Designing for performance - a technique for business model estimation

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Abstract

The companies are actively using business modelling to investigate new business opportunities. They are also applying various planning tools to design their processes. Unfortunately, there is a lack of techniques that would link these two planning levels. In this article we propose a technique for operational modelling. The technique aims to analyse the business model from a resource-based viewpoint. It lists the service components and provides means for analysing the extra resources and capabilities needed for producing the service. Operational model also helps in estimating the feasibility of the business ideas: It explicitly defines the metrics for measuring the success of the business model in terms of the strategic goals of the organisation. This easy-to-use modelling technique combines business modelling with elements from the enterprise architecture (EA) literature, and can be complemented with more formal business modelling notations and process modelling procedures.

Keywords: operational model, business model, business components, business processes

Introduction

In Finland as in many other parts of the world, many start-up companies build their new businesses on innovative use of information systems (IS). Also established firms are looking for means to transform from product-orientation towards more emphasis on customer services by utilizing latest information & communications technology (ICT). In innovating and developing IS and ICT based services, the rather newly emerged concept of *business model* (Osterwalder & Pigneur, 2002) is considered as meaningful, because it depicts how the business works and operationalizes its resources by describing systematically the general logic for creating the business value (see e.g., Bouwman et al., 2008). Networked modes of operations further reinforce the role of the business model as an aid in the negotiations and dialogue between the parties carrying out the joint business efforts (Heikkilä, 2010).

Against this backdrop it is easy to understand why business modelling methods, such as business model canvas (Osterwalder & Pigneur, 2009), have rapidly gained strong foothold in companies' strategy design process. However, the business model is just the first step from the strategy towards the actually implemented operative ICT-supported business processes - it is still too high-level conceptualisation that one simply cannot derive processes directly from it. There are two primary challenges: First, the implementers must be able to estimate the *resources and capabilities needed* (e.g. new investments e.g. in ICT). Second, they should *evaluate whether the planned service can meet the objectives* set out in the first place.

In this article we propose a technique for transforming business models into more practical operational models that help managers to find answers to the above questions in logical and agile way without requiring the use of any technical notation. The technique combines business modelling with elements from the enterprise architecture (EA) studies (see e.g., Ross et al. (2008)). The aim is to derive from the business model the componentized services and accompanying key performance indicators that are central for the service. We distinguish the concept of operation model from the concept of business model. The business model defined as "a conceptual blueprint of the company's money earning logic" (Osterwalder, 2004) provides the big picture, the general idea. The operating model, instead, emphasises the resource-based view on the operationalization of the business model, i.e., it aims to describe how much resources and changes the new service would take. This is achieved by listing the ICT, network organization, and financial arrangements needed and by spotting the common elements in the service processes. Furthermore, the technique defines the key performance indicators from both customer and operational performance point of views.

The paper is organised as follows. First, business models are briefly described. Then we continue by proposing a technique with the help of which business models can be transformed into operational models and the metrics for assessing the feasibility can be defined. The technique is then illustrated with one case example, where we refined the strategy of the case company, analysed its business model, and derived the operational models to redesign and renew its processes and IT systems. The article ends with discussion and conclusions.

The missing link

Business modelling is a topical issue both within practitioners and in research community (see for example a special issue on business models in Long Range Planning, 2010). There is a vivid research stream proposing differing definitions, taxonomies, and evaluation frameworks for business models (e.g. Timmers,1998; Amit & Zott, 2001, 2010; eFactors, 2002; Osterwalder & Pigneur, 2002; 2009; Faber et al., 2003; Bouwman, 2003; Osterwalder, 2004). In recent years, the research field has moved towards developing more descriptive models and processes that would be useful for the industry (Pateli and Giaglis, 2004; Haaker et al., 2006; Osterwalder 2009) and particularly for service business (Bask et al., 2010). Heikkilä (2010) has demonstrated the importance of the business model and especially its creation process for building smart service business networks. Moreover, it has been promoted that conceptual business model descriptions could help in designing experiments of new business ideas or testing modifications to old ones (Baden-Fuller & Morgan, 2010; Chesbrough, 2010; Teece, 2010).

The challenge in business model design is that the concept must be simple and intuitively understandable. In business model literature it is generally agreed that, for innovating and expressing prospective business models, it should include the following components (CSOFT, Heikkilä et al., 2005, which builds on TOFS model of Faber et al., 2003, by adding long-term customer relationships):

- **C**ustomers: the customer segment or segments that are targeted. The aim is to understand the need of the customer and what kind of customer relationship is established.
- **S**ervice: depicts the intended value of a service and the accompanying goods, and how it is created and provided. This includes defining the type, or different types, of services provided.
- **O**rganisation: depicts the partners, knowledge and resources needed, as well as the roles and responsibilities.
- **F**inance: focuses on payment schemes, and cost and revenue sharing between the partners.
- **T**echnology: depicts the information and communication technology that is embedded in the service, or supports the operations and collaboration.

There is also a vivid stream of research on how to express business models with some generalized notation (e.g. building on Gordijn's seminal work, 2002). Furthermore, a lot of research is devoted to modelling processes (such as IBM's Component Business Model, 2005). Generally it is acknowledged that business models and business process models are for different levels of representation of the business activities (Gordijn et al., 2000; Schuster & Motal, 2009; Bask, 2010; see Fig. 1).

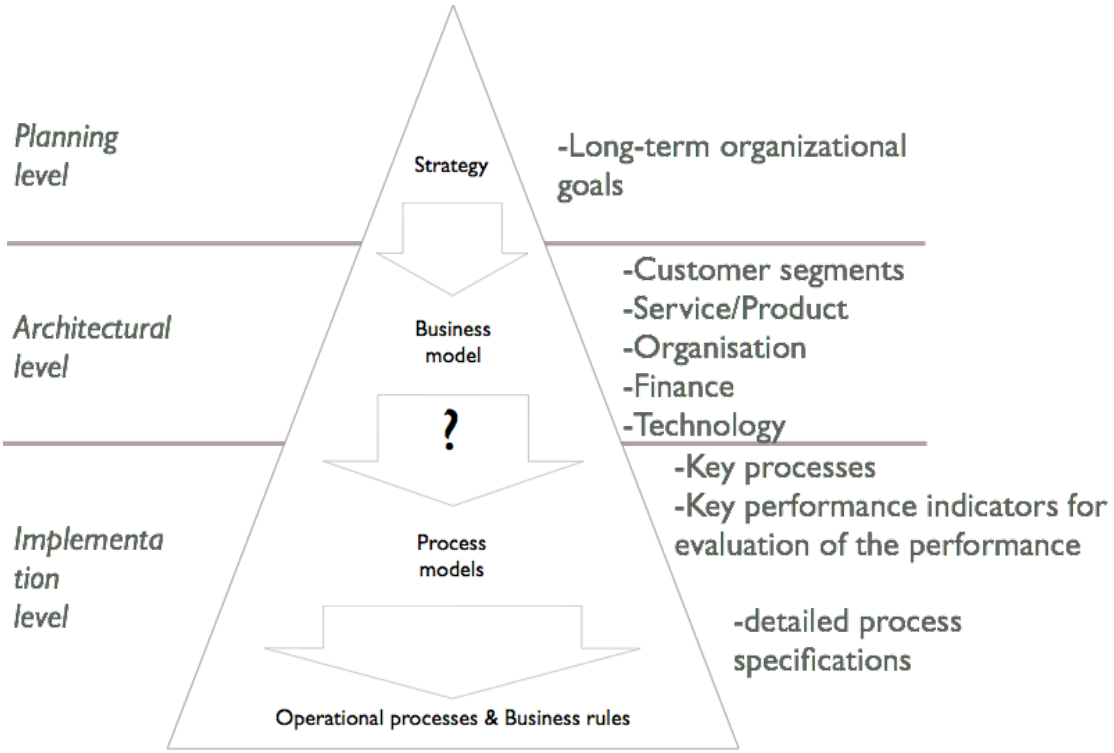

Figure 1. The path from strategy to processes (adapted from Osterwalder & Pigneur, 2002)

But, we are still missing one level between these two models: there are no proper tools to deduce the processes from the business model, yet (marked in Fig. 1 with the question mark). During this transformation of the business model to process models we need to address the

four areas identified in Enterprise Architecture (EA) research: transforming the processes architecture, information architecture, application architecture and technology architecture from the current state to the target state in a systematic and disciplined manner.

Enterprise architecting principles applied in business modelling

The lesson learned from Enterprise Architecting is that the ICT and ISs are simultaneously enablers and obstacles for implementing the strategy. One of the central tasks in good management of implementation of the strategy in a modern ICT-supported networked organization is to ensure the target setting with concrete Key Performance Indicators (KPIs) that reflect on one hand the customer view and on the other hand the excellence in performing the operations. In practice the technique is applied in joint sessions by the owners of the business areas, and in due course some facilitation is necessary to explain the stages of work. In these sessions facilitated by experienced user of the technique, the participants draw up the operational model through discussions and analyses. Thereafter a more detailed process and component design can take over according to the principles (Hammer, 1990) and practices (Davenport and Short, 1993) of process design, preferably by the implementers to achieve - or exceed - the KPI targets and quality requirements.

The process pass is completed in 6 steps, and can re-iterated at each state as necessary.

1. Define strategic objectives for the business model
2. Define customer segments with CSOFT
3. Recognise common service components
4. Determine key performance indicators

And for each service component

5. Analyse the current and the desired state of Business processes, Applications, Information, Hardware and organisation
6. Determine key performance indicators

Strategic objectives and customers' view on the services

Step 1 is to define strategic objectives for the business that is being developed. That is, the group should make explicit the goals aimed at while servicing the defined market with the chosen business model and the policies by which to get there. We don't go into detail on strategy design, but assume that the top-level strategy for the company, corporation or network in question is available or created at this stage. The first step here is simply to explicate what part of the strategy is meaningful for this particular business or business unit. The strategic objective may for instance be to create customer value through innovative content, structure or organisation of the business (Novelty); built-in elements to retain customers (Lock-in); bundles of activities to generate more value (Complementarities); or Reorganisation of activities to reduce transaction costs (Efficiency) (Amit and Zott, 2001; Zott and Amit, 2010), but it has to be turned to a more concrete strategic initiative – in the form of what to achieve in a measurable way.

In Step 2 the group analyses the business idea from the perspective of main customer segments using the business model components (CSOFT). The CSOFT components are listed in the Table 1 below with the main questions to be answered by the business model designers.

CUSTOMER ORIENTATION	*Segment 1*	*Segment X*	*Common Components*
Customer	What is the target customer segment?	What is the target customer segment?	
Service	What are the service components for the customer segment?	What are the service components for the customer segment?	
Organisation (network)	What resources & partners are required?	What resources & partners are required?	What are the common services/service components for the customer segments?
Finances	How does the customer pay for the service? How costs and revenues are shared?	How does the customer pay for the service? How costs and revenues are shared?	
Technology	What technology is needed for the business?	What technology is needed for the business?	
Key Performance Indicators	Metrics for measuring the success in terms of strategic goals	Metrics for measuring the success in terms of strategic goals	

Table 1. CSOFT analysis of the business model

Customer segmentation means subdivision of the target market into discrete/separable customer groups that share similar needs or characteristics. Often, in practise, the initial business idea represented by the business model, when more closely analyzed, is found to include several customer segments requiring different services or user experience. These segments should be listed in separate columns and attention should be paid in understanding what is the actual value add that the customer is getting by acquiring the services. Also, the volumes should be added to the table. Next, the evaluation proceeds to the Organisation component, which requires short description of the potential partners and resources that are required for supplying the planned service, and the roles for each partner. Traditional network may consist of producer, its manufacturing subcontractors, and a shipping company, but in service business also infrastructure providers, IT companies, small service companies located near the customer, etc. can be part of network as well. Financing issues are of great importance when considering new services: One should critically analyse the payment model (e.g. when and how much the customer pays for the service and its effects on the diffusion), as well as how the costs and benefits are divided between the partners. Especially in long-term services requiring high initial investments the timing of financial payments is an essential factor. And last, one should evaluate what technology is required to support the business model. It should be remembered that support is needed for all phases of the life cycle of a service and for the networked organisation.

Step 3. The next step is to identify the Common Service Components from the previously listed services. That is, to separate those services or parts of service creation processes and resources which are common to several customer segments, from the services that are specific to certain customer segment. This helps the estimation of the importance and interdependency of the services that will impact the internal and external organization, business processes and technology support needed for implementing the services. For example, an information system supporting a common service component should have high priority and should be build generic enough to serve requirements of multiple market segments. Instead, an information system acquired for the needs of one customer segment only, might cross common and segment specific processes and, as a result, cause data redundancy problems for the common service components.

Step 4. When the CSOFT components are filled up to all customer segments the analysis continues with determination of key performance indicators. The question goes: what are the metrics for measuring the success of the business model in terms of the strategic goals of the organisation? These metrics should be derived from the strategic objectives that were defined at the starting point.

Resource based view: What do we need to serve our customers?

As a result of the first phase we have determined the business model and service combinations for differing customer segments and potential candidates for joining the service provision. In order to work towards operational model we analyse in **Step 5** the common service components using a break down categories familiar from enterprise architecture domains: business processes, applications, information, hardware & organisation architecture (Morganwalp & Sage, 2004; OpenGroup, 2010). It is also important to consider the as-is and to-be states of these components. The second phase will be help to analyse especially the ICT related resources required for providing the planned service components.

In the table 2 we describe the details of the service components needed to make the services operational. So there will be as many columns as there were service components recognised in the first phase, including both common service components and customer segment specific components.

Here each service component is scrutinized by analysing the current situation and the desired situation: One should list what processes are required for the provision of the service component. What processes are already at use and what new or modified processes are needed? Similar analysis should be carried out in terms of applications, information (data) and hardware to define existing assets and contracts, need for modifications and investments. In order to estimate the feasibility of the business model the group will most probably have to discuss which of the service components or processes are provided in-house, which might be outsourced, or implemented as shared or sub-contracted activities. There after the process owners can be identified.

Step 6. The final task is to determine the key performance indicators column: in this way we get the metrics for measuring the success of the EA domain areas. They also give the economic grounds for the investments to the specific areas and components.

The result is a systematic breakdown of the planned business model that describes for each service component the business processes, required IT and the key performance indicators.

RESOURCE ORIENTATION	*Service component A*		*Service component B*		*Key Performance Indicators*
	As-is	*To-be*	*As-is*	*To-be*	
Business processes	What processes there are?	What processes there should be?	What processes there are?	What processes there should be?	Metrics for measuring the success in terms of strategic goals
Applications	What applications are used?	What applications are needed?	What applications are used?	What applications are needed?	Metrics for measuring the success in terms of strategic goals
Information	What information is available?	What information is required?	What information is available?	What information is required?	Metrics for measuring the success in terms of strategic goals
Hardware	What hardware/infra is available?	What hardware/infra is required?	What hardware/infra is available?	What hardware/infra is required?	Metrics for measuring the success in terms of strategic goals
Organisation	Who is responsible?	Who should be responsible?	Who is responsible?	Who should be responsible?	Metrics for measuring the success in terms of strategic goals

Table 2. Operational analysis of the business model

FIC case

We use one empirical case to illustrate the technique in practice. The case is about offerings of one Finnish digital/internet services company (here after called FIC). Data was collected in a project carried out in 2009-2010. This was the first case where the technique was applied in real business circumstances by the researchers.

FIC case focuses on refining and renewal of services of the company. The main catalyst for FIC to start the study was its' recent acquisition of one competitor and a merger with another during the project, whereafter the net sales of the company tripled to total of a few tens of millions euros with quadruple customer base. During the past decades the companies had gradually developed services to their own customers. After the merger, FIC management is facing a situation where they have multiple bundles of services, in additon to their own. Each is to a large extent in-house developed, partly non-interoperable, and implemented in different information systems. Yet, it is planning to improve its offering to broader customer base with new services built on ICT in order tobenefit from the expanded company size and economies of scale. As a consequence FIC's services and IT systems are to be radically redesigned, integrated and componentized as recommended by an ICT consultant. The researchers were asked for a second opinion and analysis of the proposed solutuion by the .

In the FIC case, two of the authors of this article acted as facilitators in the workshop sessions. The participants of the workshops consisted of the management group of FIC: Chief Executive Officer, Chief Financial Officer, Chief Operating Officer, Chief Marketing Officer

and Chief Information Officer of the reorganized new company. Total of 3 sessions were arranged and in the meantime the facilitators prepared the interim results for the next stages based on workshop discussions, company internal information, and public sources of similar solutions and competitor information.

Following the process pass described above, the first task (step 1.) was to define strategic objectives for the business that is being developed. The company defined its' number one strategic goal as to change from present basic services to a value-added services provider. FIC wishes to serve local customers and to arrange best ICT-based services available to its customers with superior service expertise at competitive cost structure. This is to be achieved through ambitious novel conceptualization of the business model building on automated processes, but the objectives were not that explicit or clear in the beginning, so it got refined during the consecutive stages.

Next the participants concentrated on defining the potential customer segments for the company with the help of CSOFT framework (step 2.). The result is shown in Table 3. We recognised four different customer segments: the private persons or small companies that are already within the reach of the current services of FIC; medium to large companies public institutions; entrepreneurs that are (potential) users of similar services, but currently outside the installed area; and large companies acquiring infrastructure and maintanance. The service offering to all these segments have two common parts (step 3): delivering service capacity for all four segments. Common service bundles, and certain value added services were to be offered to three segments. Examples of added value services are the information security services, filtered e-mail, www-pages, and IT systems and services for security and surveillance of homes and premises. Then there are some segment specific services, such as tailored services for companies (phone and video conferences, domain services, intranet, web store solutions). It also provides services ranging from the design of data communication networks, local area networks and computers to safe disposal of equipments. For wholesale client segment FIC offers network design, roll-out and maintenance as well as facilities and platforms.

The group also defined key performance indicators for the customer segments (step 4.): all should be evaluated against market share, profitability and average revenue per user (ARPU). When the service is expanded to new regional segment (i.e. III), the success is measured with the ratio of expected customers to potential customers in the area.

CUSTOMER ORIENTATION	*Segment I*	*Segment II*	*Segment III*	*Segment IV*	*Shared components*
Customer	Present private & SOHO (= small and home offices) clients	Medium to large clients	Potential private & SOHO clients (invesment needed)	Wholesale clients	Private person data Company data
Service	Provide capacity Regular service bundles Added value services	Provide capacity Regular service bundles Added value services Tailored service bundle + maintenance Company services	Installation Provide capacity Regular service bundles Added value sevices	Provide capacity Infra services Network and site Services Facilities for infrastrudture?	Service capacity design and allocation. Regular service bundle Added value services
Organisation (network)	In-house sales network Infrastructure component providers Service providers	Company Sales network Infrastructure component providers Service providers Company Service providers	In-house sales network Installation providers Infrastructure component providers Service providers Broadcasters	Capacity sales Infrastructure component providers	In-house sales network Infrastructure component providers Service providers
Finances	Service based	Consumption based	Service based	Fixed (marginal) price	Service based pricing
Technology	Broadband	Broadband + WAN (Wide Area Network) + Service center	Broadband + radio based broadband	Broadband + Service center	Broadband Service center
Key Performance Indicators	Market share =x% Profitability = x% ARPU = €/qtr	Market share = x% Profitability = x% ARPU = €/qtr Turnover	Coverage in the area = x% Profitability = x% ARPU = €/qtr	Market share = x% Profitability = x% ARPU = €/qtr	

Table 3. CSOFT analysis of FIC business idea

In the second phase (step 5.) each of the segments were scrutinized in their turn. The analysis proceeds through the market segments and the service components with the EA framework, as presented above, analysing the processes, information, applications, hardware and organisation.

Figure 2. below shows the architectural elements the market segments that consists of the customers within the reach of the current network,

- the **process** for providing the capacity includes marketing campaigns, sales and provisioning,
- the **information** includes service location data and customer history data,
- the **applications**/systems includes service quality analysis and configuration data,
- the **hardware** includes service platform and its local, distributed implementation
- and **the organizations** operating these services include in-house sales, network design, system design and ICT unit of FIC.

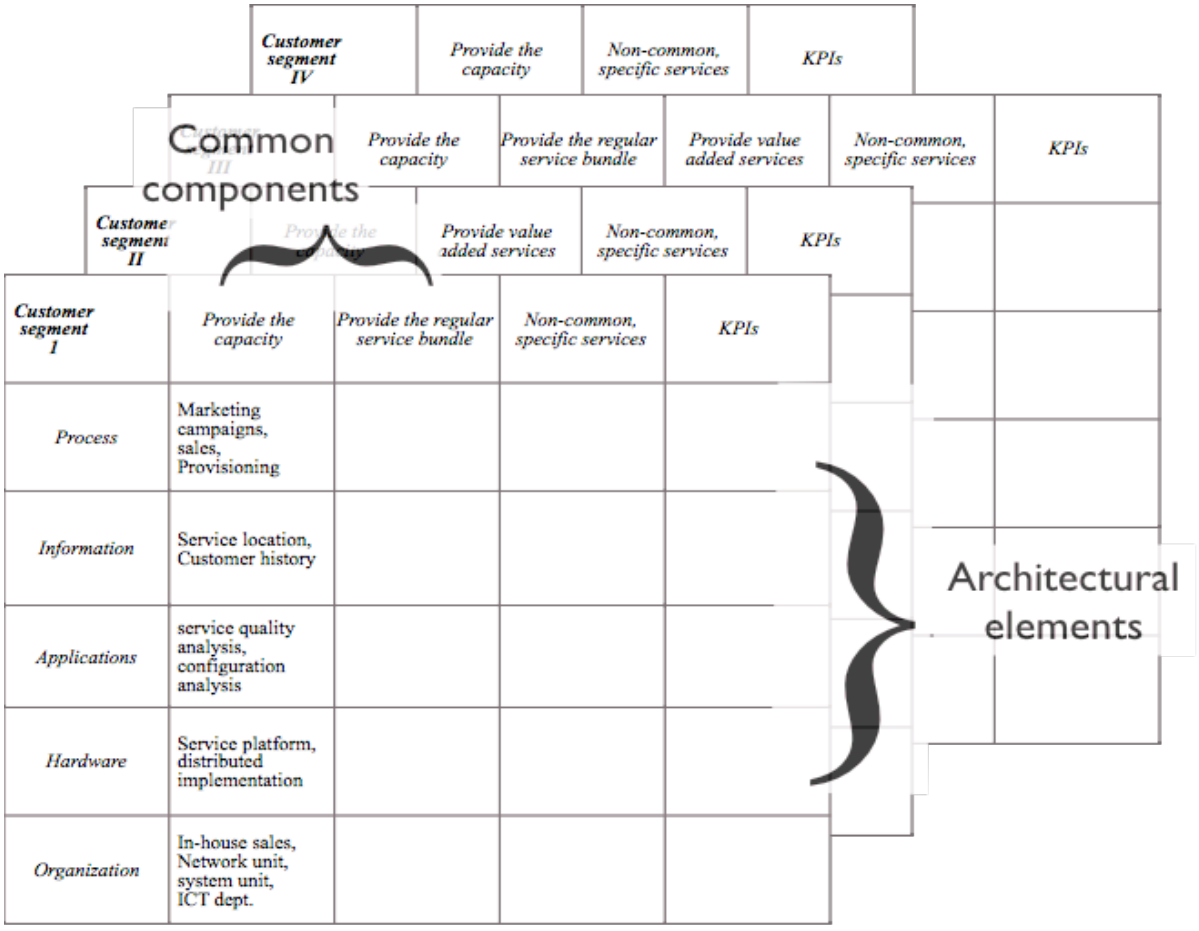

Figure 2. Operational model of FIC consisting of four tables, one for each customer segment. (as an example, the figure shows exact data for first service component "Provide capacity")

The commonalities and differences between the needs of the market segments related to each of the service components can be identified through this analysis. Some hidden aspect disclosed during this process may trigger re-definition of the market segments or the service components causing some iteration in the process, as was visible also in the case of FIC.

The resources needed for implementing the resulting service components can be estimated at this stage with reasonable accuracy and the service components can be further elaborated by traditional business process modelling methods to the level of business process definitions.

The results of the FIC case study were promising. The company adopted the operational model developed during the workshops. Now almost a year later, they have reorganised their offering according to the planned four customer segments, and have developed the services based on the components recognised in the study. The componentisation of services into service components helped them to design business processes that also take advantage of component wise approach.

Discussion

We have identified the lack of techniques for analysing the implications of new business ideas to the need for resources and ICT in existing organizations. Also, transforming business model presenting the activities from the customer point of view, into operational, real-life processes is a complicate task, during which it is easy to lose the vision into a myriad of details. The systematic technique proposed in this article is to satisfy this demand.

The proposed operational modelling technique complements the current methods available for business and process modelling. Methods such as business model canvas (Osterwalder & Pigneur, 2009) can be applied for instance in brainstorming sessions where several new business ideas can be explicated from the customers' and resource pools' viewpoints, and the most potential ones can be picked up. They can then be processed further in workshops with the operation model technique presented in this article. The result is a systematic breakdown of the operational model that describes for each service the service components, required IT and the key performance indicators. Later on, this result can be processed further into more detailed and rigorous description of the activities for instance by using value maps and profitability sheets of e^3 -value (Gordijin & Wierings, 2010), or Component Business Model (IBM, 2005).

With our case study, we illustrate the use of an alternative business modelling approach – CSOFT – combined with Enterprise Architecture derived operations. The intermediate outcome of operating model is important in dialogue between business and IT (Wout et al, 2010) in order to minimize the resources needed to deliver the required business objectives. For example, the discussions in the workshops, which took place among the management team of our case organisation, helped them in deciding which operation models best describe the way they choose to operate the service and measure their performance in accordance with the strategy. This was crucial for the case company, as it looked for ways to expand the business after the amalgamation of several companies.

The technique was also used to pinpoint factors requiring better synchronisation and removing redundancy within current processes and ISs. In such a case, the development process starts with business units identifying the operational models that currently are in place thus helping to clarify both intent and sources of synergy and disconnection points between the current business operations, IT systems and the strategic objectives. Such discourse help IT

management design feasible requirements for the new service ensuring interoperaibility and reducing redundancy with the enterprise architecture derived resources.

Figure 3 summarises the technique in context of strategy, business idea, enterprise architecture and business process modeling. The technique starts with strategy and general business idea. During the first phase (steps 1-4) the business model is elaborated with customer segments and using CSOFT analysis for the customer segments the Common service components are identified. These Common service components form the skeleton of the operational models, which are elaborated with enterprise architecture analysis in the second phase (steps 5-6) followed by business process modelling.

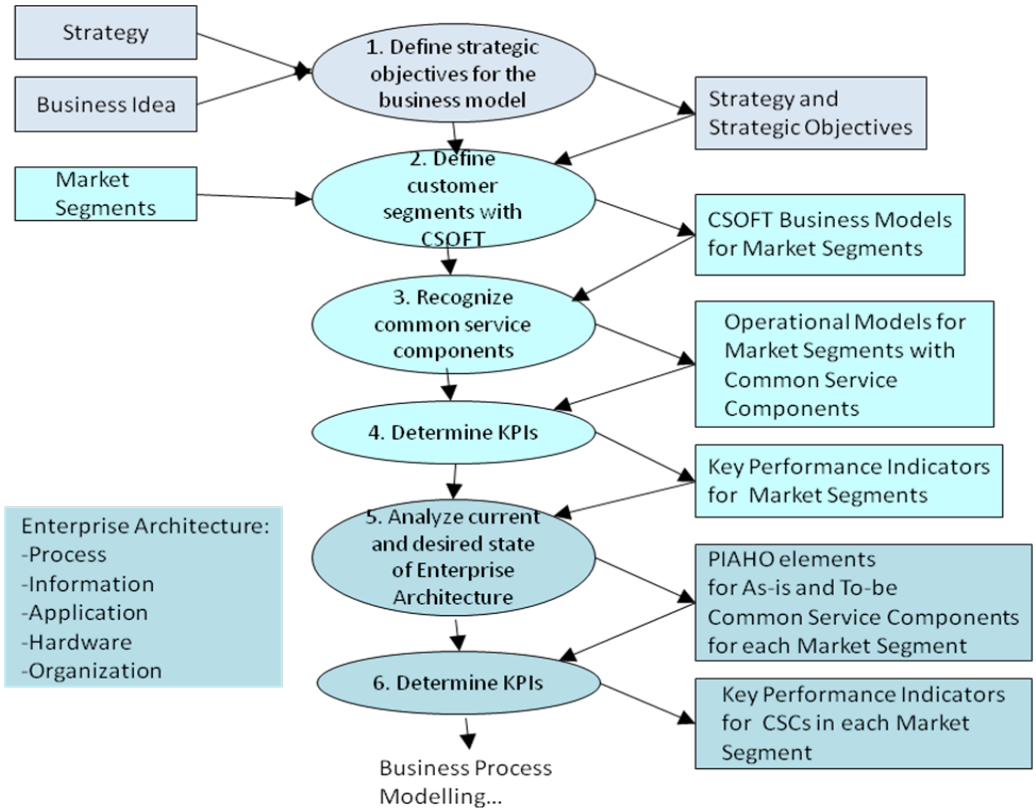

Figure 3. Relationship of the presented steps, strategy, business idea, market segments, CSOFT, Enterprise architecture and business process modelling.

Conclusions

The business model concept has rapidly gained importance both within business and in research. The latest discussions on business models, e.g. Long Range Planning's special issue in Spring 2010, promotes that conceptual business model descriptions could help in designing experiments of new business ideas or testing modifications to old ones (Baden-Fuller & Morgan, 2010; Chesbrough, 2010; Teece, 2010). This article attempts to carry the business modelling process one stage closer to practical implementation by introducing operational model technique that links business model and business process design.

The operational modelling technique described in this article is an easy-to-use procedure that can be applied in joint sessions by the owners of the business areas, facilitated by an experienced user of the technique. The technique shows the steps for turning the business model into more practical operational models. By carrying out the evaluation of the business model the actors can identify and rank the importance of the required service components, which form the base for the designing the business processes. The technique also guides them to define key performance indicators that are to be used to assess the successfulness of the business model, aligned with the strategy and customer requirements.

The operational model complements the existing literature and tools in the area of business and process modelling. Whereas business model concept (Osterwalder, 2004) is more focused on providing the big picture of the business logic, the operational modelling aims to transform this big picture into a resource-based view on required service components, and investments in IT and other infrastructure. The result of this operational modelling serves well as an input to more meticulous formulations for instance with e^3 -value modelling (Gordijn, 2002) or Component Business Model approach (IBM, 2005).

This paper describes the first company case study applying the operational modelling technique. The promising results encourage testing and developing the technique further in other business cases. We are aware of some deficiencies in the operational modelling technique, and hope to improve it in certain respects: The technique seems to be at its best in designing the operational models of small to medium sized companies. In conglomerates it might be too large undertaking to handle with the suggested managerial participation design process. It would be interesting to study how the technique could be adopted in such organisations. Furthermore, in participatory approaches the issues is always about who are the participants in the process, and in what stage they take part. In our case study the group consisted of all chief executives of the company representing expertise from all main functions of the organisation. Is the input of all these CxOs really needed at all steps of the technique? And how about co-creation of the business together with the users or other stakeholders? Even though the method can be used to prioritise the service components, it does not offer systematic or explicit method to write down the priority lists. At best, the technique could produce a road map for the implementation of the business model, including the process for handling the change requests in future.

References

Amit, R., & Zott, C. (2010). Business Model Design: An Activity System Perspective. Long Range Planning, 43(2-3).

Amit, R., & Zott, C. (2001). Value creation in e-business. Strategic Management Journal, 22, 493-520.

Baden-Fuller, C. & Morgan, M. (2010). Business Models as Models. Long Range Planning, 43(2-3).

Bask, A., Tinnilä, M., & Rajahonka, M. (2010). Matching service strategies, business models and modular business processes. Business Process Management Journal, 16(1), pp.153-180.

Bouwman, H. (2003a). State of the art on Business models, B4U/D3.2, Telematica Instituut, TU Delft, TNO, KPN research.

Bouwman, H. (2003b). Designing metrics for business models describing Mobile services delivered by networked organisations. The 16th Bled Electronic Commerce Conference: eTransformation, Bled, Slovenia, June 9 - 11, 2003.

Chesbrough, H. (2010). Business Model Innovation: Opportunities and Barriers. Long Range Planning, 43(2-3).

Davenport T., and Short J., (1990). The New Industrial Engineering: Information Technology and Business Process Redesign. Sloan Management Review, Summer 1990, pp. 11-27.

eFactors (2002). WP3: E-business Model Roadmap. Deliverable 3.1. of Information Systems Technologies e-Factors Thematic Network Report, IST-2001-24868.

Faber, E., Ballon, P., Bouwman, H., Haaker, T., Rietkerk, O., & Steen, M. (2003). Designing business models for mobile ICT services. 16th Bled Electronic Commerce Conference eTransformation, Bled, Slovenia.

Gordijn, J. (2002). Value-based Requirements Engineering – Exploring Innovative e-Commerce Ideas. PhD thesis, Vrije Universiteit, Amsterdam, NL, 2002. Also available from http://www.cs.vu.nl/~gordijn/.

Gordijn, J., Akkermans, H., & Vliet H. (2000). Business Modelling is not Process Modelling. In the Proceedings of the 'ECOMO 200O. Springer-Verlag, 40-51.

Gordijin, J. & Wieringen, R. (2010). A Value-Oriented Approach to E-business Process Design. Advanced Information Systems Engineering, Lecture Notes in Computer Science, 2010, Volume 2681.

Haaker, T., Faber, E. & Bouwman, H. (2006). Balancing customer and network value in business models for mobile services, International Journal of Mobile Communications, Vol. 4, No. 6, pp. 645–661.

Hammer M. (1990). Reengineering Work: Don't Automate, Obliterate. Harvard Business Review, July-August 1990, pp. 104-112.

Hedman, J., & Kalling, T. (2003). The business model concept: theoretical underpinnings and empirical illustrations. European Journal of Information Systems, 12(1), 49 – 59.

Heikkilä, M. (2010). Coordination of complex operations over organisational boundaries (Diss. Thesis, University of Jyväskylä). Jyväskylä studies in Computing.

Heikkilä, J., Heikkilä, M., & Tinnilä, M. (2005). The Role of Business Models in Developing Business Networks. In Saarinen T., Tinnilä M. and Tseng A. (Eds.), Managing Business in a Multi-Channel World: Success Factors for E-Business. Idea Group, Inc., 232-246.

IBM Business Consulting Services (2005). Component Business Models – Making Specialization Real. IBM Institute for Business Value. IBMCorporation 2005.

Morganwalp, J.M., & Sage, A.P. (2004). Enterprise Architecture Measures of Effectiveness. International Journal of Technology, Policy and Management, 4(1), 81-94.

OpenGroup (2010). The Open Group Architecture Framework (TOGAF), Version 9. www.opengroup.org/togaf.

Osterwalder, A. (2004). The Business Model Ontology: A Proposition in a Design Science Approach (Diss. Thesis, l'Ecole des Hautes Etudes Commerciales de l'Université de Lausanne).

Osterwalder, A., & Pigneur, Y. (2002). An e-Business model ontology for modelling e-Business. In Loebbecke et al. (Eds.), The proceedings of the 15th Bled Conference on E-Commerce, Bled, Slovenia.

Osterwalder, A., & Pigneur, Y. (2009). Business Model Generation.

Schuster, R. & Motal, T. (2009). From e3-value to REA: Modeling multi-party eBusiness Collaborations. Proceedings of the IEEE Conference on Commerce and Enterprise Computing.

Teece, D. (2010). Business Models, Business Strategy and Innovation. Long Range Planning, 43(2-3).

Timmers, P. (1998). Business Models for Electronic Markets. In Gadient, Y., Schmid, B.F., Selz, D. (Eds.) Electronic Commerce in Europe. Electronic Markets, 8(2).

Wout, J., Waage, M. Hartman H., Stahlecker, M. & Hofman, A. (2010). The Integrated Architecture Framework Explained: Why, What, How, Springer.