Analysis of IT-Business Models
Towards Theory Development of Business Model Transformation and Monitoring

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Keywords: Business Models, Performance Management, Business Processes, IT-Industry, Business Model Transformation.

Abstract: Companies in fast evolving industries like the IT-industry are continuously confronted with external influences on their business model. For these companies, it is crucial to be able to react rapidly on external and internal influences on their business model to prevail over competitors in the long term. So far, business model research mainly focused on static concepts like taxonomies, ontologies or components, not taking into consideration the dynamic relationships between the strategic business model layer and the layer of business processes. This paper presents the conceptual development and the implementation of a top-down and a bottom-up approach in terms of business modelling. The top-down approach describes the influence that IT-business models have on their underlying value creating activities on process layer, whereas the bottom-up approach shows how value creating activities in the IT-industry can be used as feedback indicator for the quality of the current business model. The goal of the presented research is to come one step closer towards a holistic theory development in the field of dynamic business model research by focusing on the interrelations between business model layer and the layer of business processes.

1 INTRODUCTION

Fast changing business environments like the IT-industry often force companies to continuously rethink and renew their current business model (Chesbrough 2007). Particularly for companies in the IT-industry, it can have drastic consequences when decisions about required changes on their current business model are made too late. The right business model is crucial to establish successfully in the marketplace as factors like changing customer preferences, new business partners, new technologies as well as new regulations continuously influence a company's business model (Cavalcante et al. 2011). A breakthrough about how a business carries out its operations can come along with an innovation of its whole business model (McGrath 2010). Thus, decision makers must be continuously aware about the threats to their company's business model in order to be able to react in time (McGrath 2010).

A business model provides an abstract view on a company's organizational structure as well as on its value creating activities (Al-Debei and Avison 2010; Demil and Lecocq 2010). It is commonly viewed as a mediator between strategy and business processes, which reflects in different granularity levels of the concepts from operational to tactical and to strategic level (Al-Debei et al. 2008). One way to overcome the challenge of rethinking and renewing a business model is to continuously monitor business processes in operations and to adjust the business model according to changes on process layer (Bonakdar et al. 2013; Bouwman et al. 2012). An analysis of the current business model helps companies to understand why certain firms can establish successfully on the market while the competitiveness of other companies declines (McGrath 2010).

Although, business models have already been discussed in many different ways (Markides 2006; Teece 2010; Zott et al. 2011), the focus so far has been mainly on static aspects like business model components (Afuah and Tucci 2004; Hamel 2002; Mahadevan 2000; Osterwalder and Pigneur 2004; Petrovic et al. 2001) or taxonomies (Mahadevan 2000; Tapscott et al. 2000; Timmers 1998), not taking into consideration dynamic aspects.

This paper focuses on the development of a holistic concept that depicts the transformation from IT-business models into business processes (top-down) as well as the feedback loop from business processes back to the business model (bottom-up). The software industry business model framework by

Di Valentin C., Werth D. and Loos P.
Analysis of IT-Business Models - Towards Theory Development of Business Model Transformation and Monitoring.
DOI: 10.5220/0005886701710177
In *Proceedings of the Fifth International Symposium on Business Modeling and Software Design (BMSD 2015)*, pages 171-177
ISBN: 978-989-758-111-3

Schief and Buxmann (2012) forms the basis for representing aspects related to business model layer whereas process related characteristics of the IT-industry are depicted by means of the software industry value chain of Pussep et al. (2012). The research questions we address in this paper are:

R1: "How can the existing relationships between the layer of business models and business processes be transferred into a theoretical construct?"

R2: "How can IT-Business Models be improved by means of an information system that provides recommendations for business model adaptation based on its underlying business processes?"

We used both concepts to describe the influence IT-business models have on value crating activities on process layer and vice versa by carrying out a mapping of both concepts and integrating relevant key measures to monitor business processes and their corresponding business model elements. As a business model connects strategic layer and the layer of business processes (Al-Debei and Avison 2010), several stakeholders such as strategic decision makers, business developers, company founders and controllers of companies in the IT-industry benefit from the developed concept and its implementation.

The research method follows a design science-oriented approach. According to the design science methodology an artifact is being created within a prototypical approach in order to meet collected requirements fitting to a specific problem description (Hevner et al. 2004). The presented research is based on several artifacts. The basis for depicting the business model layer is represented by the software industry business model framework of Schief and Buxmann (2012). The software industry value chain with its value creating activities for IT-firms is used on process layer (Pussep et al. 2012). Based on these artifacts we analyzed the relationship between the IT-business model elements and the elements of the software industry value chain.

The goal of the presented research is to provide a basis for theory development in the area of dynamic business model research by depicting the relationship between process layer and business model layer in form of a reference framework. The presented work builds upon previously carried out research in the field of IT-business models regarding the top-down approach from business model transformation into business processes (Burkhart et al. 2012).

2 RELATED WORK

2.1 Term Definitions

The concept of business models is often described as closely related to the concept of strategy (Magretta 2002; Morris et al. 2005). In contrast to business models, business strategies specifically deal with competitive struggle by revealing possibilities to outperform competitors, while business models describe the collaboration of all participating business resources (Magretta 2002; Porter 1996). For this reason, business models are often described as a way of implementing a company's strategy (Bouwman et al. 2012). Osterwalder, Pigneur and Tucci (2005) describe business models as a '…conceptual tool containing a set of objects, concepts and their relationships with the objective to express the business logic of a specific firm'. Hence, business models provide a view on a company's logic of value creation (Al-Debei and Avison 2010; Demil and Lecocq 2010), whereas business processes describe the implementation of a concrete scenario into executable process steps (Hammer and Champy 1994; Scheer 1994). Thus, business processes describe which input factors are needed to produce a certain output (Hammer and Champy 1994). Misleadingly, in literature and practice the terms *business model* and *business process* are often used interchangeably (Magretta 2002).

The design of business processes usually begins with the determination of a company's business model and its strategic goals (Harmon 2009). Hence, a clear understanding about the scenario to be realized on process level can be achieved, as changes on a business model have an influence on the underlying business processes (Al-Debei and Avison 2010). This relationship can be also described inversely from process level back to the business model: The consideration of all relevant factors that are involved in the activities of business processes can be used on business model layer as analysis unit during the phase of planning business models. Thus, meaningful information for the design of business models can be obtained from process layer. Particularly business processes in the IT-domain are mainly ICT-enabled (Buxmann et al. 2012; Pussep et al. 2011). Hence, the successful implementation of a business model is largely dependent on the ability of an organization to successfully match their business processes to their supporting IT (Petrovic et al. 2001).

2.2 Business Modeling and Performance Measurement in the IT-Industry

Daas, Hurkmanns, Overbeek and Bouwman (2012) present a tool that supports the evaluation of alternative business models by incorporating market analysis data. Furthermore the tool weights the implications of business models on the partners of a company's value network. *e³ value editor* (Gordijn and Akkermans 2006) allows business model designers to capture and evaluate business models from a financial point of view. *Business Model Tool Box* offers methods for designing business models. It is based on Osterwalder's (2010) 'Business Model Canvas' and supports the configuration of business models according to nine predefined building blocks (Osterwalder and Pigneur 2010; Osterwalder 2015). However, the tool only supports business model configuration not taking into consideration dynamic aspects related to business processes. The *EA Performance Reference Model of the Federal Enterprise Architecture* enables companies to link their strategy and their goals to the underlying process-KPIs. However, the focus of this framework is on aspects about modeling and strategic alignment. A positioning of companies within a certain industry branch according to their maturity of performance measurement and resulting implications on strategy and on business model level is not offered by this reference model (Camarinha-Matos and Afsarmanesh 2008). *CMMI (Capability Maturity Model Integration)* consists of five levels of process maturity (Staples et al. 2007). Beginning from process level, specific process KPIs like for instance 'ability to remove defects', 'costs of defect removal' or 'process capability & maturity' are assigned. These KPIs support assessing the quality of the software development process and the resulting software product. However, there is no link between process layer and the strategic aspects of the running business such as e.g. the needs of a software company's customers (Staples et al. 2007).

2.3 Requirements Derivation

The state of the art analysis shows that, so far, there neither exist a holistic methodology nor a tool that supports all phases from business model configuration, its transformation into business processes (top-down) as well as the way back from business processes to the business model (bottom-up). Based on the results of the state of the art analysis we derived the following requirements:

Req. 1: IT-firms must be able to describe their business model in a standardized manner. To simplify the process of business model configuration, companies must be able to choose from predefined building blocks the business model elements that are most relevant for their company.

Req. 2: IT-firms must be able to transform their business model into executable business processes (top-down). *Req. 2.1:* Therefore, an interface to business process layer has to be provided. *Req. 2*.2: In order to provide a mapping to process layer, industry-specific business processes have to be considered.

Req. 3: IT-firms must have the possibility to continuously monitor their business model in form of a feedback loop from process layer back to the business model (bottom-up). *Req. 3.1*: In doing so, process related KPIs must be defined that take into consideration the characteristics of business models in the IT industry. *Req. 3*.2: A standardized control dashboard should offer a permanent overview of the current business model. Whenever the company reaches critical thresholds the right contact persons have to be informed through the dashboard.

3 TOP-DOWN AND BOTTOM-UP BUSINESS MODEL CONCEPTS

3.1 IT-Business Model Framework

The software industry business model framework of Schief and Buxmann (2012) forms an important basis for the developed and implemented top-down and bottom-up concepts. It covers generic aspects about business models as well as economic principles that are characteristic for the software industry (Req. 1) (Kontio et al. 2005; Schief and Buxmann 2012; Rajala 2012). The constitutive elements of business models in the software industry have been derived through an identification of the most prevalent classes of software business models (Kontio et al. 2005; Popp 2011; Schief and Buxmann 2012). Moreover, performance implications are considered in the framework (Rajala and Westerlund 2012; Schief and Pussep 2013; Schief et al. 2012). The concept consists of 25 business model elements that are classified into the five categories *Strategy, Revenue Model, Product Manufacturing, Product Distribution* and *Usage*. Each business model element can be described according to several characteristics. The business model element *Investment Horizon* for instance can be described according to the characteristics

Subsidence Model, Income Model, Growth Model, etc. (Schief and Buxmann 2012).

3.2 Business Model Transformation into Business Processes (Top-down)

Each business model has an impact on business process layer in terms of required resources, process steps and involved organizational units like e.g. employees (Al-Debei and Avison 2010). During a company's start-up phase when companies create their business model, they often do not adequately consider the business processes that are triggered by the business model (Al-Debei and Avison 2010). However, with an increasing size of the company the consideration of the underlying business processes and their impact on business models becomes increasingly important. Therefore, we apply the indication of KPIs for specific business model elements and correlated process steps to measure the effects of business model transformation into business processes as well as to carry out adaptations on a business model. To establish a relationship between business model elements and operative business processes it is important to integrate BPM-tools. Business processes (Req. 2.2) are represented by the software industry value chain of Pussep et al. (2011, 2012) consisting of ten value chain activities. To each of these activities several specific business processes are assigned to (Pussep et al. 2012). We developed a connection between the derived business model elements and the business processes that are assigned to the activities of the software industry value chain by means of the ARIS methodology (Scheer 2002) through Event Driven Process Chains (EPCs). EPCs are flowcharts that can be applied in terms of depicting a company's business processes (Scheer 1994). An interface to the ARIS database enables to carry out this connection from business model to business process layer (Req.2.1). The ARIS method describes business processes according to four views: The *Organizational View* describes the organizational structure that is needed to carry out specific process steps. Concepts within the organizational view are depicted as organizational units. The *Implementation View* focuses on the performing aspect of a business process, i.e. its execution. The *Performance and Information Views* contain the required and produced resources within a process (e.g. intermediate products like software code or project plans) as well as the actions of process execution (e.g. a software product as output of the software development process or billing of the developed software product). Each of the 25 business model elements adheres the requirements for the transformation from business model into business process. Depending on the selected characteristics of each business model element, several business processes with different resources are triggered. Details, about how the top-down concept has been implemented can be found in Burkhart et al. (2012). If, for instance, a company decides to distribute its products not only on national level but also on international level, this change on the business model will have an impact on the corresponding value chain activities and its assigned business processes. Hence, the tool provides anytime an overview about how business processes are affected by the business model.

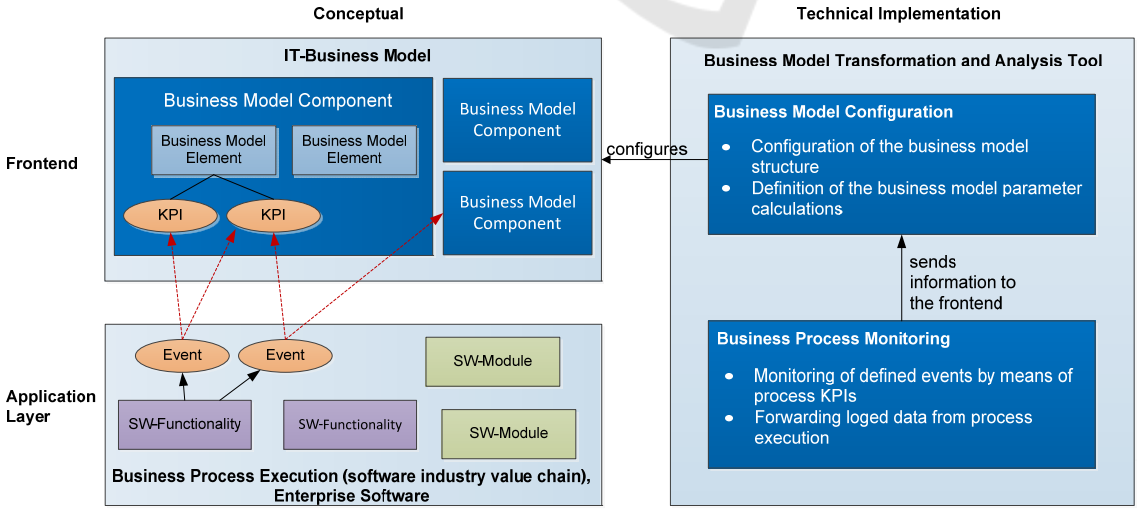

Figure 1: Bottom-up Concept: Feedback loop from process layer back to the business model (bottom-up).

3.3 Business Model Monitoring and Adaptation (Bottom-up)

In a next step, a methodology has been developed, which enables to measure a business model's quality based on its underlying business processes to which we also refer as *feedback loop from business processes back to the business model*. The goal of this method is to be able to continuously monitoring the quality of an IT-business model and to carry out real-time adaptations in order to improve the business model's performance. Figure 1 shows how the structural dependencies between a company's business model and its underlying enterprise software on process layer are considered in our bottom-up concept. The software industry value chain with its EPCs is classified to the application layer. Here, software modules, functionalities of the EPC as well as events can be mapped with KPIs to the corresponding business model elements. Therefore, users can select for each step of a certain business process relevant KPIs which will be mapped to the corresponding business model elements. The process KPIs have been derived in form of expert interviews with representatives from the software industry in order to identify the most relevant KPIs for each activity of the software industry value chain Bonakdar et al. (2013). We integrated the derived KPIs in our tool in form of a dropdown menu. By this means, users are free to select the most relevant KPIs for their company, such as 'cycle time', 'implementation time', etc., (Req. 3.1). After selection and import of the KPIs in the *Business Process Monitoring Component*, the current values of the KPIs are continuously monitored and sent to the business model. As soon as a certain threshold is passed, the tool sends this information from business process execution layer to the *Business Model Configuration Component*, where this is information is displayed in form of a control dashboard (Req.3.2).

The concept has been evaluated in form of expert interviews with decision makers in the IT industry. Regarding the concept of business model transformation, 9 of the interviewed companies stated that there still exists neither a concept nor an implementation of a company-wide mechanism which allows companies to estimate the impact of strategic decisions on process layer. Thus, all of the surveyed companies confirmed that it would be a benefit to have a tool, which is tailored to the processes and business model of their company in order to support to transform strategic aspects into executable business processes. Furthermore, the interviews have shown, that most of the surveyed companies do not use a company-wide performance measurement system in order to carry out internal or external benchmarking. Most of the interviewed IT-companies were not able to assign relevant key measures to specific activities of the introduced software industry value chain, but most companies are still in the process of identifying the most relevant KPIs for their companies. In most cases, KPIs are not yet related to the specific value creating aspects of the surveyed companies, they rather have a generic character. Hence, most of the companies stated that particularly our proposed bottom-up concept would provide a benefit in terms of linking performance measurement to the strategic aspects of their business model as many of the interviewees stated that they have significant problems in connecting their KPIs to specific elements of their business model

4 CONCLUSIONS

This paper presented a concept of business model transformation and analysis with a focus on IT-firms. Motivated by the lack of research regarding the interdependencies between business models and business processes we derived a top-down as well as a bottom-up concept to describe the relationship between IT-Business Models and value chains in the IT industry. The top-down concept describes how strategic decisions in business models can be operationalized and transferred into business processes whereas the bottom-up concept describes how information from business processes in form of KPIs can be automatically considered on business model layer to be able to monitor the quality of the business model. In future business model research, the developed top-down and bottom-up concepts serve as a basis for theory development, particularly in terms of the analysis and development of an automated tool support for business model configuration, transformation and analysis.

So far, the focus of our research has been on the IT-industry. However, the developed top-down and bottom-up concepts serve as blueprint for other industries. In order to apply the developed concepts in other industries, business model components and value chain activities of the respective industry sector have to be developed in order to depict the influences between business model and business process layer.

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