Towards a Framework for Transforming Business Models into Business Processes

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ABSTRACT

This paper aims at providing a methodological framework for mapping strategic business model updates onto the business processes within a company. An analysis of the interdependencies between business models and business processes to estimate the effects of a strategic decision constitutes an essential pillar of the proposed framework. In order to facilitate the underlying transformation of business models into business processes, the development of executable process modules will serve to transform partial aspects of a complex novel business model separately. Companies can utilize the benefits of the proposed framework to implement their business models in a more efficient and optimized way.

Keywords

Business model, business processes, transformation, dynamic business models

INTRODUCTION

Long-term success of an enterprise heavily relies on the thorough design and continuous improvement of the underlying business model. A business model explains how a company works by representing an abstract view on aspects like supply chains of certain products or the organization within the company. All necessary information like critical success factors, processes and capital flows are outlined therein (Scheer, 2001). The concept of business models has established itself most notably during the internet boom and gains in importance ever since (Magretta, 2002).

Even though research has focused the topic of business models in a multifaceted way, a literature review yields criticism concerning the lack of a unified concept and several other research gaps (Bellman, Clark, Craft, Malcolm and Ricciardi, 1957; Brockmann and Gronau 2009; Morris, Schindehutte and Allen, 2005; Osterwalder, Pigneur and Tucci, 2005; Timmers, 1998; Zott, Amit and Massa, 2010). Existing approaches with a practical orientation are hardly capable of supporting the broad range of business model construction and analysis in all its particulars.

A business model is commonly viewed as a mediator between strategy and business processes, which reflects in different granularity levels of the concepts (operational vs. tactical vs. strategic) (Morris et al., 2005). In contrast to business models, business strategies specifically deal with competitive struggle. At that, business strategies reveal possibilities to outperform competitors, while business models describe the collaboration of all participating business resources. The association of the aggregation levels business strategy, business model and business processes is depicted in the following figure.
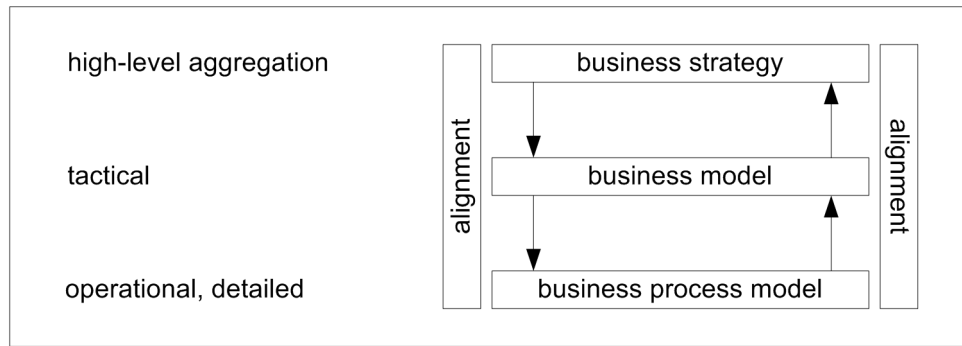
Figure 1. Different aggregation levels of business process models, business models and strategies (Al-Debei, El-Haddadeh and Avison, 2008)

The objective of this paper is an examination of the connection between the two layers "business model" and "business processes" as well as the development of transformation mechanisms for translating business model changes into update procedures for the underlying business processes. The connectivity between the two layers is additionally reviewed with regard to bidirectional interactions in order to propagate changes on the process layer onto the business model.

The design of the business processes will be based on the actual business model characteristics along the supply chain. This focus is essential since a dynamic supply chain management is a key success factor (Oesterle, 2007).

The outline of the rest of this document is as follows: After a discussion of the term "business model" in the following chapter, a distinction of the more detailed terms "business model element" and "business model element feature" is presented in the chapter "Base Framework for Transformation". Both of the terms are related to a company's supply chain and act as the foundation of the proposed transformation mechanism from the business model to the business process layer. The two layers will also be illustrated in this section. Then, the resulting transformation method is explained both on a conceptual level and exemplarily by means of a software development process. The paper closes with a conclusion and evaluation of the main results and states future research areas within the topic.

BUSINESS MODELS AND BUSINESS PROCESSES

State of the Art in Business Model Research

Generally speaking the concept of business models is used as a management tool to understand and analyze the current business logic of a company. In addition, it supports the planning, design and experimental testing of new business concepts that enhance current concepts or represent future orientations (Schief and Buxmann, 2012). Apart from this economical view business models are also utilized for requirements engineering, especially in the context of e-business models. At that, the models serve as basis for choosing and developing information and communication systems which are being deployed to realize and support the business activities (Gordijn and Akkermans, 2001).

Research on business models is still facing the need for academic elaboration in several areas. A number of such research gaps has been identified and criticized by Pateli and Giaglis in 2004 (Pateli and Giaglis, 2004) and most of them seem to persist until the present day (Burkhart, Krumeich, Werth and Loos, 2011). It still remains vague how the research area of business models is related to the more advanced topic of business strategies. Despite the emerging view of both areas as heterogeneous, but still connected areas implications and results from one area are rarely incorporated into studies of the respective other area. The most extensive lack of clarity subsists in the interdependencies between the individual components of a business model. Yet this aspect is essential for understanding and applying the concept in a structured way. Apart from that, more attention has to be paid to means of representation of business models, since neither a graphical nor a textual notation has established itself so far. As a consequence both a procedure model for representing business models based on an ontology and appropriate IT tools for designing and analyzing business models are addressed. A suitable analysis though requires evaluation criteria and metrics, which are not yet existent. Besides that, an extension to all business stages as well as a consideration of the lifecycles of products and services are inevitable for a holistic picture and understanding of the company's business model.

Academic analysis of business models is an emergent research area. Even though early works from 1957 (Bellman et al., 1957) and 1960 (Jones, 1960) already deal with the topic in a broader sense, it has not been until the internet boom in the late 1990s that profound and extensive studies have been released (Hedman and Kalling, 2003; Magretta, 2002)

The rising importance of business models in research can be attributed to the evolving business activities from a conventional to a web-based workflow (e-business). This issue has often been sensationalized by companies with the term "business model", which caused the term to become a buzzword of the internet boom (Magretta, 2002).

Term Definitions

A literature review yields a multitude of studies concerning the definition of "business model", yet the missing consensus causes discussions in the circles of experts (Al-Debei and Avison, 2010; Zott et al., 2010). Staehler explains this discord with the varying emphasis of the different definitions (Staehler, 2001). According to this perception, the definitions rather share a complementary character instead of a contrary one. With regard to the different foci, Scheer et al. first provide a generic definition of a "business model" and refine it to the application field of e-business in a second step (Scheer, Deelmann and Loos, 2003). Besides specific and textual definitions a number of abstract explanations that are grounded on the constituent elements of a business model. One example can be found in the specification by Alt and Zimmermann which collects the generic elements that compose business models (Alt and Zimmermann, 2001).

Distinctions can also be found in the approaches of deriving definitions. Osterwalder, Pigneur and Tucci, who define a business model 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" (Osterwalder et al., 2005), rely on a more semantic approach by analyzing the term components "business" and "model" using the lexical database WordNet. In contrast to such semantic strategies, most definitions are deduced from a scientific literature review. In this vein, Al-Debei et al. define business models in a comprehensive and universal way as "an abstract representation of an organization, be it conceptual, textual, and/or graphical, of all core interrelated architectural, co-operational, and financial arrangements designed and developed by an organization presently and in the future, as well as all core products and/or services the organization offers, or will offer, based on these arrangements that are needed to achieve its strategic goals and objectives" (Al-Debei et al., 2008). This paper follows the definition of Aziz et al., who describe business models based on their components (Aziz, Fitzsimmons and Douglas, 2008). In a literature review they identified 54 of such components and subsequently rated them according to their number of usages. The ten most commonly referenced components constitute their definition of a business model.

Distinction between Business Processes and Business Models

Due to their terminological proximity the two confusable terms "business model" and "business process model" have to be differentiated. Conceptually business models subsume the actions of an enterprise concerning the creation of value while business process models specify the concrete processes of these considerations (Osterwalder et al., 2005). Consequently the business process model encompasses the concrete process implementation of a scenario, which can be explained by the production of an output by the use of several input factors (Andresen, Brockmann and Roztocki 2011; Di Valentin, Emrich, Werth and Loos, 2012, Gordijn, Akkermans and Vliet, 2000; Hammer and Champy, 1994).

A business model in contrast represents a view on the logic of creating value within a company (Osterwalder et al., 2005). Hence the design of business processes is supposed to begin with determining the underlying business model and strategic goals. By doing this, a clear comprehension of the scenario to be modeled can be achieved because changes in the existing business model influence the corresponding business processes.

By considering all factors that correlate with the activities of a business process, its scope can be utilized as an expressive analysis unit in the course of planning business models. Thus, meaningful information for the design of business models can be obtained. On the one hand the business model conveys the meaning of the business processes by explaining why they are being executed in the way they are. On the other hand a dynamic relationship persists between business processes and their underlying information systems and resources, which will be covered in the scope of defining process templates (see section "Micro View and Process Template")

BASE FRAMEWORK FOR TRANSFORMATION

The previous paragraphs motivated the necessity of a linkage between business models and business processes. In the following an approach for transforming a business model into business processes is presented on an abstract level as well as on the exemplary scenario of a license model in the context of a software engineering process. Figure 2 depicts the concept of transformation from business models into business processes by the example of a software engineering process which will be further expanded in the subsequent chapters.
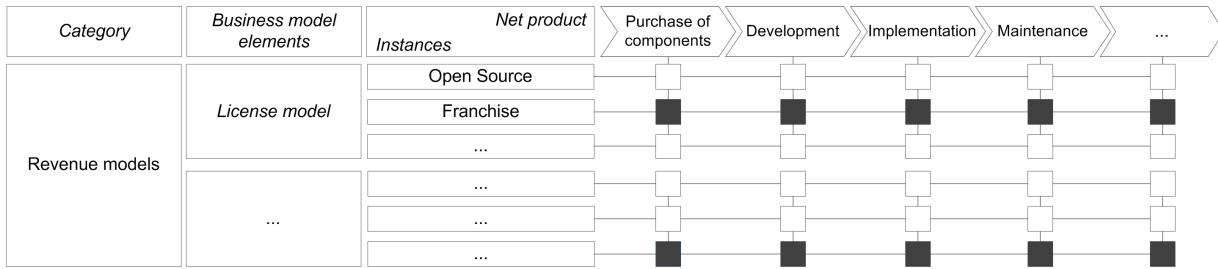
Figure 2. The concept of transformation

Relations between Business Model and Business Process

Introduction and Macro View

Business models are characterized by their elements (e.g. license model or pricing model as elements of the category "Revenue models") and their elements' respective features (e.g. Open Source, Franchise) (Schief and Buxmann, 2012). Hereby business model elements cannot be characterized as business models themselves, but rather as their constituent parts. Each element encompasses necessary requirements for realizing the transformation from business models into business processes. Element features represent alternative realizations of each element to choose from. Figure 2 visualizes the transformation concept by the example of a software engineering process, which will be further expanded in the subsequent chapters.

We propose a component based understanding of business models, i.e. models are composed of different categories. For this purpose, business model have been defined (Schief and Buxmann, 2012) based on an extensive literature review (Burkhart et al., 2011). This study resulted in 20 business model components including their respective features. All possible permutations of elements within a category are admissible. However, each combination can implicate variations in the shape, resources and constraints of the business process. The business process modules depicted as squares in figure 2 are placed within a supply chain and serve as basis for transforming partial aspects of a new business model. That way the underlying change process from business model to business process is organized easier and more efficiently due the capability of using predefined process templates. Starting from the business model, requirements regarding the adaption of business process structures can be derived. These structures are closely related to the elements and element features. The following example is supposed to clarify the connection between business model and business process:

Changes in the real net output ratio planned by the management (e.g. outsourcing of IT) require the incorporation of additional business partners (e.g. outsourcing service provider) into a company's comprehensive process. The outsourcing of processes is usually associated with process interfaces, which are arranged via Service Level Agreements and supported by a multitude of resources (e.g. information and communication systems). Consequently, changes on the business model layer like a switch from in-house to outsourced IT, have immediate impact on the corresponding business processes.

To deduce business process requirements from business model changes within a given scenario (e.g. a certain industry, company or branch), the following steps are proposed:

- An explication of business model elements subject to the current scenario (like software industry) is performed as a first step. This is inevitable to understand the actual and desired state of a business model within a specific scenario. On top of that, this step supports the identification of requirements regarding the transformation from actual to desired state. To clarify which processes are affected by a business model change, a relevance relationship between business model elements and business processes has to be defined.

- As a second step the requirements that result from both the business model and the relationship between business model elements and business processes are defined. The objective of this step is the establishment of a common understanding of the excepted requirements as well as the completion of a feasibility assessment.

- A third step comprises the wording of the relevant business process elements with regard to the specific scenario. This step aims at identifying und understanding the processes that are about to be transferred to a desired state within the scope of business model transformation.

- In a final step business process elements are described by means of process templates. Such templates are dependent on the feature of a business model element. The specificity of the templates yields multiple process variants, which can be valid for one or more business models. The templates serve as blueprints for the process implementation.

Micro View and Process Template

To emphasize the relevant aspects for a transformation from business model to business process we propose four views onto a process. These views set up the already introduced process templates. According to the criterion of semantic similarity the following blocks have been identified (Scheer, 2001):

- Organization: The organizational view represents an essential part in process consideration because changes of the business model usually imply adaptations within the organizational structure (e.g. caused by new business partners).

- Implementation: The implementation view focuses the performing aspect of a business process, i.e. the actual execution.

- Performance and Information Flow: Performance and information reflect significant factors when dealing with processes. These factors usually subsume the resources of the process beginning (e.g. intermediate products like software code, project plans) as well as the performances of a process execution (e.g. finished software as output of software development or an invoice).

A simplified pattern of process elements within the four views is depicted in figure 3. This example will serve as explication of the processes in the following sections. The extended event-driven process chain (eEPC) has been chosen as modeling language (Scheer, 2001).
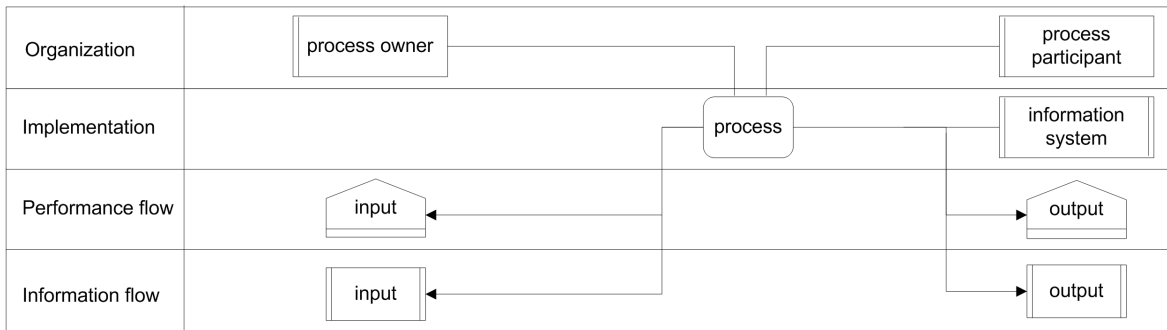
Figure 3. Template for describing business processes

Due to the dependence relationship, business model elements influence the underlying business process, as demonstrated in the simple example. Thereby the process changes can be of structural (e.g. changed resources) or of dynamical nature (e.g. changed processing logic, changed environmental impacts). By the definition of the four views (Organization, Implementation, Performance Flow, Information Flow) structural differences between process variants can easily be expressed. A detailed discussion of dynamic adaptations is excluded at this point.

Transferring Business Model Requirements into Business Processes

Explicating Business Model Elements and Mapping onto Processes

In order to develop the coherence between business models and business processes, a link ("mapping") between the model's elements and the processes of an organization has to be set up initially. Since a literature review yielded no reference mapping for this scenario, the consulting of branch and business experts is proposed for this specific step. These experts estimate the coherences which results in a qualitative mapping from business model elements onto business processes.

Following the example of a software engineering process, such a mapping has been compiled in cooperation with experts of the software industry for the business model element "license model" (cf. the following table).

Processes Business Model Elements	Procurement	Development	Implemen-tation	Maintenance & Support	Marketing	Operations	Product Management	Project Management	…
License Model	x	x	x	x	x	-	x	-	
…									

Table 1. Mapping of business model elements onto processes

The coherence relations, which will be covered in more detail in the following sections, are outlined in a clear way within this mapping. The example of the business model element "license model" exhibits no influence of the chosen license model onto the processes "operations" and "project management". These processes remain independent from the choice between open source or franchise models. However, all remaining processes are affected either in a structural or dynamic way, which has to be analyzed in a second step.

Summarizing, the explication of the coherences establishes the general mapping between a business model and its underlying business process. The result can be viewed as a filter, which allows the analysis of relevant relationships by process planners as well as the wording of requirements regarding the process.

Definition of the requirements and relationships for the transformation from business models into business processes

Changes within the underlying business model form the basis for the planning and implementation of its underlying business processes. Thus, a description of the extent of business process adaptation that results from modifications within the business model element features has to be accomplished. For this purpose, requirements have to be formulated that describe the expected variations within a company's business processes. These changes within a company's business processes depend on the specific features assigned to the elements of a business model. The following example depicted in table 2 clarifies the abovementioned relations by means of an example that explains a software development process.

- Requirement 1: A transformation of the business model element feature "Franchise" into "Open Source" evokes a reconsideration of the feature "purchase of software components" (process: buying components)
- Requirement 2: A transformation within the licensing of the business model element feature "Franchise" into "Open Source" evokes a reconsideration of the "development of software components" (process: buying components)
    - Requirement 2.1: A community which is able to develop this specific "Open Source" solution must be established and integrated in the software development process (processes: development, marketing, product management).
    - Requirement 2.n: …

A requirements specification that enables process planers to identify several business process variations in dependence of the underlying business model forms the result of this second step in business model transformation. In a subsequent step, the transformation of these derived requirements into a company's underlying business processes takes place.

Formulation of the business model elements

In section "Micro View and Process Template" the basic template for process views has been derived. In a next step, several exemplary process variations for a specific sub-process (e.g. requirements analysis) in dependence of several business model element features are described by using natural language. Thus, emerging differences between the several process variations become apparent. For the process of "requirements analysis", the following example in table 2 describes the features "Franchise" and "Open Source" of the business model element "License Model".
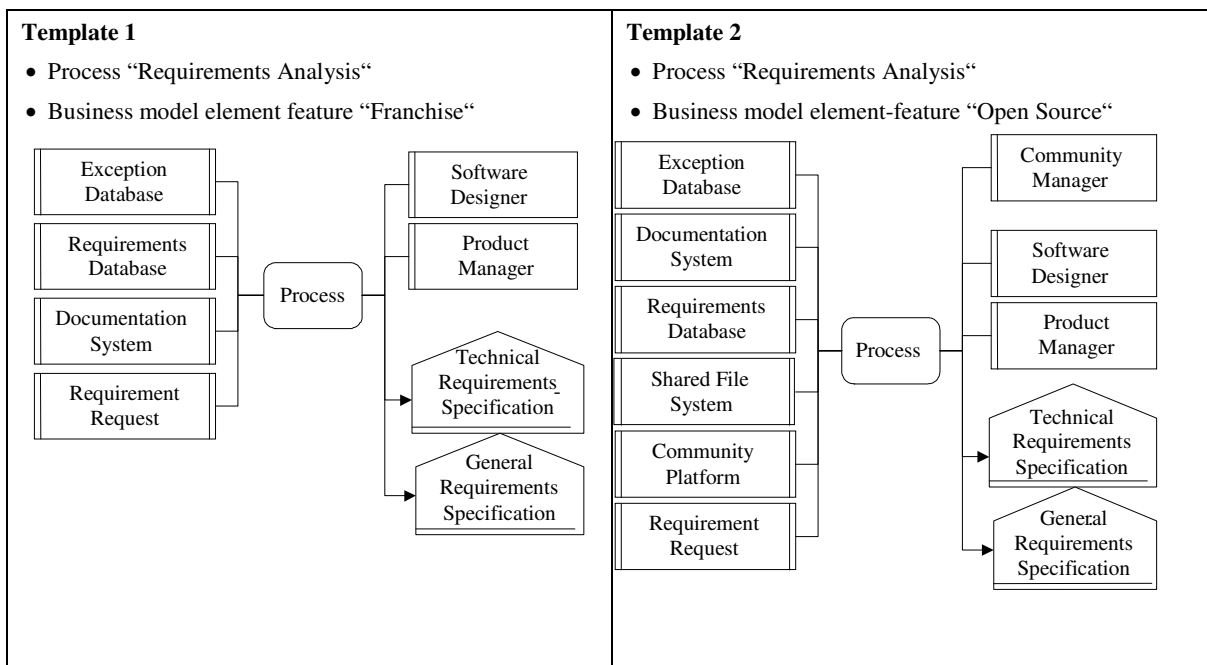
Business Model Element Feature Dimensions	Franchise	Open Source	Distinctions
Organization	• Product Manager • Software Designer	• Community Manager • Product Manager • SW-Designer	• Open Source requires new specification of roles
Implementation	• Requirements and Bug Tracking Database • Documentation System	• Community Plattform • Requirements and Bug Tracking Database • Shared File System	• Open Source accesses other information and communication-platforms • Stronger focus on collaboration tools
Information Flow	• Requirement Request	• Requirement Request	
Performance Flow	• General Requirements Specification • Technical Requirements Specification	• General Requirements Specification • Technical Requirements Specification	

Table 2: Business process elements describing the process of „requirements analysis"

A comparison of both process variations reveals distinctions within the resources referring to participating organizational units as well as applied information and communication technologies.

Description of the process templates

In a last step, the defined process template finally represents the constituent part for the description of the underlying business processes influenced by business model transformation. These descriptions form the basis for further resulting developments and implementations of business processes that go along with changes and transformations on a company's business model. The following figure shows two process templates for the "requirements analysis".

Template 1
• Process "Requirements Analysis"
• Business model element feature "Franchise"

Exception Database
Requirements Database
Documentation System
Requirement Request
Process
Software Designer
Product Manager
Technical Requirements Specification
General Requirements Specification

Template 2
• Process "Requirements Analysis"
• Business model element-feature "Open Source"

Exception Database
Documentation System
Requirements Database
Shared File System
Community Platform
Requirement Request
Process
Community Manager
Software Designer
Product Manager
Technical Requirements Specification
General Requirements Specification

Table 3: Comparison of two process variations in form of process templates

SUMMARY AND OUTLOOK

The approach introduced in this paper has a strong focus on the following objectives:

- Identifying how business models and business processes can be qualitatively linked

- Depicting how business processes vary according to changes within a company's business model

For achieving these objectives, the presented process model supports process planners formulating the requirements for the definition of business processes. In doing so, these requirements are based on a company's underlying business model. The impact of business models on business processes has been demonstrated by means of examples from the software industry. The main focus of the description lies in the methodology that can be transferred to other domains (e.g. other industry sectors).

The depicted impacts of a company's business model on its underlying business processes are expected to be distinguished between several use cases. For this reason, future research should focus on additional analysis which makes it possible to identify reference dependencies within one domain and convey these requirements into process design. Further connecting factors for prospective research are:

- In a next step, an analysis and verification of the role of description languages and software tools should be carried out.

- Besides an explanation of the transformation from business models into business processes, a reversed consideration should also be performed. The impact business processes have on a company's underlying business models should be the focus in future research work.

REFERENCES

1. Al-Debei, M. M. and Avison, D. (2010) Developing a unified framework of the business model concept, *European Journal of Information Systems*, 19, 3, 359-376.

2. Al-Debei, M. M., El-Haddadeh, R. and Avison, D. (2008) Defining the Business Model in the New World of Digital Business, in *Proceedings of the 14th Americas Conference on Information Systems (AMCIS '08)*, Toronto, 1-11.

3. Alt, R. and Zimmermann, H. D. (2001) Introduction to Special Section – Business Models, *Electronic Markets*, 11, 1, 3-9.

4. Andresen, K., Brockmann, C. and Roztocki, N. (2011) Business Models for Enterprise System Providers. Towards the Solution Based Procedure, in *Proceedings of the 17th Americas Conference on Information Systems (AMCIS '11)*, Detroit, 1-8.

5. Aziz, S., Fitzsimmons, K. and Douglas, E. (2008) Clarifying the Business Model Construct. In Gillin, L. Murray (Ed.) *Proceedings of the 5th AGSE International Entrepreneurship Research Exchange*, Melbourne, 795-813.

6. Bellman, R., Clark, C., Craft, C., Malcolm, D. and Ricciardi, F. (1957) On the construction of multistage, multi-person business game, *Operations Research*, 5, 4, 469-503.

7. Brockmann, C. and Gronau, N. (2009) Business Models of ERP System Providers, in *Proceedings of the 15th Americas Conference on Information Systems (AMCIS '09)*, San Francisco, 1-11.

8. Burkhart, T., Krumeich, J., Werth, D. and Loos, P. (2011) Analyzing the Business Model Concept – A comprehensive Framework, in *Proceedings of the Classification of Literature in International Conference on Information Systems 2011 (ICIS)*, Shanghai.

9. Di Valentin, C., Emrich, A., Werth, D. and Loos, P. (2012) Conceiving Adaptability for Business Models – A Literature-based Approach, in *Proceedings of the International Conference on Information Resources Management (Conf-IRM-12),* May 21-23, Vienna, Austria, IGI Global, 2012

10. Gordijn, J., Akkermans, H. and Vliet, H. (2000) Business modelling is not process modeling, in *Proceedings on the 1st International Workshop on Conceptual Modeling Approaches for e-Business (eCOMO)*, London, 40-51.

11. Gordijn, J. and Akkermans, H. (2001) e3-value: Design and Evaluation of e-Business Models, *IEEE Intelligent Systems*, 16, 4, 11-17.

12. Hammer, M. and Champy, J. (1994) Business Reengineering, 3rd edition, Campus Verlag, Frankfurt.

13. Hedman, J. and Kalling, T. (2003) The Business Model: A Means to Understand the Business Context of Information and Communication Technology, Working Paper No. 9, Lund University, Lund.

14. Jones, GM. (1960) Educators, Electrons, and Business Models: A Problem in Synthesis, *Accounting Reviews*, 35, 4, 619-626.

15. Magretta, J. (2002) Why business models matter, *Harvard Business Review*, 80, 5, 86-92.

16. Morris, M., Schindehutte, M. and Allen, J. (2005) The entrepreneur's business model: toward a unified perspective, *Journal of Business Research*, 58, 6, 726-735.

17. Oesterle, H. (2007) Business Engineering – Geschaeftsmodelle transformieren, in Peter Loos and Helmut Krcmar (Eds.) *Architekturen und Prozesse, Strukturen und Dynamik in Forschung und Unternehmen*, Springer, Berlin.

18. Osterwalder, A., Pigneur, Y. and Tucci, C. (2005) Clarifying Business Models: Origins, Present and Future of the Concept, *Communications of the Association for Information Systems*, 16, 1, 1-25.

19. Pateli, A. and Giaglis, G. (2004) A research framework for analysing eBusiness models, *European Journal of Information Systems*, 13, 4, 302-314.

20. Scheer, AW. (2001) ARIS – Modellierungsmethoden, Metamodelle, Anwendungen, 4th edition, Springer, Berlin.

21. Scheer, C., Deelmann, T. and Loos, P. (2003) Geschaeftsmodelle und internetbasierte Geschaeftsmodelle – Begriffsbestimmung und Teilnehmermodell, in Peter Loos (Ed.) *Working Papers of the Research Group Information Systems & Management (ISYM)*, Paper 12, Mainz.

22. Schief, M. and Buxmann, P. (2012) Business Models in the Software Industry, in *International Conference on System Sciences (HICCS)*, Hawaii.

23. Staehler, P. (2001) Merkmale von Geschaeftsmodellen in der digitalen Oekonomie, Josef Eul Verlag, St. Gallen.

24. Timmers, P. (1998) Business Models for Electronic Markets, *Journal on Electronic Markets*, 8, 2, 3-8.

25. Zott, C., Amit, R. and Massa, L. (2010) The Business Model: Theoretical Roots, Recent Developments, and Future Research, IESE Business School Working Paper No. 862, Navarra.