an integration of CRM and BPM as theoretical underpinnings needs to take place on the conceptual and on the methodological level to achieve a sound framework. On the conceptual level, the process output is the linking element. On the customer side, customer satisfaction and therefore profitability critically depends on the fulfillment of customers' expectations towards the process output. On the process side, the process output is the final result of the underlying business process and therefore also determines its operational efficiency. As a result, the process output does not only integrate the customer and the process perspective, but it also unites the economic opponents of profitability and efficiency.

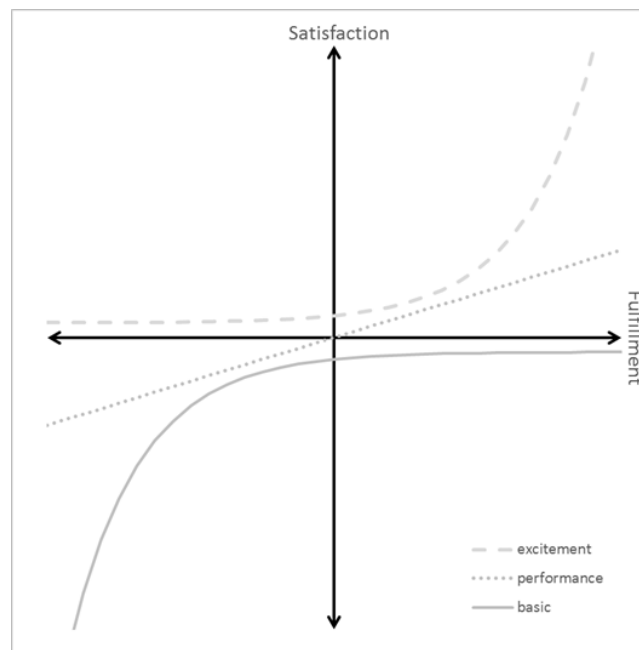
In order to bring this conceptual integration down to the methodological level, we draw upon the results of value-based management (VBM) because of three reasons: First, VBM abstracts as a paradigm of corporate decision making from domain-specific conditions by taking an economic perspective and by translating problem specifications into the neutral measure of cash flow effects. Taking this neutral perspective enables VBM to take customer, process and integrating perspectives. Whereas customer-centric designs improve the profitability of an organization's customers and thereby also corporate cash inflows, efficient designs decrease process cash outflows sacrificed for the production of the process output. Thus, the residual measure of cash flows constitutes the equivalent to the process output as linking element on the methodological level. Structurally, both designs increase cash flows either by reducing cash outflows (efficient designs) or by increasing cash inflows (customer-centric designs). This structural equivalence makes the effects comparable and integrative. Second, VBM emphasizes risk as the second decisive factor of corporate decision making. Thus, it is directly applicable for the risk trade-off as well. Third, the benefits and the applicability of the paradigm have already been demonstrated in CRM and BPM (Bolsinger 2015; Buhl et al. 2011; Kumar 2009; Kumar and Pansari 2016). Based on this reasoning, we can conclude the suitability of VBM as our methodological integration frame.

In order to further substantiate the suitability of VBM as integration frame, we now outline its theoretical foundation. Within the last decade, VBM has established as the predominant paradigm for economic research and practice in corporate decisions (Buhl et al. 2011). The success of VBM can be traced back to the incorporation of a long-term perspective of the firm value and the focus on a sustainable increase of the firm value within corporate decisions (Ittner and Larcker 2001; Koller et al. 2015). Basically, VBM represents an extension of the share-holder value approach by (Rappaport 1986) which was elaborated by Copeland et al. (1994) and by Stewart and Stern (1991). The long-term perspective of VBM implicitly results in the completion of the more general stakeholder value approach (Danielson et al. 2008). In order to fully implement VBM in an organization, decisions on all hierarchy levels have to be aligned to a firm value maximizing strategy. Thus, there is a strong need for organizations following the VBM approach to identify and quantify the value contributions – typically measured by the effect on future cash-flows – of every single asset and decision. The basic principle behind this required decomposition is that the firm value can be calculated by aggregating all current and future assets of an organization. For well-founded decisions, additional knowledge about the time value of money, as well as on the risk attitude of a decision-maker is mandatory (Buhl et al. 2011). Besides those parameters, the choice of an appropriate valuation function for determining the value of single assets is crucial. In this choice, the concrete decision situation should be taken into account as investment and decision theory suggest (Buhl et al. 2011; Damodaran 2012). Whereas the net present value (NPV) of future cash flows with a risk-free discount factor is common for decisions under certainty, a more differentiated view is required for a situation with risk. Decisions under risk should be grounded on the NPV method incorporating a risk-free discount factor for risk-neutral decision-makers. In contrast other methods like the certainty equivalent method or the risk-adjusted NPV have to be applied for risk-averse decision makers (Copeland et al. 2005). The applicability of VBM on our research topic requires the compilation of the responsive behavior of customers and processes on different process design strategies into cash flow effects. This cash flow focus ensures the comparability across effects and compatibility to the valuation functions from VBM.

### **Customer Effects**

Disassembling the E-E trade-off into its singular components, *customer satisfaction* as the experience component plays an important role for the cash inflow perspective. Certainly, customer satisfaction itself is not the objective criterion, but there is evidence that customer satisfaction leads to improved customer retention which ultimately results in increased cash inflows (Anderson and Mittal 2000; Danaher and Rust 1996; Gruca and Rego 2005; Heskett et al. 1997; Larivière et al. 2016; Parasuraman et al. 1988). Besides, the American Customer Satisfaction Index, supposed by Fornell et al. (1996), the so called Kano model is predominant in customer satisfaction research (Kano et al. 1984; Matzler et al. 1996). Both approaches aim at determining the satisfaction of an organization's customers. The Kano model conceptually manifests the confirmation disconfirmation paradigm (Oliver 1980). According to this paradigm, customer satisfaction evolves from the comparison of a customer's expectations prior to the actually perceived experience about the quality or performance of the product or service (Matzler et al. 2004). If the perceived performance falls short of the customer's expectations, dissatisfaction or under-fulfillment realizes: Correspondingly, customers feel satisfied in the case of over-fulfillment, if the perceived performance exceeds expectations.

In case of a balanced relationship between expectations and perceptions, customers will feel moderately satisfied (Matzler et al. 2004). Kano et al. (1984) enhance this theory and further differentiate these findings into three different relationships: Basic, performance and excitement relationships or requirements. The fundamental idea of those different types of requirements can be easily transferred on products or services as they are just the aggregation of different requirements. Thus, products or services that are classified as basic factors – which in turns means that in an aggregated view, basic requirements predominate the product or service – can only negatively influence satisfaction. In the case of under-fulfillment, customers feel extremely dissatisfied and in the case of over-fulfillment they do not feel satisfied. As depicted in Figure 1, basic factors (solid line) show an asymmetric experience-expectation relationship in the shape of a negative exponential function with the fulfillment of expectations on the x-axis and the resulting satisfaction on the y-axis. Figure 1 illustrates the high disappointment potential and the absence of any satisfaction potential for basic factors. The typical example of a basic factor is the cleanliness of a toilet. Excitement factors do not suffer from partly or even total under-fulfillment, but they strongly increase customer satisfaction in case of over-fulfillment of expectations. The corresponding curve (dashed line) is shaped like a positive exponential function illustrating their satisfactory potential and their robustness against under-fulfillment. Performance factors are linearly shaped and translate the fulfillment of expectations directly proportionally into satisfaction or dissatisfaction. Figure 1 depicts the positive influence of over-fulfillment on customer satisfaction and the negative influence on satisfaction in case of bad performance (dotted line).



**Figure 1: Kano model**

With customer satisfaction directly influencing future cash flows of an organization (Anderson and Mittal 2000; Danaher and Rust 1996; Gruca and Rego 2005; Heskett et al. 1997; Larivière et al. 2016), the role of pleasing customers as a prerequisite for long-term economic success becomes evident. Connecting Kano's (1984) insights about satisfaction-relationships and the outlined relationship between customer satisfaction and future cash flows shows that the cash inflows generated by a process, strongly depend on the classification of the process' outputs as basic, performance or excitement outputs. As Kano's (1984) model points out, processes can exacerbate different dynamics on customer satisfaction. Thus, different risk- and E-E strategies conditioned on the classification of produced output may be beneficial. With respect to our research question "How do risk- and E-E trade-off affect strategic orientation in business process design?" we hypothesize, that the exponential relationships for excitement and basic factors may make process fulfillment – defined as the degree to which the customers' expectations are met in their experience – more important as compared to performance processes and their linear dynamics. In addition, the

asymmetric risk profiles of excitement processes and basic factors may suggest different risk strategies. We investigate these first hypotheses in the course of this manuscript.

### ***Value-based Process Management***

As already outlined, process costs or cash outflows are the predominant decision criterion in BPM. In the mid-nineties, BPM scholars began to criticize this one-sided view (Kanevsky and Housel 1995) and applied the principles of VBM on process decision making (Bolsinger et al. 2011). Following this paradigm, Gullledge et al. (1997) postulated the equal importance of cash inflow components. Within the last years, this mindset gained ever more importance in the community and the research stream of value-based BPM emerged (vom Brocke and Sonnenberg 2015). The basic idea of value-based BPM is to interpret an organization as a network or portfolio of processes which contribute all together to the firm value of the organization (Bolsinger et al. 2011). In this interpretation, improving processes gets a strong focus on the long-term maximization of the firm value, as the process value is correspondingly defined as its contribution to the corporate value (Buhl et al. 2011). Next to value-based BPM as the “cleanest” application of VBM on process decision making, some closely related approaches like value-focused BPM (Neiger and Churilov 2004; Rotaru et al. 2011), value-oriented BPM (vom Brocke et al. 2010) and value-driven BPM (Franz et al. 2011) exist as well.

Process redesign developed as a problem domain of special interest for the approach of value-based BPM (Bolsinger et al. 2015). Whereas some works focus on the control flow in order to figure out the best design alternatives (Bolsinger 2015; vom Brocke et al. 2010), others concentrate on process performance and process structures (Afflerbach et al. 2014; Linhart et al. 2015). Although, these approaches put process cash inflows into the focus of design questions, the effects of process redesign on this decisive factor are often modeled exogenously. The response of a process’ profitability to a redesign initiative is thereby primarily determined by the process behavior. Customer reactions are only considered implicitly. However, exactly the synthesis of CRM and BPM is relevant for strategic decisions about process design as we already motivated in the introductory section.

Summing up, the current state in BPM literature in general and in value-based BPM in particular, mainly focuses on performance tuning and cost-risk optimization (Reijers and Limam Mansar 2005). Recently, BPM begins to discover the explorative perspective and highlights the need for innovative, risk-taking and customer-centric designs (Rosemann 2014). Currently, the outward perspective on customers is underrepresented in BPM literature (Bolsinger et al. 2011; Bolsinger 2015; Reijers and Limam Mansar 2005). The key contribution of this paper lies exactly in integrating the customer and process side for determining proper design objectives and in deriving a quantitative framework which indicates which of both sides should be emphasized.

### **Model**

When establishing an ambidextrous design strategy with the E-E trade-off on the one hand and the risk trade-off on the other hand, there arise two key problems: First, organizations have to separately define design principles for each process with respect to their relevant characteristics. Given the large number of processes, this task of strategic alignment suffers from very high complexities. As a response, the development of a strategic framework providing concrete strategic guidance on defining design principles is mandatory to reduce complexity and to foster consistency across the process landscape. Second, the integration of the internal process perspective and the external customer perspective is crucial to holistically investigate the interplay between an organization’s business processes and its customers. Accordingly, our units of analysis are so called “value or primary activities”, i.e. business processes with a direct interface to customers (Porter and Millar 1985). Please note that the scope of our framework is to provide a better understanding about the strategic effects of process design and the definition of process and customer types, which are relevant for a proper strategic orientation. Our framework should not get confound with a decision model for operative redesign decision as it takes a more high-level, strategic view on business process redesign. Operational redesign decisions require more detailed analyses and should follow our strategic investigations in a second step.

As methodological foundation we draw upon the results of VBM. This famous paradigm is accepted in both, CRM, as concepts like the customer lifetime value illustrate, and BPM, as the concept of value-based BPM



demonstrates. A highly acknowledged approach within the tool-kit of VBM is to insert (the NPV of) cash flows into an appropriate valuation function in order to obtain a comparable decision criterion. In our framework, we use the expected value as a typical valuation function from VBM. Although the expected value reflects a risk-neutral decision maker and thereby contradicts the typical assumption of risk-aversion, this simplification enables us to separate effects from the process and customer sides and effects from the decision makers' risk attitudes. As a result, we can derive more general and clearer results. In Section 4 we discuss our findings for risk-averse decision makers and show their robustness against this assumption.

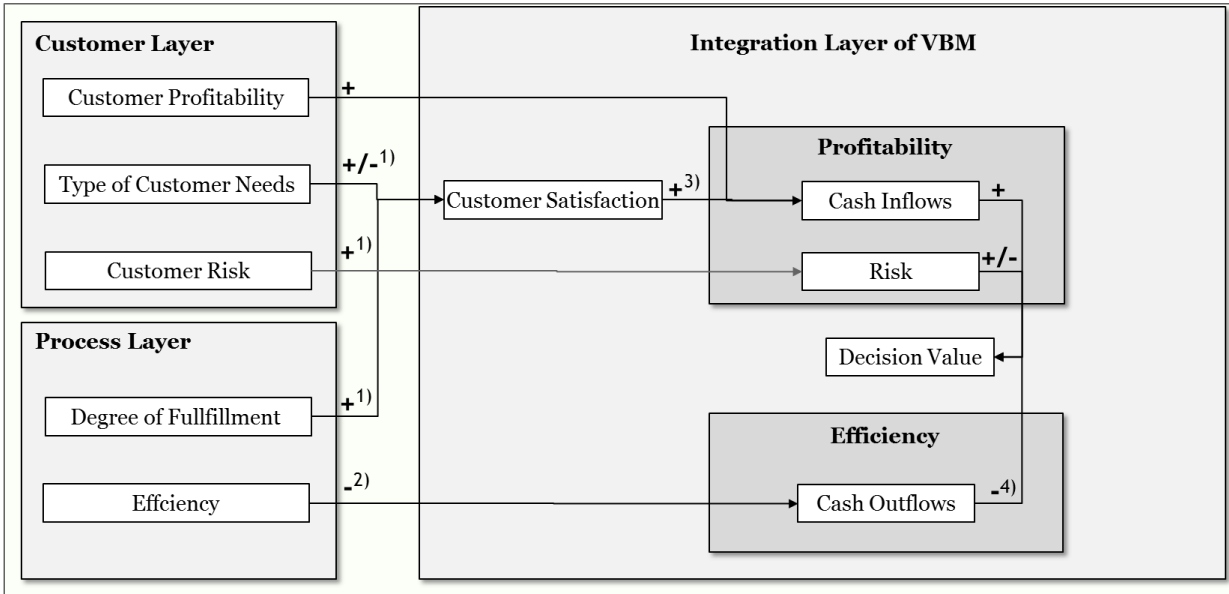
In order to further increase the comprehensibility of our framework, which is crucial for the purpose of our framework, we modify the expected NPV as our objective function in two ways. First, we directly consider cash flows and not their NPV. If the underlying cash flows follow an independent, identical distribution – a very common condition in business process management (see e.g. Bolsinger et al. 2011; Buhl et al. 2011; Murray and Haubl 2011) – the NPV can get reduced to a constant discount factor. As the pure discounting, does not alter decisions and as the scope of our model lies on the strategic decision and not on an accurate value estimation, we can abstract from this complexity and use the periodic cash flows instead as a proxy. Second, we distinguish between cash inflows  $CI$  coming from the external customer side and cash outflows  $CO$  coming from the process side. The clear assignment of cash inflows to the customers and cash outflows to processes is an approach which considerably increases the comprehensibility of the interplay between both sides. Moreover, it does not influence our results, as the assignment of cash flows to research objects is problem specific in VBM. Whereas the BPM literature traditionally assigns both, cash in- and outflows to processes (e.g. Bolsinger et al. 2011; vom Brocke et al. 2010), CRM literature assigns all cash flows to the customer as its central research object (e.g. Gupta et al. 2006). For our integrative purpose, basically all combinations in between these extreme assignments would theoretically be possible. Accordingly, we have chosen the clearest variant. Using the sum of cash in- and outflows as objective function, increasing cash inflows (or increasing customer satisfaction) and decreasing cash outflows (increasing process efficiency) finally have the same effect. Our objective function  $V$  then equals

$$V = E(CI) - E(CO) \quad (1)$$

Equation (1) separately represents the relevant factors for a proper strategic orientation for the focal business process. The expected cash inflows (first term of equation (1)), resulting from selling the process output to the customer, is a measure for customer profitability. The expected cash outflows (second term of equation (1)) resulting from executing the underlying process to produce the process output is a measure for process efficiency. In order to properly compile the cash in- and outflow components, we draw back on the results from CRM for the inflow side and from BPM for the outflow side. As justificatory literature for the process layer, we refer to Bolsinger et al. (2011) who transfer the principles of VBM to BPM in the context of process redesign. The basic idea of their model is the description of process cash (out-) flows on the basis of a stochastic distribution. They show that the value of a process can be calculated by inserting the normal distributed cash flows into the chosen valuation function. Thereby, the process value is completely determined by the expected cash flows (efficiency) and their variances within the integration layer of VBM.

Considering the customer layer, Gruca and Rego (2005) illustrate that operational cash inflows i.e. profitability linearly depend on customer satisfaction. Thus, the substantiation of the cash inflows requires the compilation of customer satisfaction. For this purpose, we refer to the well-established Kano model (Kano et al. 1984) who differentiate between three types of relationships between the realized customer satisfaction and the degree of fulfillment of the customers' needs towards the process output. At this point, we can again bridge the customer and the process world. The degree of fulfillment is a typical process characteristic, which is closely linked to customer satisfaction and thereby to cash inflows. The higher the expected degree of fulfillment, the higher the expected customer satisfaction and the higher expected cash inflows. To model this casual chain, we begin with the degree of fulfillment. Analogously to the reasoning from Bolsinger et al. (2011) about process cash flows, we can describe the degree of fulfillment also by a normal distributed random variable. In a second step, we transfer the threefold manifesto of Kano (1984) to the process level by differentiating between basic, performance and excitement processes and modeling the different satisfaction mechanics. In a third step, we transform the intermediate result for customer satisfaction into cash flows and insert them into our valuation function. Following this procedure, we describe the customer value on the basis of the expected fulfillment as a measure for customer profitability and the fulfillment variance as a measure for customer risk. Finally, we integrate both sides in the valuation layer within our objective function. Figure 2 illustrates the reasoning above and graphically summarizes

our results, whereas the arrows show the direction of influence, the plus/minus indicate a positive or negative influence. Below, we substantiate our objective function in more detail.



1) Kano et al. 1984; 2) Limam Mansar et al. 2009; 3) Gruca and Rego 2005; 4) Bolsinger et al. 2011;

**Figure 2: Basic Idea of CRM-BPM-Framework**

A key result of value-based BPM is, that process cash flows follow a normal distribution (see e.g. Bolsinger et al. 2011; Buhl et al. 2011; Murray and Haubl 2011). This implies that the expected value and the variance of the process cash flows completely define the value of a business process. The central limit theorem and variations from it provide the justification for this result. As the number of process executions  $n$  within a single period is sufficiently large and as the other assumptions of identical and independent repetitiveness hold for business processes, the central limit theorem states that process cash flows are normally distributed (Bolsinger et al. 2011). In our case, the expected process cash outflows sacrificed for the production of the process output in a single period  $E(CO)$  calculates by multiplying the number of executions  $n$  and the expected outflows  $\mu_{CO}$  per process instance.

$$-E(CO) = -n \cdot \mu_{CO} \quad (2)$$

For compiling process cash inflows, we begin with modeling the degree of fulfillment as the bridging variable between the customer and the process layer. Therefore, we transfer the reasoning about cash flows as the central process characteristic of value-based BPM to the degree of fulfillment as the central process characteristic of CRM. The identical and independent repetitiveness of processes makes the central limit theorem also applicable for the degree of fulfillment. If a process fulfills the needs of an organization's customer to the expected degree  $\mu_F$  and variance  $\sigma_F^2$ , the total fulfillment of the entire customer base i.e. over the total number of process executions  $n$  then also follows a normal distribution with mean  $n \cdot \mu_F$  and variance  $n \cdot \sigma_F^2$ . In order to translate the fulfillment into satisfaction, we need to consider the different mechanics toward the three kinds of process outputs and derive an analytical relationship for each output type. Excitement outputs are ideal for an organization as disappointing customers does not decrease customer satisfaction whereas an over-fulfillment of expectations leads to an exponential increase of satisfaction. In terms of risk, the organization only faces "upside risk" meaning that it can only win and not lose in satisfying their customers. Moreover, their winning potential increases exponentially with the degree of fulfillment. Mathematically, an exponential function  $\exp(bF)$  mirrors this ideal relationship between satisfaction and fulfillment  $F$  where  $b$  is a measure for customer sensitivity towards fulfillment. The higher the sensitivity  $b$  the more satisfied feel customers in the case of excitement. Basic outputs follow the same logic in the opposite direction. They are the worst-case type for an organization as over-fulfillment is not rewarded or perceived by customers whereas disappointment leads to an exponential decrease of satisfaction. In terms of risk, the organization only faces "downside risk" meaning that it can only lose and

not win in satisfying their customers and their losing potential is exponential. A negative exponential function  $-\exp(-bF)$  mirrors this undesirable relationship. Again  $b$  is a measure for customer sensitivity on fulfillment and the higher  $b$  the worse the reaction on disappointment. Performance outputs stand in between these extremes. Over- and under-fulfillment are equally perceived and both linearly increase and decrease customer satisfaction. The corresponding mathematical function  $bF$  shows this ambiguity. In order to finally transfer our intermediate results into cash inflows, we refer to Gruca and Rego (2005) who empirically illustrate a linear relationship between both constructs. The profitability  $p$  monetizes satisfaction and is defined as the exchange rate between satisfaction and cash inflows as illustrated by Gruca and Rego (2005). On this foundations, we can compile the cash inflow components of the objective function. Therefore we integrate the respective cash inflow functions over the density of the fulfillment.

$$E(CI) = \begin{array}{ll} \int p \cdot \exp(b \cdot F) f(F) dF & \text{e-process} \\ \int p \cdot b \cdot F f(F) dF & \text{p-process} \\ \int -p \cdot \exp(-b \cdot F) f(F) dF & \text{b-process} \end{array} \quad (3)$$

Two things are important to note when solving these integrals. First, the solution for the exponential functions of excitement and basic processes correspond to the expected value of a log-normal distribution and are therefore known in stochastic theory. Second, the linear relationship from the performance factors follows the same logic as for the cash outflow component. Thus, we already know the solution for performance processes as well. Equation (4) shows the complete substantiation for the customer side.

$$E(CI) = \begin{array}{ll} p \cdot \exp\left(b \cdot n \cdot \mu_F + \frac{b^2}{2} \cdot n \cdot \sigma_F^2\right) & \text{e-process} \\ n \cdot p \cdot b \cdot \mu_F & \text{p-process} \\ -p \cdot \exp\left(-b \cdot n \cdot \mu_F + \frac{b^2}{2} \cdot n \cdot \sigma_F^2\right) & \text{b-process} \end{array} \quad (4)$$

Synchronizing the process side with the customer side into one equation, we finally get to our final objective function  $V$  which is illustrated in equation (5).

$$V = \begin{array}{ll} p \cdot \exp\left(b \cdot n \cdot \mu_F + \frac{b^2}{2} \cdot n \cdot \sigma_F^2\right) - n \cdot \mu_{CO} & \text{e-process} \\ n \cdot p \cdot b \cdot \mu_F - n \cdot \mu_{CO} & \text{p-process} \\ -p \cdot \exp\left(-b \cdot n \cdot \mu_F + \frac{b^2}{2} \cdot n \cdot \sigma_F^2\right) - n \cdot \mu_{CO} & \text{b-process} \end{array} \quad (5)$$

Equation (5) constitutes a solid foundation to derive solutions for the E-E trade-off and the risk trade-off. It combines different types of customer behaviors and process efficiency on a common theoretical foundation enabling the detailed analysis of the E-E trade-off. Furthermore, risk in form of the variation of the process fulfillment is also implemented providing the analytical basis for the risk trade-off.

Variable	Definition	Origin
V	Decision value	Value Based Management (e.g. Kollar et al. 2015)
$\mu_{CO}$	Expected cash outflow per process execution	Inspired by Bolsinger (2015)
$\mu_F$	Expected degree of fulfillment of customer needs	Inspired by Kano et al. (1984)
$\sigma_F^2$	Variance of process output	Inspired by Bolsinger (2015)
p	Profitability of satisfaction	Inspired by Gruca and Rego (2005)
b	Customer sensitivity on fulfillment	Inspired by Kano et al. (1984)
n	Number of executions of a process per period	Bolsinger (2015)

**Table 1 – Overview Variables**

## Interpretation and Analyses

### Risk Orientation

Based on our analytical framework from the previous section, we can now define the optimal strategic design of business processes with respect to both trade-offs incorporated in our research objective, namely risk- and E-E trade-off. Beginning with the risk trade-off, we can state that BPM primarily advises risk-averse process designs. Theoretical foundations for this one-sided advice come from the statistical theory of variation and from the typical assumption of risk-averse decision makers in economic research. The statistical theory of variation suggests that process variation causes process outputs to deviate from their target specification and that the elimination of deviations leads to cost savings (Deming 1994). This reasoning is the basis for the popular six sigma approach that demands the continuous reduction of variation as strategic objective. From a more economic view, the typical assumption of risk-averse decision makers leads to the dominance of risk-averse design objectives (Bolsinger et al. 2011). However, when including the customer perspective as a second analytical lens on the risk trade-off, these results demand further differentiation: The different cash inflow dynamics from excitement, basic and performance processes need to be taken into account. As excitement processes promise extremely satisfied customers for high fulfillments and as they are not exposed to potential disappointments for low fulfillments, an organization faces only upside risk. In this case, risk-taking designs are beneficial as positive extremes are rewarded by additional cash inflows while negative deviances are not punished by lower cash inflows. Correspondingly, more varying excitement processes showing more extreme fulfillments better adopt this asymmetric risk mechanics and thereby show a higher profitability. For basic processes the opposing argumentation holds. They face extremely disappointed and unprofitable customers for low fulfillments and cannot benefit from profitability increases in the cases of high fulfillments. In other words, basic processes only face downside risk. Risk-averse designs are advantageous as positive extremes are not rewarded by additional cash inflows while negative deviances are punished by lower cash inflows. Consequentially, more stable basic process show a smaller exposure to the described downside risk and promise a higher profitability. Considering performance processes, we can state that the symmetric satisfaction mechanics neither favors a risk-taking nor a risk-averse orientation and that a risk-neutral orientation should be followed.

In order to mathematically prove this argumentation within our framework, we derive the objective functions (equation (5)) with respect to the variance of the fulfillment and show that the derivative (equation (6)) for excitement processes is strictly positive, that the derivative for basic processes is strictly negative and that the derivative for performance processes equals zero indicating risk-taking, risk-averse and risk-neutral designs as beneficial. Accordingly, we can confirm our hypothesis that risk strategy is dependent on the process type.

$$\frac{\partial V}{\partial \sigma_F} = \begin{cases} p \cdot b^2 \cdot n \cdot \sigma_F^2 \cdot \exp\left(b \cdot n \cdot \mu_F + \frac{b^2}{2} \cdot n \cdot \sigma_F^2\right) > 0 & \text{e-process} \\ 0 & \text{p-process} \\ -p \cdot b^2 \cdot n \cdot \sigma_F^2 \cdot \exp\left(-b \cdot n \cdot \mu_F + \frac{b^2}{2} \cdot n \cdot \sigma_F^2\right) < 0 & \text{b-process} \end{cases} \quad (6)$$

For excitement processes, the derivative of the objective function with respect to the fulfillment variance is strictly positive. This is because all parameters are defined on a positive definition range and because the exponential function has a strictly positive value range. For basic processes, the same argumentation holds, but the minus sign makes the derivative strictly negative. As performance processes do not display the fulfillment variance in their value function, the derivative equals zero.

As we intentionally applied the expected value as our valuation function and thereby assumed a risk-neutral decision maker, we now discuss our results for risk-averse decision makers. As the process and customer characteristics do not show a risk preference for performance factors, the risk aversion originating from the attitude of the decision maker becomes decisive. Thus, risk-averse decision makers should concentrate on risk-averse designs for performance processes. In the case of basic processes, the risk aversion from the customer and process side is reinforced by the decision maker's attitude and again risk-averse designs are favorable. For excitement processes, the preference for risk-taking designs is countered by the risk aversion

of the decision maker and we cannot directly make a clear statement. However, we can put forward two qualitative arguments to support risk-taking designs. First, the positive effect of process variance originating from the upside risk of excitement processes exponentially increases process profitability. In the BPM literature, the negative effects of process variance resulting from the decision maker's risk attitude are often modeled as linear and thereby less influential than the exponential benefits from risk-taking designs on the customer side (see e.g. Bolsinger et al. 2011; Buhl et al. 2011). Second, economic theory often interprets risk as two-sided and thereby combines upside and downside exposures while neglecting the one-sided potential of the case at hand. Thus, the typical conceptualization of risk aversion does not fit the conditions of excitement processes. More differentiated interpretations of risk can be found in advanced performance measures like the Shadwick Omega (Shadwick and Keating 2002) which directly addresses this conceptual drawback. On this basis, we argue that the interpretation of risk aversion is not suitable for excitement processes and state that the preference of risk-taking designs also holds for risk-averse decision makers. Summing all up, we showed that organizations should follow an ambidextrous design strategy with respect to the risk orientation of their processes. For excitement processes, risk-taking designs are beneficial as they better absorb the asymmetric profitability mechanics. For basic and performance processes, the more traditional, risk-averse orientation can be maintained.

### ***Experience-Efficiency Trade-Off***

Existing redesign approaches like for example Limam Mansar et al. (2009) or the Devil's Quadrangle from Brand and van der Kolk (1995) put operational process performance and therefore efficiency as their central objectives. Redesign approaches from the research stream of value-based BPM strongly request the additional consideration of cash inflows but do not explicitly include customer behavior as the decisive force. In this section, we relate process efficiency represented by the cash outflows and customer orientation represented by the cash inflows within our framework to fill this research gap.

Again the different mechanics of basic and excitement processes with their asymmetric customer perceptions on the one side and the linear perception of performance processes on the other side demand the ambidexterity of design objectives. Analyzing the different structures qualitatively, we derive three key-results: First, organizations need to ensure a saturation degree of fulfillment  $\mu_{SAT}$  for basic processes. In other words, customer-centric designs are favorable until very disappointed customers are prevented. Once that saturation fulfillment is reached, efficient designs become more favorable even if the fulfillment stays moderate. A generic design strategy would be: "Prevent extreme disappointments at possibly low process costs". This two-sided strategy is a direct consequence from the asymmetry of the customer behavior. As customers of basic processes become only disappointed for large underperformances, only these extreme cases have to be prevented (Kano et al. 1984). In all other cases, efficiency promises to be more valuable than additionally boosting process fulfillment. Second, excitement processes need a minimum level of fulfillment  $\mu_{MIN}$  to prefer customer-centricity over efficiency. In the right accelerating branch of the satisfaction curve, i.e. in the area of high over-fulfillment, (see Figure 1) customer-centric designs unfold their true potential. According to Kano (1984), true excitement requires unexpectedly high fulfillments. If customer-centric designs cannot bring the process in this excitement area, efficient alternatives are the better strategy. Third, the effects of customer-centricity and efficiency are about equally strong across different levels of fulfillment for performance processes.

In order to show these qualitative propositions mathematically, we introduce the experience-efficiency-ratio (E-E-ratio) as the relation between the derivative of the objective function with respect to the expected degree of fulfillment and its derivative with respect to the expected cash outflows. If processes exhibit an E-E-ratio larger than one, their values react more sensitively on customer-centric redesigns. For ratios smaller than one, efficient redesigns become more valuable. This inequality can be rewritten into the minimum level of fulfillment for excitement processes and the saturation level of fulfillment for basic processes.

$$\begin{aligned}
p \cdot b \cdot \exp\left(b \cdot n \cdot \mu_F + \frac{b^2}{2} \cdot n \cdot \sigma_F^2\right) &> 1 && \text{e-process} \\
\rightarrow \mu_F > -\frac{\ln(p \cdot b)}{b \cdot n} - \frac{b}{2} \cdot \sigma_F^2 = \mu_{MIN} &&& \\
E - E - \text{ratio} = p \cdot b > 1 &&& \text{p-process} \quad (7) \\
p \cdot b \cdot \exp\left(-b \cdot n \cdot \mu_F + \frac{b^2}{2} \cdot n \cdot \sigma_F^2\right) &> 1 && \text{b-process} \\
\rightarrow \mu_F < \frac{\ln(p \cdot b)}{b \cdot n} + \frac{b}{2} \cdot \sigma_F^2 = \mu_{SAT} &&&
\end{aligned}$$

Further substantiating these findings, we conduct sensitivity analyses of the E-E-ratio against customer sensitivity  $b$  and the degree of expected fulfillment  $\mu_F$ . In a first step, we set up a basic calibration for all variables of the E-E-ratio (cf. Table 2 – basic calibration). The parameter values of this calibration are in a common range and enable a comparable illustration of the mathematical results. Naturally, values are strongly dependent on the investigated industry and organizations, so we decided to choose moderate or average values for each parameter. Thus, as values for  $p$  and  $n$  linearly influence the E-E-ratio, we standardize them to 100. Furthermore,  $\mu_F$  and  $\sigma_F$  can take on values between 0 and 1, thus we took moderate values as starting point for our sensitivity analysis to allow for adequate variations into both directions. Customer sensitivity is probably most difficult to operationalize (we add a corresponding discussion in the conclusive section). Analytically, the form of the Kano functions resemble exponential utility functions from VBM. Accordingly, we took a plausible value inspired by values reported in VBM literature (Bolsinger 2015; Buhl et al. 2011).

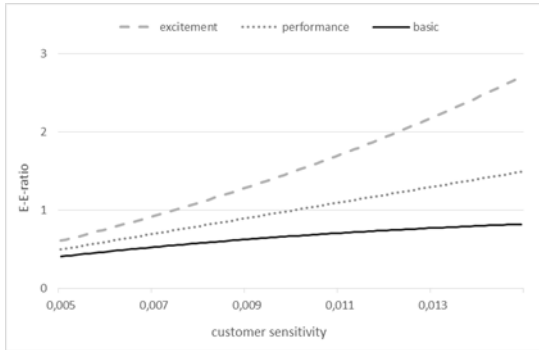
customer profitability $p$	customer sensitivity $b$	number of customers $n$	expected degree of fulfillment $\mu_F$	std. deviation of fulfillment $\sigma_F$
100	0.015	100	0.4	0.2

**Table 2 – basic calibration**

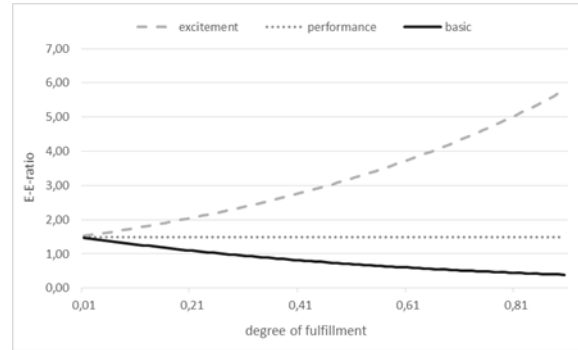
For customer sensitivity  $b$  we started with 0.005 slightly increasing in steps of 0.0001 up to 0.015. Figure 3 shows that customer-centric designs gain importance with more sensitive reactions of customers on fulfillment. The less sensitive customers react on a given level of fulfillment, the less desirable are customer-centric process designs, as customers do not reward the invested effort with higher satisfaction and profitability. This is directly reflected by the linear increase of the E-E-ratio for performance processes. For excitement processes, customer-centric designs are highly recommended from a minimum level of customer sensitivity on. Thus, organizations should aim at high fulfillments and even accept drawbacks in process efficiency, if the customer sensitivity is that high, that customers really reward their redesign efforts with excitement and therefore profitability. Basic processes have to be efficient as the E-E-ratio stays smaller than one. In other words, basic processes should follow lean and efficient designs as the marginal costs of non-fulfillment are always lower than the marginal process costs. This is because the expected degree of fulfillment is with 0.4 in a moderate range, preventing extreme disappointments and favoring efficiency. Overall the illustration transports two key messages: First, higher customer sensitivities favor customer-centric designs. Second, with moderate expected fulfillments, excitement processes should be designed to excite and basic processes should be designed possibly efficient.

In a second step, we vary the degree of fulfillment  $\mu_F$  (values ranging from 0 to 0.9 with steps of 0.01) to illustrate the asymmetry of optimal process designs across different degrees of current fulfillment (cf. Figure 4). Whereas our first analysis indicates, that efficient process designs are favorable for basic processes in any case, we can now refine this recommendation in line with our mathematical results. Indeed, our second analysis illustrates the saturation degree of fulfillment which should be reached by customer-centric designs. From this saturation level on, organizations should focus on efficient process design. Although concrete values for the saturation level strongly depend on the chosen customer sensitivity in the basic calibration, we can generally state, that organizations should fulfill the saturation level for basic processes possibly efficient. As already shown mathematically in equation 7, the optimal design orientation of performance processes, does not vary across different degrees of fulfillment. Finally, excitement processes should prefer customer-centric designs with higher fulfillments. This can be substantiated by the

parametrization of customer sensitivity rate in our basic calibration. As the chosen customer sensitivity makes excitement possible, efforts for higher fulfillment and thus higher customer satisfaction pay out.



**Figure 3: Variation of customer sensitivity of fulfillment**



**Figure 4: Variation of degree of fulfillment**

The presented theoretically based framework is by nature a bit abstract and up to now not tested empirically. Thus, we want to illustrate the practical relevance, using an example from the automotive industry. For our example, we draw back on a comparison of the two car manufacturer Toyota and BMW. The Japanese car manufacturer Toyota is actually the largest car manufacturer in the world as measured by cars produced in 2015 (Schmitt 2016) and therefore produces *mass-market vehicles*. In contrast, BMW is a bit more focused on the *luxury vehicle market*. Accordingly, the widespread image of Toyota is a – compared to the German manufacturer BMW – auspicious car manufacturer, but still producing good quality cars. Deriving from these images, Toyota’s mass-market customers can be declared as comparably easy, whereas BMW’s luxury customers are more demanding. Besides the customer side, we need to investigate the process side in order to apply the presented framework. Therefore the production process fits well to illustrate the mechanism of the framework. As high fulfillment in the production process leads to a high car quality and therefore higher customer satisfaction, whereas low fulfillment causes low car quality and dissatisfaction, we declare it as a performance process.

Starting with Toyota, we recognize a consequent lean six sigma approach in its production process (Pepper and Spedding 2010), combining efficient process design with a certain level of quality control. Measured by the American Customer Satisfaction Index (ACSI), this strategy pays out as Toyota holds the second rank for customer satisfaction in the category “mass-market vehicles” in the ACSI Automobile Report (American Customer Satisfaction Index 2016). This is in line with the proposed design strategy of our framework which is a risk-averse and exploitative design for performance processes with easy customers. In contrast, BMW with demanding luxury vehicle customers should focus more on the customers in order to meet their needs. Thus, BMW has a more complex production process, offering greater variety of interior and equipment options. Additionally, strict quality controls are necessary. Exactly this strategy is proposed by our model recommending a risk-averse and explorative strategy for performance processes with demanding customers. Again, the strategy pays out for BMW with the second rank for customer satisfaction in the category “luxury vehicles” (American Customer Satisfaction Index 2016). In order to validate these results, we propose to conduct a cross-case analysis in a next step.

## Conclusion and Discussion

At the center of this paper stands the necessity of a two-dimensional, ambidextrous strategy for business process design. Thus, organizations have to find the right balance between risk-taking and risk-averse process designs (risk trade-off) as well as between explorative and exploitative process designs (E-E trade-off). Even if an organization accepts the necessity of design ambidexterity, the key problem is still to decide which of the archetype designs their processes should follow. This decision is very complex as it requires detailed knowledge about customer and process behavior. Moreover, it needs to be taken for every process separately. Given this complexity, organizations have a deep need for concrete, practical guidance on how to decide the strategic orientation of their business processes.

In order to meet this requirement the presented framework integrates the customer and the process perspectives to provide a holistic understanding about the interplay of the trade-offs. We connect established theories from BPM in form of value-based BPM and CRM in form of the Kano model, incorporating a strong VBM focus as our methodological bracket. In doing so, we do not claim to give in-depth guidelines for the design of a singular process, we rather aim at an improved understanding of the decisive forces and at providing high-level design guidelines for all Kano process types. Therefore, the contribution of our framework is two-fold. First, we enhance existing redesign approaches like Limam Mansar et al. (2009) and others who operate on a given set of strategic redesign objectives. These approaches focus on prioritizing different redesign ideas on a defined strategic evaluation scheme. With deriving such an evaluation scheme, we complement existing approaches to a holistic redesign framework. Second, we support the rethinking of the BPM community in the direction of ambidextrous BPM as initiated by Rosemann (2014). The predominant strategic objective of BPM is improving process performance which typically follows a more efficiency-orientated connotation. We demonstrate that customer orientation and the inclusion of the customer perspective is a second strategic objective that should stand equally next to operational performance.

Based on our framework, we prioritize design strategies with respect to different process and customer characteristics. For business processes, current expected fulfillment, the variance of current fulfillment and current efficiency are the decisive characteristics. On the customer side, customer sensitivity towards fulfillment and the classification of their perceptions as excitement, basic or performance processes are relevant. Our comparative analyses propose risk-taking designs for excitement processes and risk-averse designs for basic and performance processes. The basic reasoning behind this result is to leverage the asymmetric upside potential of excitement process to excite while simultaneously managing the risk of under-fulfillment for performance and basic processes. For the E-E trade-off, we conclude customer-centric designs for excitement processes with moderate and high fulfillments to fully exploit their upside potential. Furthermore, we propose efficient designs for excitement processes with low fulfillment, as efficiency savings outweigh further selling potential stimulated by an increased customer satisfaction. For basic processes, we propose customer-centric designs until an acceptable fulfillment is promised and the risk of extreme disappointments is mitigated. Once such a saturation degree of fulfillment is ensured, we recommend switching to efficient design alternatives to achieve this saturation state as efficient as possible. For performance processes, our framework gives the differentiated advices to use efficient designs in case of “easy” customers, which are customers that are not sensitive to (non)-fulfillment of their needs, whereas customer-centric designs are promising for sensitive customers that strongly react on good or bad performances. Table 3 summarizes our results and proposes which of the 4 archetype strategies should be used dependent on process characteristics. The 4 archetype strategies are: 1) *risk-taking and efficient*, 2) *risk-taking and customer-centric*, 3) *risk-averse and efficient* and 4) *risk-averse and customer-centric*.



	<b>Low fulfillments</b>	<b>Moderate fulfillments</b>	<b>High fulfillments</b>
<b>Basic processes</b>	4) Risk-averse and explorative design	3) Risk-averse and exploitative design	3) Risk-averse and exploitative design
<b>Performance processes with “easy” customers</b>	3) Risk-averse and exploitative design	3) Risk-averse and exploitative design	3) Risk-averse and exploitative design
<b>Performance processes with “demanding” customers</b>	4) Risk-averse and explorative design	4) Risk-averse and explorative design	4) Risk-averse and explorative design
<b>Excitement processes</b>	2) Risk-taking and exploitative design	1) Risk-taking and explorative design	1) Risk-taking and explorative design

**Table 3: Process design principles**

Readdressing our primary research objective of supporting practical decision makers in defining the proper design strategy, we now discuss the applicability of our model, especially the gathering of the required input data. Whereas organizations may obtain typical process data on expected process cash outflows or fulfillment (e.g. process error rate) from their ERP system or the accounting department, information on customer behavior needs a more thorough discussion. As for the most important information, organizations need to determine as what Kano type customers perceive their process outputs. Therefore, a customer survey needs to be conducted. For a proper classification method as excitement, basic or performance process, we refer to the questionnaire of Matzler et al. (1996). Concerning customer profitability and the number of customers, CRM systems might provide a proper orientation. The most abstract variable is customer sensitivity towards fulfillment. Calibrating this variable should either be achieved in line with the conducted customer survey in form of scenario descriptions or by expert estimations. However, customer sensitivity only matters for performance processes where it decides between exploitative and explorative design strategies. We suggest that practitioners should trust in their feelings whether they have demanding or easy customers and decide accordingly. Addressing a second point of applicability, we want to discuss the practical relevance of our model as a *black-box approach*. In BPM, academia typically differentiates three kinds of redesign approaches: creative, structured and enhanced structured (Limam Mansar and Reijers 2005). The creative approach identifies new process designs relying on brainstorming sessions of human decision makers. The degree of improvement in this approach thereby heavily relies on the intuition of decision makers and leverages their knowledge bases. The strengths of this approach lie in the high creativity and the innovative power allowed to the decision makers, but often leads to biased prioritizations (Limam Mansar et al. 2009). The structured approach uses quantitative models for redesigning processes. Although this approach is less biased and avoids neglecting promising design candidates, it is less creative and more industrial. As an intersection between both extremes, Limam Mansar et al. (2009) propose an improved redesign process. They propose a two-step approach, where quantitative models make propositions which are then evaluated by a design committee (Limam Mansar et al. 2009). This is also where we see the strength of our model. It should not be applied blindly, but the proposed design strategy should be validated by the process decision makers. The model should help and support decision makers to understand the interplay of different effects to provide them a reasonable basis for making good redesign decisions.

Our framework and our managerial implications are beset with limitations that demand future research. First, we restricted our framework to so called primary activities (Porter and Millar 1985), also known as core processes (cf. Dumas et al. 2013) which are business processes with direct interfaces to the end-customers of an organization. As a result, our framework is not directly applicable for support and

management processes which aim at ensuring the proper functioning of primary activities. To transfer our results on these types of processes, their insuring effects and their perceptions by the end-customers need to be quantified. However, given the indirectness of effects a strong dominance of efficient designs is to be expected. Second, we cannot depict robust values for the saturation and minimum degree of expected fulfillment to completely describe the conditions for customer-centric designs. Although, we can conceptually and analytically prove the existence of these conditions and determine the asymmetric customer behavior as comprehensive reason, further empirical research is needed to provide decisive values. As we can determine customer sensitivity fulfillment variance, profitability and the number of executions as influencing variables on the degrees of fulfillment, we provide a suitable base for future empirical analyses. Third, solving the question about proper strategic orientation for redesign initiatives is only one task in the complete redesign process (Limam Mansar et al. 2009). Other tasks like the identification of redesign patterns or their evaluation against the strategic objectives is outside our research scope. We encourage future work to address this drawback and to implement our strategic reasoning into existing redesign approaches. Thereby, a holistic redesign tool could emerge. Fourth, the model operates on a kind of consensus of customer base on the classification of the process into the three categories. Criticizing this ternary classification is reasonable but it represents the essential of the acknowledged Kano model. Besides, our model could be adjusted to more flexible classifications. Therefore, users need to divide their customer base into three customer types respective to their attitudes toward the process output, parameterize our model for all three process types and build the weighted average of the intermediate process values with respect to the proportion of the customer types on the entire customer base. If one customer type dominates the other types, let's say with a proportion of 75% or more, users can use the respective dominant class as representative for the entire base.

Summing up, there is still need for further research at the interface of BPM and CRM. However, the mindset of a strong value focus in designing business processes combined with the knowledge about the presented trade-offs and its implications on design principles, empowers organizations to improve their value on the long run.

## Acknowledgements

This research was (in part) carried out in the context of the Project Group Business and Information Systems Engineering of the Fraunhofer Institute for Applied Information Technology FIT.

## References

- Afflerbach, P., Kastner, G., Krause, F., and Röglinger, M. 2014. "The Business Value of Process Flexibility," *Business & Information Systems Engineering* (6:4), pp. 203–214.
- Alexandrov, A. 2015. "When Should Firms Expose Themselves to Risk?" *Management Science* (61:12), pp. 3001–3008.
- American Customer Satisfaction Index 2016. *ACSI Automobile Report 2016*. <http://www.theacsi.org/news-and-resources/customer-satisfaction-reports/reports-2016/acsi-automobile-report-2016>. Accessed 6 September 2016.
- Anderson, E. W., and Mittal, V. 2000. "Strengthening the Satisfaction-Profit Chain," *Journal of Service Research* (3:2), pp. 107–120.
- Anupindi, R., Chopra, S., Deshmukh, D., van Mieghem, A., and Zemel, E. 2012. *Managing Business Process Flows: Principles of Operations Management*, New York: Prentice Hall.
- Aperrin, A. 2015. *Social Networking Usage: 2005-2015*. [http://www.pewinternet.org/files/2015/10/PI\\_2015-10-08\\_Social-Networking-Usage-2005-2015\\_FINAL.pdf](http://www.pewinternet.org/files/2015/10/PI_2015-10-08_Social-Networking-Usage-2005-2015_FINAL.pdf). Accessed 6 May 2016.
- Bharadwaj, A., El Sawy, O. A., Pavlou, P. A., and Venkatraman, N. V. 2013. "Visions and Voices on Emerging Challenges in Digital Business Strategy," *MIS Quarterly* (37:2), pp. 633–661.
- Bolsinger, M. 2015. "Bringing Value-Based Business Process Management to the Operational Process level," *Information Systems and e-Business Management* (13:2), pp. 355–398.
- Bolsinger, M., Bewernik, M.-A., and Buhl, H. U. 2011. "Value-Based Process Improvement," in *Proceedings of the 19<sup>th</sup> European Conference on Information Systems (ECIS)*, Helsinki, Finland. June 9-11, 2011, Paper 21.
- Bolsinger, M., Elsäßer, A., Helm, C., and Röglinger, M. 2015. "Process Improvement through Economically Driven Routing of Instances," *Business Process Management Journal* (21:2), pp. 353–378.
- Brand, N., and van der Kolk, H. 1995. "Workflow Analysis and Design," *Kluwer Bedrijfswetenschappen, Deventer* (in Dutch).
- Buhl, H. U., Röglinger, M., Stöckl, S., and Braunwarth, K. S. 2011. "Value Orientation in Process Management," *Business & Information Systems Engineering* (3:3), pp. 163–172.
- Conger, S. 2010. "Six Sigma and Business Process Management," in *Handbook on Business Process Management 1*, J. vom Brocke and M. Rosemann (eds.), Berlin, Heidelberg: Springer, pp. 127–148.
- Copeland, T. E., Koller, T., and Murrin, J. 1994. *Valuation: Measuring and Managing the Value of Companies*, New York, NY: Wiley.
- Copeland, T. E., Weston, J. F., and Shastri, K. 2005. *Financial Theory and Corporate Policy*, Boston, MA: Pearson Education Inc.
- Damodaran, A. 2012. *Investment Valuation: Tools and Techniques for Determining the Value of any Asset*, Hoboken, NJ: Wiley.
- Danaher, P. J., and Rust, R. T. 1996. "Indirect Financial Benefits from Service Quality," *Quality Management Journal* (3:2), pp. 63–88.
- Danielson, M. G., Heck, J. L., and Shaffer, D. 2008. "Shareholder Theory – How Opponents and Proponents Both Get it Wrong," *Journal of Applied Finance (Formerly Financial Practice and Education)* (18:2), pp. 62–66.
- Deming, W. E. 1994. *Out of the Crisis*, Cambridge, MA: Cambridge University Press.
- Dumas, M., La Rosa, M., Mendling, J., and Reijers, H. A. 2013. *Fundamentals of Business Process Management*, Berlin, Heidelberg: Springer.
- Fornell, C., Johnson, M. D., Anderson, E. W., Cha, J., and Bryant, B. E. 1996. "The American Customer Satisfaction Index: Nature, Purpose, and Findings," *Journal of Marketing* (60:4), pp. 7–18.
- Franz, P., Kirchmer, M., and Rosemann, M. 2011. *Value-Driven Business Process Management – Impact and Benefits*. [https://www.accenture.com/mx-es/~/\\_media/Accenture/Conversion-Assets/DotCom/Documents/Local/es-la/PDF2/Accenture-Value-Driven-Business-Process-Management.pdf](https://www.accenture.com/mx-es/~/_media/Accenture/Conversion-Assets/DotCom/Documents/Local/es-la/PDF2/Accenture-Value-Driven-Business-Process-Management.pdf). Accessed 4 May 2016.
- Goyal, M., and Netessine, S. 2011. "Volume Flexibility, Product Flexibility, or Both: The Role of Demand Correlation and Product Substitution," *Manufacturing & Service Operations Management* (13:2), pp. 180–193.

- Gruca, T. S., and Rego, L. L. 2005. "Customer Satisfaction, Cash Flow, and Shareholder Value," *Journal of Marketing* (69:3), pp. 115–130.
- Gulledge, T. R., Hirschmann, P., and Scheer, A.-W. 1997. "Value-Based Management of Inter-Organizational Business Processes," in *Proceedings of the Third International Conference on Wirtschaftsinformatik 97: Internationale Geschäftstätigkeit auf der Basis flexibler Organisationsstrukturen und leistungsfähiger Informationssysteme*, H. E. Krallmann (ed.), Berlin, Germany. February 26-27, 1997, pp. 73–98.
- Gupta, S., Hanssens, D., Hardie, B., Kahn, W., Kumar, V., Lin, N., Ravishanker, N., and Sriram, S. 2006. "Modeling Customer Lifetime Value," *Journal of Service Research* (9:2), pp. 139–155.
- Hall, J. M., and Johnson, M. E. 2009. "When Should a Process Be Art, Not Science?" *Harvard Business Review* (87:3), pp. 58–65.
- Hammer, M., and Stanton, S. 1999. "How Process Enterprises Really Work," *Harvard Business Review* (77:6), pp. 108–118.
- Harmon, P., and Wolf, C. 2014. *The State of Business Process Management 2014. Business Process Trends*. <http://www.bptrends.com/bpt/wp-content/uploads/BPTrends-State-of-BPM-Survey-Report.pdf>. Accessed 3 May 2016.
- Heskett, J. L., Jones, T. O., Loveman, G. W., Sasser Jr., W. E., and Schlesinger, L. A. 1994. "Putting the Service-Profit Chain to Work," *Harvard Business Review* (72:2), pp. 164–170.
- Heskett, J. L., Sasser Jr, W. E., and Schlesinger, L. A. 1997. *The Service Profit Chain: How Leading Companies Link Profit to Loyalty, Satisfaction, and Value*, New York: Free Press.
- Ittner, C. D., and Larcker, D. F. 2001. "Assessing Empirical Research in Managerial Accounting: a Value-Based Management Perspective," *Journal of Accounting and Economics* (32:1), pp. 349–410.
- Kanevsky, V., and Housel, T. J. 1995. "Value-Based Business Process Reengineering: An Objective Approach to Value Added," in *Business Process Change: Reengineering Concepts, Methods and Technologies*, V. Grover and W. J. Kettinger (eds.), Hershey, PA: Idea Group Publishing, pp. 376–401.
- Kano, N., Seraku, N., Takahashi, F., and Tsuji, S. 1984. "Attractive Quality and Must-be Quality," *The Journal of the Japanese Society for Quality Control* (14), pp. 39–48.
- Kohlborn, T., Mueller, O., Poepelbuss, J., and Roeglinger, M. 2014. "Interview with Michael Rosemann on Ambidextrous Business Process Management," *Business Process Management Journal* (20:4), pp. 634–638.
- Koller, T., Goedhart, M., and Wessels, D. 2015. *Valuation: Measuring and Managing the Value of Companies*, Hoboken NJ: Wiley.
- Kumar, V. 2009. *Managing Customers for Profit: Strategies to Increase Profits and Build Loyalty*, Upper Saddle River, N.J.: Pearson Education.
- Kumar, V., and Pansari, A. 2016. "National Culture, Economy, and Customer Lifetime Value: Assessing the Relative Impact of the Drivers of Customer Lifetime Value for a Global Retailer," *Journal of International Marketing* (24:1), pp. 1–21.
- Larivière, B., Keiningham, T. L., Aksoy, L., Yalçın, A., Morgeson, F. V., and Mithas, S. 2016. "Modeling Heterogeneity in the Satisfaction, Loyalty Intention, and Shareholder Value Linkage: A Cross-Industry Analysis at the Customer and Firm Levels," *Journal of Marketing Research* (53:1), pp. 91–109.
- Limam Mansar, S., and Reijers, H. A. 2005. "Best Practices in Business Process Redesign: Validation of a Redesign Framework," *Computers in Industry* (56:5), pp. 457–471.
- Limam Mansar, S., and Reijers, H. A. 2007. "Best Practices in Business Process Redesign: Use and Impact," *Business Process Management Journal* (13:2), pp. 193–213.
- Limam Mansar, S., Reijers, H. A., and Ounnar, F. 2009. "Development of a Decision-Making Strategy to Improve the Efficiency of BPR," *Expert Systems with Applications* (36:2), pp. 3248–3262.
- Linhart, A., Manderscheid, J., Roeglinger, M., and Schlott, H. 2015. "Process Improvement Roadmapping – How to Max Out Your Process," in *Proceedings of the 36<sup>th</sup> International Conference on Information Systems*, T. Carte, A. Heinzl and C. Urquhart (eds.), Fort Worth, Texas, USA. December 13-16, 2015, Association for Information Systems.
- Markides, C. C. 2013. "Business Model Innovation: What Can the Ambidexterity Literature Teach Us?" *The Academy of Management Perspectives* (27:4), pp. 313–323.
- Matzler, K., Bailom, F., Hinterhuber, H. H., Renzl, B., and Pichler, J. 2004. "The Asymmetric Relationship Between Attribute-Level Performance and Overall Customer Satisfaction: A Reconsideration of the Importance–Performance Analysis," *Industrial Marketing Management* (33:4), pp. 271–277.
- Matzler, K., Hinterhuber, H. H., Bailom, F., and Sauerwein, E. 1996. "How to Delight Your Customers," *The Journal of Product and Brand Management* (5:2), pp. 6–18.

- Mithas, S., and Rust, R. T. 2016. "How Information Technology Strategy and Investments Influence Firm Performance: Conjecture and Empirical Evidence," *MIS Quarterly* (40:1), pp. 223–246.
- Murray, K. B., and Haubl, G. 2011. "Freedom of Choice, Ease of Use, and the Formation of Interface Preferences," *MIS Quarterly* (35:4), pp. 955–976.
- Neiger, D., and Churilov, L. 2004. "Goal-Oriented Business Process Modeling with EPCs and Value-Focused Thinking," in *Second International Conference on Business Process Management*, J. Desel, B. Pernici and M. Weske (eds.), Potsdam, Germany. June 17-18, 2004, Berlin, Heidelberg: Springer, pp. 98–115.
- Oliver, R. L. 1980. "A Cognitive Model of the Antecedents and Consequences of Satisfaction Decisions," *Journal of Marketing Research* (17:4), pp. 460–469.
- Parasuraman, A., Zeithaml, V. A., and Berry, L. L. 1988. "Servqual: A Multiple-Item Scale for Measuring Consumer Perceptions of Service Quality," *Journal of Retailing* (64:1), pp. 12–40.
- Pepper, M., and Spedding, T. A. 2010. "The evolution of lean Six Sigma," *International Journal of Quality & Reliability Management* (27:2), pp. 138–155.
- Porter, M. E. 1980. *Competitive Strategy: Techniques for Analyzing Industries and Competitors*, New York: Free Press.
- Porter, M. E., and Millar, V. E. 1985. *How Information Gives You Competitive Advantage*: Harvard Business Review, Reprint Service.
- Raisch, S., and Birkinshaw, J. 2008. "Organizational Ambidexterity: Antecedents, Outcomes, and Moderators," *Journal of Management* (34:3), pp. 375–409.
- Rappaport, A. 1986. *Creating Shareholder Value: The New Standard for Business Performance*, New York, NY: Free Press.
- Reijers, H. A., and Limam Mansar, S. 2005. "Best practices in business process redesign: An overview and qualitative evaluation of successful redesign heuristics," *Omega* (33:4), pp. 283–306.
- Relling, M., Schnittka, O., Sattler, H., and Johnen, M. 2016. "Each Can Help or Hurt: Negative and Positive Word of Mouth in Social Network Brand Communities," *International Journal of Research in Marketing* (33:1), pp. 42–58.
- Rosemann, M. 2014. "Proposals for Future BPM Research Directions," in *Proceedings of the 2<sup>nd</sup> Asia Pacific Conference on Business Process Management*, C. Ouyang and J.-Y. Jung (eds.), Brisbane, QLD. July 3-4, 2014, pp. 1–15.
- Rosemann, M., and vom Brocke, J. 2015. "The Six Core Elements of Business Process Management," in *Handbook on Business Process Management 1*, Heidelberg: Springer, pp. 105–122.
- Rotaru, K., Wilkin, C., Churilov, L., Neiger, D., and Ceglowski, A. 2011. "Formalizing Process-Based Risk with Value-Focused Process Engineering," *Information Systems and e-Business Management* (9:4), pp. 447–474.
- Schmitt, B. 2016. *Nice Try VW: Toyota Again World's Largest Automaker*. <http://www.forbes.com/sites/bertelschmitt/2016/01/27/nice-try-vw-toyota-again-worlds-largest-automaker/#56b3889b2b65>. Accessed 6 September 2016.
- Shadwick, W. F., and Keating, C. 2002. "A Universal Performance Measure," *Journal of Performance Measurement* (6:3), pp. 59–84.
- Soh, C., Lynne, M. M., and Goh, K. H. 2006. "Electronic Marketplaces and Price Transparency: Strategy, Information Technology, and Success," *MIS Quarterly* (30:3), pp. 705–723.
- Stewart, G. B., and Stern, J. M. 1991. *The Quest for Value: A Guide for Senior Managers*, New York, N.Y.: Harper-Business.
- The Journal of the Japanes Society for Quality Control*.
- Valvi, A. C., and Fragkos, K. C. 2012. "Critical Review of the E-Loyalty Literature: A Purchase-Centred Framework," *Electronic Commerce Research* (12:3), pp. 331–378.
- van der Aalst, W. M. P. 2013. "Business Process Management: A Comprehensive Survey," *ISRN Software Engineering* (Volume 2013), pp. 1–37.
- Vanwersch, R. J. B., Vanderfeesten, I., Rietzschel, E., and Reijers, H. A. 2015. "Improving Business Processes: Does Anybody have an Idea?" in *Business Process Management*, H. R. Motahari-Nezhad, J. Recker and M. Weidlich (eds.), Cham: Springer International Publishing, pp. 3–18.
- vom Brocke, J., Recker, J., and Mendling, J. 2010. "Value-Oriented Process Modeling: Integrating Financial Perspectives into Business Process Re-design," *Business Process Management Journal* (16:2), pp. 333–356.

- vom Brocke, J., Schmiedel, T., Recker, J., Trkman, P., Mertens, W., and Viaene, S. 2014. "Ten Principles of Good Business Process Management," *Business Process Management Journal* (20:4), pp. 530–548.
- vom Brocke, J., and Sonnenberg, C. 2015. "Value-Oriented in Business Process Management," in *Handbook on Business Process Management 2*, J. vom Brocke and M. Rosemann (eds.), Berlin, Heidelberg: Springer, pp. 101–132.
- Wagner, D., Suchan, C., Leunig, B., and Frank, J. 2011. "Towards the Analysis of Information Systems Flexibility: Proposition of a Method," in *Proceedings of the 10<sup>th</sup> International Conference on Wirtschaftsinformatik*, A. Bernstein and G. Schwabe (eds.), Zurich. February 16-18, 2011, pp. 808–817.
- Zellner, G. 2011. "A Structured Evaluation of Business Process Improvement Approaches," *Business Process Management Journal* (17:2), pp. 203–237.