

Examining business models for emerging technology-based services – a network perspective

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Abstract

The paper examines business models for emerging technology-based services. Although the concept of business model is an essential term in business and the existing literature offers various definitions of it, there is still much confusion around the term. Hence, the aim is to develop some common ground for defining and developing business models by identifying some general elements of a business model in the field of technology-based services. As single companies often cannot govern all the relevant resources and activities needed in producing and commercializing such services, a network of actors is needed. Thus, the concept also needs to be further developed from a network perspective. As a result, the paper presents a framework describing the elements of a net business model that need to be considered in a business model in order to describe the production and commercialization of technology-based services in business nets. The research project is in progress, and the framework will be further developed in the future based on existing theory, as well as according to further empirical study.

Keywords: *Business model, strategic business net, technology-based service, Delphi method*

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Introduction

Emerging technologies across different fields have multiple effects on business, firms, markets and marketing (Srinivasan, 2008). Radical technological developments can be characterized by nonlinear and unpredictable change, which bring many challenges to firms commercializing breakthrough innovations while there is no clear market structure with identifiable actors (Möller & Svahn, 2009). As new technology is changing the business environment, there is a need to find new innovative business models. Technology is taken to the markets by firms through a venture shaped by a specific business model, and in many cases managers need to expand their perspectives and find the right business models in order to capture value from that specific technology (Chesbrough & Rosenbloom, 2002).

Although the concept of business model is increasingly discussed both in the academia and everyday language, there is still confusion around the concept in terms of how it can be defined and used. Various definitions of the concept exist, but none appears to be generally accepted. This may be due to the fact that the concept draws from as well as integrates a range of disciplines (Chesbrough & Rosenbloom, 2002; Shafer, Smith & Linder, 2005). However, before managers can apply the concept properly, they need a simple working definition of the concept that clears up the fuzziness around the term (Magretta, 2002). Hence, this study focuses on developing some common ground for defining and developing business models. The paper acknowledges that the concept is in many cases context-specific, and hence examines it in the specific field of emerging technology-based services. More specifically the focus is on ubiquitous services which commonly combine the advances of information and networking technologies (Shin & Lee, 2005) as well as mobile and pervasive computing (Lyytinen & Yoo, 2002).

Furthermore, this study examines the concept of business model more specifically from a network perspective, as there are often various actors involved in developing services and hence, a complexity of relationships internal as well as external to the organization occurs

(e.g. Morgan, Deeter-Schmelz & Moberg, 2007; Syson & Perks, 2004). This is the case especially in the emergence of new technology and technology-based services, where a diversity of activities and resources are needed from various actors (see e.g. Komulainen, Mainela, Sinisalo, Tähtinen & Ulkuniemi, 2006; Lundgren, 1995; Möller & Svahn, 2009). This study suggests that these multiple actors form emerging business nets with radical changes in their value systems or completely new value activities, which aim at creating new technology (Möller & Rajala, 2007; Möller, Rajala & Svahn, 2005), and hence are relevant in examining the business model concept.

For the abovementioned reasons, the aim of this paper is to 1) identify some general elements of a business model in the field of technology-based services and 2) develop the concept further from a network and especially from strategic net perspective. In pursuing these goals, the paper builds on research on business models (e.g. Hedman & Kalling, 2003; Timmers, 1998) especially from a network perspective (e.g. Helander & Rissanen, 2005; Komulainen et al., 2006), and the strategic or value net approach (e.g. Möller & Rajala, 2007; Möller, Rajala & Svahn, 2005; Parolini, 1999).

The empirical part of the paper presents a qualitative study that employs the Delphi method. This specific method was chosen as the concept of business model is very fragmentary and the aim is to elaborate the concept in a highly dynamic environment. The study included two online questionnaire rounds among experts from firms and non-business actors with open-ended questions. As a result, the paper presents a conceptual framework for developing business models for emerging technology-based services in a networked business field. It includes the elements that need to be considered in a business model in order to describe the production and commercialization of technology-based services in business nets. Along with this, some general guidelines and characteristics of business models in this specific field of business are discussed.

The paper is organised in the following way. First, the theoretical premises of the study are discussed: the concept of business model as well as the nature of strategic business nets. After this, the methodological choices employed in the study are elaborated. Then, the analysis of the data obtained through the Delphi-study will be discussed in two phases, after both questionnaire rounds. Finally, based on the analysis and the theoretical premises, a framework for identifying the elements of a business model will be presented as results and some conclusion will be drawn.

Theoretical base

The concept of business model

The term business model became a great buzzword in the era of the internet boom and dot-com companies (Magretta, 2002; Shafer, Smith & Linder, 2005). Previous literature offers various definitions of the concept; many emphasize strongly the e- prefix (e.g. Timmers, 1998; Weill & Vitale, 2001), while others are not restricted to certain businesses such as the online world (Shafer, Smith & Linder, 2005). In the following table, some definitions of the concept are presented with an emphasis on different aspects, elements, and manners of representation.

Table 1. Definitions of business models

Authors	Definition	Central elements and characteristics
Amit & Zott, 2001	Business model represents an important locus of innovation and a crucial source of value creation for the firm and its suppliers, partners and customers. Each business model is centered on a particular firm.	Value creation, actors, single firm's perspective.
Chesbrough & Rosenbloom, 2002	Companies must find the right business model in order to create value from new technology. Business model provides a framework which considers the technological characteristics and potentials as inputs and converts them through customers and markets into economic outputs.	Technology, value, normative representation, context-specific.
Hedman & Kalling, 2003	The concept of business model generally describes the key components of a given business: 1) customers, 2) competitors, 3) offering, 4) activities and organisation, 5) resources, 6) supply of factor and production inputs and 7) a longitudinal process component to cover the dynamics of the business model as well as the cognitive and cultural constraints that management has to take into account.	Actors, offering, flows of resources, central firm, dynamics, general representation.
Helander & Rissanen, 2005	Business models of the companies must be linked to the business models of the other companies involved in the network.	Network, interconnectedness of business models.
Komulainen et al., 2006	There can be identified three core elements of a network business model; the product/service, the business actors and their roles, and value-creating exchanges among the actors.	Product/service, business actors and their roles, value-creating exchanges, network perspective.
Shafer, Smith & Linder, 2005	Business model is defined "as a representation of a firm's underlying core logic and strategic choices for creating and capturing value within a value network".	Central firm, value creation and capture, value network.
Weill & Vitale, 2001	Business model represents the roles and relations among the firm's customers, allies and suppliers identifying the major flows of product, information and money and the major benefits for the actors.	Actors and roles, value exchanges (flows), relations, relationship perspective.

The list is not by all means exhaustive but demonstrates the different elements and perspectives build into the concept of business model. It is not in the interests of this paper to give a review of the wide range of definitions of business models and their components (see e.g. Hedman & Kalling, 2003; Shafer, Smith & Linder, 2005) but instead, the current study emphasizes the key component or perspective of business models, which has been identified frequently in the existing literature: business networks.

Interorganizational networks represent a key element in business models (Westerlund, Rajala & Leminen, 2008). It can also be seen from table 1, that actors and their roles as well as networks are emphasized in various definitions. Timmers (1998) includes in his definition of a business model a description of the various business actors and their roles. Shafer, Smith and Linder (2005) emphasize the value network and the role that the firm chooses to play in the network as important elements of the business model. Chesbrough and Rosenbloom (2002) also suggest that one of the functions of a business model is to describe the position that firm has within the value network. Westerlund, Rajala and Leminen (2008) propose that the business model of a firm describes the way the company creates revenue by specifying the relationships with other actors as well as the firm's position in the value creating network. Helander and Rissanen (2005) talk about open source software business models and recognise that the value created in open source projects generally cannot be owned by a single company but value is created for the network. Thus business models must be linked

between the companies involved in the network and may also include some other components outside the network (Helander & Rissanen, 2005).

Although the network of actors and their roles have been identified as important elements of a business model, they are still generally explored from a single firm's perspective (e.g. Amit & Zott, 2001). However, single companies most often cannot master all the necessary resources and competencies to develop and produce new technology by themselves. Instead, there are more actors involved. Thus the underlying business models are not limited to one core actor but instead they have to be attractive to multiple actors (Bouwman & Fiel, 2008; Komulainen et al., 2006). This study adopts the viewpoint of Komulainen et al. (2006), who examine the concept of business model from a network perspective (see Table 1). The network perspective, or more specifically the strategic net approach, will be elaborated in the following.

Strategic business nets

As already noticed, in the emergence of new technology-based services, an individual company cannot master all the necessary resources and competencies but a diversity of activities are needed from various actors (see e.g. Komulainen et al., 2006; Lundgren, 1995; Möller & Svahn, 2009). E.g. Kallio (2004) has identified various roles in wireless business such as the application provider, content provider, infrastructure provider, operator, service provider and the end user. The multiple actors involved in the development, production and commercialization of the services form strategic business nets, as it is not usually reasonable to try to create value for the customer through the firm itself with limited competencies if it is possible to ally with other firms that can complement the existing competencies (Helander, 2004).

Strategic business nets are distinguished from more general "networks of firms" and they can be defined as intentionally formed networks that contain a finite set of parties, at least three (Möller, Rajala & Svahn, 2005). Jarillo (1988) conceptualizes strategic networks as a mode of organization which is a long-term and purposeful arrangement to gain or sustain competitive advantage by outsourcing activities and focusing on the key ones in which the firm has comparative advantage. Furthermore, a hub firm is seen as essential in setting up the network and taking a pro-active role in it. Strategic networks are composed of enduring interorganizational ties that are strategically significant for the firms involved in them as such networks can provide companies the access to information, resources, markets and technologies, and allow firms to achieve strategic objectives such risk sharing (Gulati, Nohria & Zaheer, 2000). Möller, Rajala and Svahn (2005) highlight the centrality of the value system and its level of determination in understanding strategic nets. Value creating systems can be defined as sets of activities that create value and that are connected to each other by flows of information, material, money and influence relationships (Parolini, 1999). It is important to decide which parts of a value chain or a system of a given product are emphasized in a firm and which are farmed out: a critical component of a strategic network is the opportunity for joint value creation between the organisations (Jarillo, 1988).

Möller, Rajala and Svahn (2005) identify three factors that explain the nature of strategic nets and their management: 1) the level of determination of the value activities and the actors forming the net, 2) the goal of the net or its hub firm in terms of the desired outcomes that are pursued through the net, and 3) the structure of the net which can be described through the vertical and horizontal dimensions and through the numbers and different types of actors.

Hence, there are different types of nets as well. The focus of this study lies in emerging value systems which are created in order to commercialise new technologies, products or business concepts (Möller, Rajala & Svahn, 2005). More specifically, Möller and Rajala (2007) distinguish application nets as a specific net category in the area of emerging business nets which include radical and discontinuous change. Application nets are formed in order to achieve commercially viable business applications out of the evolving technology. Such nets are mostly driven by a hub firm and involve a web of component, software, and other technology providers, as well as pilot customers. However, such application nets need to be transformed into viable business nets, and hence the concept of business model needs to be explored from a strategic net perspective.

In figure 1, the various and somewhat overlapping elements of business models and business nets are shown. It is evident from the theoretical discussion that business nets are an essential element of business models, and thus the two theoretical premises are strongly interconnected. The various elements identified in the figure are connected to each other and thus are overlapping. The elements under business nets are essential in business models, such as actors and roles, dynamics, relations and the value system. Hence, in describing a business model, one also needs to describe the business net involved.

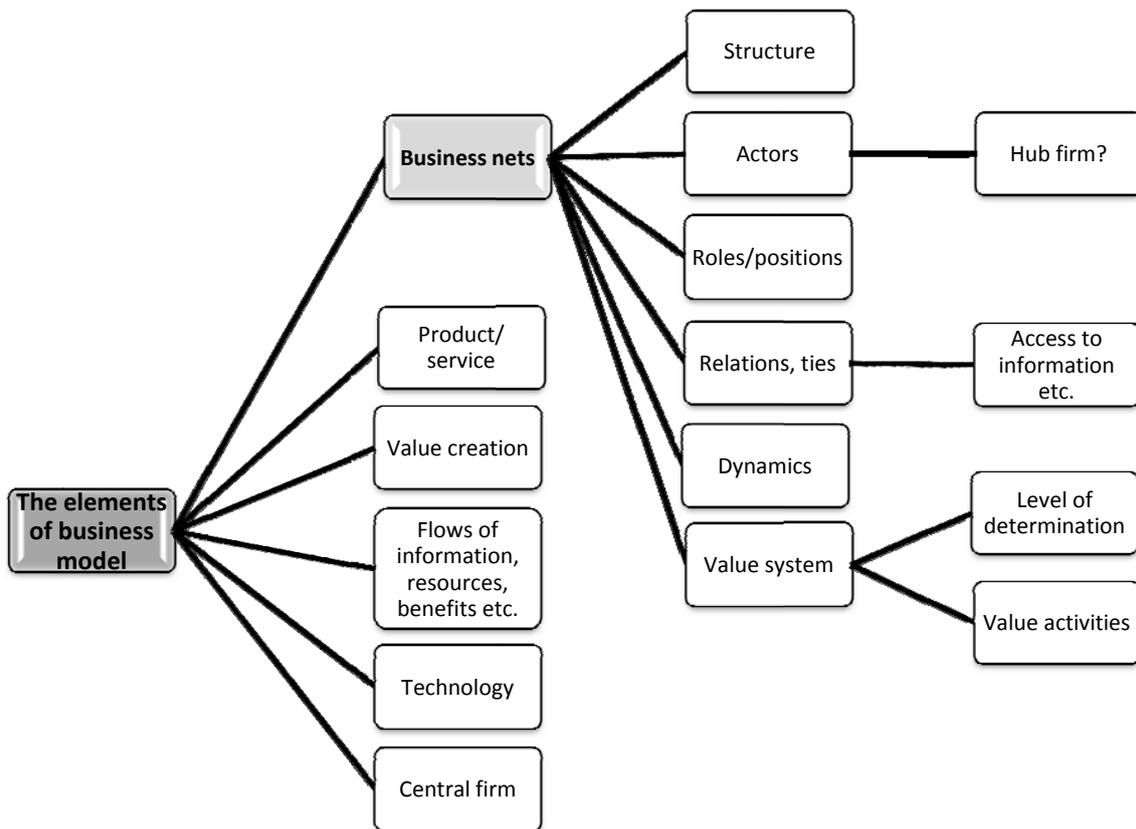


Figure 1. A theoretical framework of the elements of a business model

Methodology

This study has chosen to apply a qualitative Delphi method. The method is concerned with utilizing experts' opinions in a structured communication process, which effectively allows a group of individuals to deal with a complex problem (Linstone & Turoff, 1975).

Traditionally, the Delphi method has been used to achieve consensus around situations where there is contradictory or insufficient amount of information (Hasson, Keeney & McKenna, 2000). Other major variation of the method is policy Delphi (e.g. Turoff, 1975) where opposing views are debated on a complex issue (Loo, 2002). The Delphi method was chosen for this study as the concept of business model is very fragmentary and the aim is to develop the concept further in a highly dynamic environment. The aim was not to achieve consensus among the experts, but to increase the understanding of the concept of business model by gaining different perceptions and opinions of it. The current study is a preliminary study of the research project, in order to gain some pre-understanding of the phenomenon and lay some ground for further research.

The Delphi method is a research process that involves various phases. For example Linstone and Turoff (1975) identify four main phases of the Delphi research process; 1) exploration of the subject wherein individuals contribute additional information, 2) process of reaching an understanding of how the group views the issue, 3) in case of strong disagreement among the group, an exploration of the underlying reasons for the differences, and 4) final analysis and evaluation. The data gained from the process represents basically the subjective beliefs and judgements of the experts (Bell, 1997, 264). Although the Delphi process tends to minimize the feelings and information communicated through face-to-face communication, the process provides the individuals a great degree of individuality and freedom from restrictions on their expressions (Linstone & Turoff, 1975). This preliminary study did not include expert interviews or other face-to-face meetings but the questionnaires were the primary mode of data collection. This may have had an effect on the richness of the data. However, the experts had the chance to answer to the questions anonymously and by writing which provided them the opportunity answer to the questions freely.

This study has followed the general steps of the research process by starting with defining the research problem. The two online questionnaire rounds consisted mainly of open-ended questions. The first questionnaire round involved two expert panels, Panel 1 with representatives of firms and non-business actors in technology-based business field, and Panel 2 with firm representatives from various other business fields (see Table 2). The questionnaire revolved around general business models and their usage in practice. It consisted of two parts: firstly seven different definitions offered by the existing literature were presented and the experts were asked to comment on them freely. These definitions can be found in the theoretical part of the paper (Table 1). The alternative definitions were chosen based on their emphasis on perspective (single/central firm, relationship, or network), manner of representation (normative, general, or context-specific) and alternative elements of business models. Secondly, three open-ended questions were presented concerning these definitions, elements of business models, and their usage in business field. After conducting the first round, the data was analysed.

The preliminary results of the first round were presented to the experts on the second questionnaire round, which had been formed based on the data. The second questionnaire was sent solely to Panel 1, representatives of firms and non-business actors in technology-based business field, as the focus was more narrowed down to technology-based services. The questionnaire presented a framework describing the elements of a business model which had been identified based on the data gained from the first round (product/service, actors and their roles, value exchanges, value net, business logic and strategic issues, and the environment). The experts were asked to comment on that, as well as to comment a few statements regarding the nature and development of business models in the field of technology-based

services, which had also been formed based on the data from the first round. Finally, the experts also had an opportunity to answer freely to an open-ended question about business models in general. After the second round, the data was analysed and reported. The numbers of the members and the respondents of both panels can be seen in table 2. In the first round, altogether 13 of 37 experts responded to the questionnaire and in the second round 10 of 20 experts responded.

Table 2. Expert panels

	Panel 1 (members/respondents)	Panel 2 (members/respondents)
1st questionnaire round	20 / 7	17 / 6
2nd questionnaire round	20 / 10	- / -

Data analysis was done in two main phases. Firstly, after the first questionnaire round, the data was analysed in order to present the results to the experts in the second questionnaire. Secondly, the data obtained from the second questionnaire round was analysed and the results obtained from the first questionnaire were modified based on the analysis.

In both stages of the analysis, the answers were codified with the QSR NVivo 8-program. This was done in two main phases after both questionnaire rounds. The analysis was started first by reading the data several times and then by codifying it into various themes. The themes were codified under free nodes in NVivo, and they included elements of business models identified in the theoretical base as well as some other elements and characteristics arisen from the data. Secondly, these various themes were combined into wider categories by using tree nodes in NVivo. As part of the analysis, the themes were written out and also illustrated figuratively after both questionnaire rounds. The actual data analysis done with NVivo is described in more detail in the following chapter.

Analysis of the Delphi-study

First questionnaire round

After reading the answers the first few times, several themes around the elements of business models were found. These elements mainly represent the factors that business models need to cover and describe. Altogether six basic elements of business models were recognized: actors and their roles, services and products, value net, value exchanges, business logic and strategic issues, and the environment. The actors represent different business actors such as suppliers, partners and other network players as well as customers and competitors. Business model should also describe their roles in the network. The service or product is in a central place in a business model, and it includes e.g. innovations and technology aspects. The value net naturally includes the actors of the net, but as an essential factor in the analysis of the net was seen the level of cooperation as well as the changes in the net. Value exchanges refer to the value creation logic of the net, such as the flows of competencies, resources and benefits between the actors. It was also emphasized in the data, that the business model needs to describe both the business logic and strategic choices, that is, both the operational level and strategic decisions and their implementation. Finally, the environment was seen as a very central element of business models, as the changes in the environment, such as the market, culture, regulations and legislation, and technology have to be taken into account in developing and adjusting the business model.

In addition, there were also other interesting findings concerning the fundamental characteristics of business models that affect the development and implementation of them. Based on the data it was evident that it is quite difficult to develop a single general definition of the concept of business model, as it becomes too vague. One definition cannot cover everything and moreover, in trying to do so, the uniqueness of business models suffers as the business models need to cover fundamental and practical actions and choices in the company's everyday business. Still, on the other hand it was seen that companies operating in a basically same process can have the same model of planning and controlling instead of individual models.

Thus it was seen that a business model is more of a framework instead of developing a single business model. A framework gives space for realigning the process. Therefore, an ongoing strategic process is needed besides the business model. This was closely related to another essential characteristic of business models strongly emphasized in the data, namely dynamics. Business model changes over time as there are many dynamic factors in the surrounding environment, which affect the development of business models; relationships, knowledge, flexibility, time resources, and networking as well as new technology. Another confrontation could be found between long term vs. short term planning, which should be both covered in a business model. Furthermore, the development of business models was also seen different in small vs. large companies: small businesses may not have that complete models as in big, multinational companies the models are defined at the top.

The network perspective on business models was present in the panellists' answers. The respondents found it possible to create business models for multiple actors, moreover, most of them saw that business models need to be linked at least to some extent as no one can do business on their own. Business models could be established to multiple players with different roles, and each player specifies their own models later in more detail. This is naturally dependent on the level of cooperation between the actors, and it was also noticed that business models cannot always be linked in case of a low level of cooperation.

Second questionnaire round

The second questionnaire round elaborated the elements as well as the nature and development of business models. Basically, the elements identified in the first round proved to be essential in a business model based on the data. Only some elaborations on the roles of the elements and the nature of business models were found. Also the role of the presented framework was discussed in the data. What does it aim to describe; a concrete value chain or a description of strategic decision-making? Furthermore, the interrelationships and priority between the different elements raised questions among the respondents.

The role of a single company vs. value net in the business model was further deliberated. It was seen that some of the elements refer to the business model of a single company and others to the business model of the value net. A separation of the business models of single companies and that of the value nets is needed. That is, could the business models of single companies be embedded in the business model of the value net? Furthermore, the level of cooperation was emphasized in the data in terms of developing business models for the value net. On one hand, it was seen that this can be impossible e.g. in the case of networks that exist only a short period of time. Then on the other hand, most experts agreed that it is more often necessary to develop business models for a net of actors. However, it is central that the business model is developed for the service itself that the different actors in the net are

producing. Thus, the role of the service is central in the business model. Furthermore, the role of the customer was seen as important in a business model and in the field of technology-based services in general. The business model and the value net need to be based on the needs and benefits, which have been found in practice. Also money and revenue flows were mentioned as an important element in addition to those identified in the first round, and those flows should be described in a business model.

The discussion around defining the concept of business model continued in the second questionnaire round. It was clear that there cannot be a general and universal definition of business model at operational level. However, it is possible to define the elements of a business model, and specify the content of the elements in each case. Furthermore, businesses are different in different fields, and thus it might be preferable to develop more context-specific definitions or frameworks. Also the dynamic nature of business models was strongly emphasized in the answers. The environment has many effects on business models. Especially the role of technology was emphasized, such as new technological development, as well as the usage of old or existing technology, which can be employed in a new technology innovation.

Results

Based on the analysis of the data, and drawing on existing theoretical discussion in the fields of business models and strategic business nets, the paper presents a conceptual framework for developing business models for emerging technology-based services in a networked business field. The framework will be further developed based on existing theory, as well as according to further empirical study. The current framework is presented in figure 2.

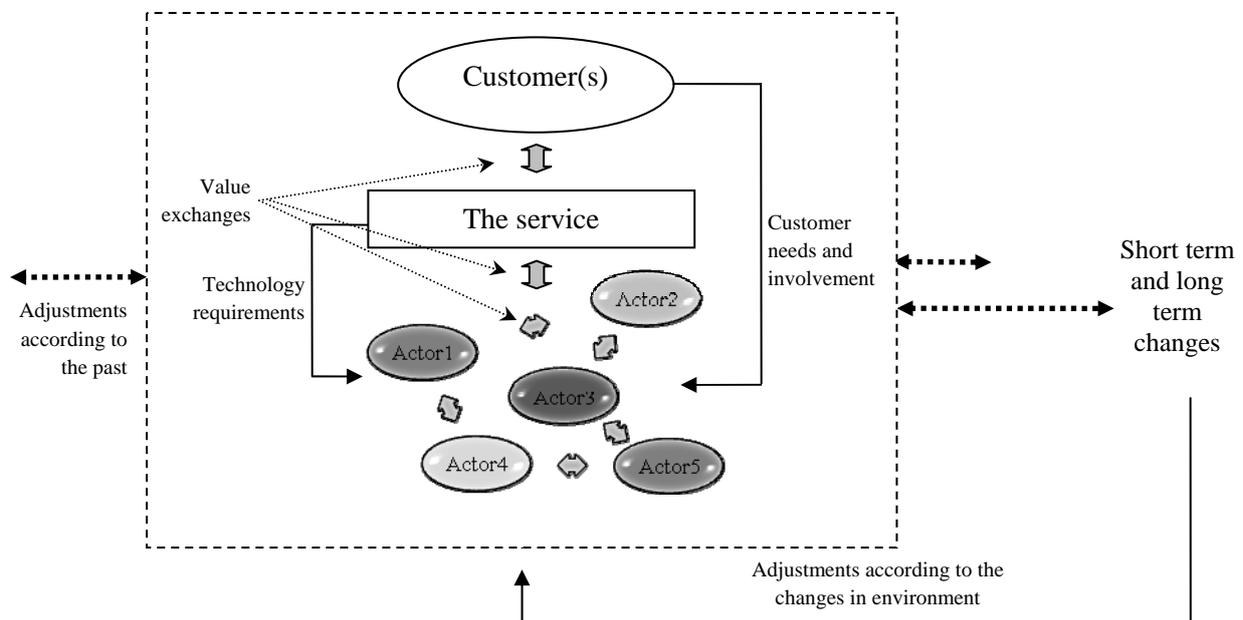


Figure 2. A framework of the elements of a net business model

The framework represents the elements that need to be considered in a business model in order to describe the production and commercialization of technology-based services in business nets. The key elements of a business model are presented inside the dash lined rectangle: the service, the customer(s), the actors and their roles below (ellipses), as well as

the value exchanges (arrows) between the actors, the service, and the customer. Hence, the business model describes the business net in commercializing the service, and thus the term of net business model is used. The service is the central element of the net business model, as it defines the necessary technology requirements and hence also the necessary competencies and resources needed from different actors. Thus every actor has a certain role in the net business model. The service placed in the middle of the framework can also represent the hub company of the net.

The customer is an essential element of the net business model, as it pays for the service and hence, the customer needs have to be taken into account in developing and commercializing the service. Thus, the customer is involved in the net as well. The arrows between the actors, the service, and the customer represent the value exchanges, such as flows of money, other benefits, resources and activities.

However, the net business model cannot exist in isolation or be a static model of the business net, but it needs to be developed and constantly adjusted according to the environment. Hence, the borders of the rectangle are illustrated with dash lines. Changes both in short and long term need to be taken into account in developing the net business model. The model also has to be adjusted according to these changes on a continuous basis. Furthermore, in addition to future-oriented changes in the environment, also factors in the past can have effects in the development and adjustment of the net business model, e.g. in the form of old or existing technology which can become useful along with new technology in a service innovation.

Conclusions

Overall, the presented framework identifies a set of generic elements that need to be described in a net business model and hence assist the development of such business models in practice. However, the aim was not to develop a universal framework for defining business models in all fields, but the content within the defined elements varies in each case. Yet, after the identification of such elements, the framework can be used to develop net business models and their scenarios in the future. Furthermore, it creates common ground for defining the concept of business model in the field of novel technology-based services from a network perspective.

Many of the elements in the framework can be identified in the theoretical base, such as the actors and their roles, the service, and the value exchanges (e.g. Komulainen et al., 2006). Also dynamics, or more specifically radical and discontinuous change (Möller & Rajala, 2007), has also been identified as characteristic to emerging business nets. This study further elaborates dynamics as central in business models, and distinguishes between long term and short term changes, as well as the past. The role of the customer was strongly emphasized in the data, and seen as important especially in this specific field as the customer needs should be taken into account when developing new technology and services. A crucial element already identified in the theoretical base (e.g. Westerlund, Rajala & Leminen, 2008) and further emphasized as a result of the study, are business nets. The current study suggests that business models need to be viewed from a net perspective instead of single companies. Hence, the service is a central element of the net business model as it defines the necessary activities and competencies needed by the actors. In addition to identifying the elements of a net business model based on the theoretical discussion and the Delphi study, the framework also describes the roles and relations of the elements to each other instead of just listing them. However, this needs further examination in the future.

The elements identified in the framework are quite abstract in nature, and many of them can be central in business models in general, also in fields other than emerging technology-based services. The framework could be applied particularly in other emerging business fields with new innovations and rapid change. However, the current framework emphasizes services in the field of new technology because of the networked nature of this specific environment. Single companies rarely master all the necessary competencies needed in the production and commercialization of a new technology-based service, and hence there is a need to develop business models for such services in a net of companies. Furthermore, such business environment is also rather dynamic in nature, including rapid changes and emerging business opportunities. Overall, the generalizability of such a framework is a matter of the abstraction level; in pursuing to cover everything in detail, it becomes too specific, as when trying to generalize over different fields, it becomes too vague. This is a dilemma that was strongly emphasized among the experts in the Delphi study, and also needs further attention.

However, the research project is still in progress. The suggested framework is thus preliminary, and it needs to be further developed on the basis of existing theoretical discussion in the fields of business models and strategic business nets. The aim is also to continue the research with further empirical study including expert interviews, and develop the framework accordingly. After completing the framework, it will be used in developing future net business model scenarios for technology-based services in the specific field of ubiquitous computing. In addition to this continuing research process, the framework could also be elaborated in other contexts besides emerging technology-based services. Also the role of business nets in producing and commercializing products and services in general could be examined more carefully.

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