Mikko Pynnönen

CUSTOMER DRIVEN BUSINESS MODEL – CONNECTING CUSTOMER VALUE TO FIRM RESOURCES IN ICT VALUE NETWORKS

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ABSTRACT

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The objective of this thesis is to provide a business model framework that connects customer value to firm resources and explains the change logic of the business model. Strategic supply management and especially dynamic value network management as its scope, the dissertation is based on basic economic theories, transaction cost economics and the resource-based view. The main research question is how the changing customer values should be taken into account when planning business in a networked environment. The main question is divided into questions that form the basic research problems for the separate case studies presented in the five Publications. This research adopts the case study strategy, and the constructive research approach within it. The material consists of data from several Delphi panels and expert workshops, software pilot documents, company financial statements and information on investor relations on the companies’ web sites. The cases used in this study are a mobile multi-player game value network, smart phone and “Skype mobile” services, the business models of AOL, eBay, Google, Amazon and a telecom operator, a virtual city portal business system and a multi-play offering.

The main contribution of this dissertation is bridging the gap between firm resources and customer value. This has been done by theorizing the business model concept and connecting it to both the resource-based view and customer value. This thesis contributes to the resource-based view, which deals with customer value and firm resources needed to deliver the value but has a gap in explaining how the customer value changes should be connected to the changes in key resources. This dissertation also provides tools and processes for analyzing the customer value preferences of ICT services, constructing and analyzing business models and business concept innovation and conducting resource analysis.

Keywords: business model, value network, customer value, business concept innovation, management, ICT services, resource-based view, transaction cost economics

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The idea of obtaining my doctorate has sounded fascinating for me ever since I first started to study Economics at the end of the year 1999. After completing my Master’s Thesis in the fall of 2004, there were just lots of unsolved problems related to my mindset towards business, and I applied to get into the doctoral program to get answers to these questions. In the fall of 2005, after a rough start in a couple of small and short projects at TBRC, I got a position as a researcher in a big project called Sirmakka which concentrated on studying the dynamics of the ICT industry. This is when the idea of the structure of this dissertation started to take shape. As all the good processes, the actual writing of this dissertation started a bit late from schedule, at Christmas early this year (the original aim was to get the first version ready by the end of last year). The writing of this thesis has been a far more time consuming process than I would ever have guessed and it has took me several long nights to get it finished. Luckily I have had the support of the best experts that have believed in me and powerful organizations supporting me both mentally and financially. Without these I would not have succeeded.

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Contribution of Mikko Pynnönen in the publications:

Mikko Pynnönen is responsible of the research plan and coordinating the writing of the publications. He is also the main author in the papers.

1. Made the research plan. Responsible of analysis and writing of the case. Wrote also most of the theory.
2. Coordinated the planning and implementing of the research. Responsible for analyzing the case. Wrote most of the paper.
3. Responsible of the coordination of case research process, analysis and the writing process. Wrote most of the paper.
4. Made the research plan, organized the workshops, responsible of analysis and the writing process. Wrote most of the paper.
5. Responsible for planning, implementing and analyzing the case. Wrote most of the paper.
SECTION I
OVERVIEW OF THE DISSERTATION
1. INTRODUCTION AND BACKGROUND OF THE STUDY

1.1. Research context

Change seems to be an incessant phenomenon in the modern global society. New technologies and innovations as well as customers’ changing expectations create transformations in business. Organizations must be able to adapt to the change or rather to control it. The phenomenon of industry change in this dissertation is viewed through ICT (Information and Communication Technology) service business. The drivers of change are re-orienting customer expectations and new business innovations based on the knowledge of these expectations and the possibilities created by new technology. In this dissertation the terms customer and consumer are used when speaking of the individuals using the services.

The scope of this study is in strategic supply management (Nollet et al., 2005) and especially in dynamic value network management. Value network is a network of firms that have different business relationships with each other (Kothandaraman and Wilson, 2001). The value network aims to produce and deliver value to the customers and its members. Value has two sides for customers: monetary and non-monetary (Flint and Woodruf, 2001). In this dissertation the focus is on the non-monetary aspects of customer value. The firms in the value network benefit from providing the customer preferred value to customers by getting money from their services.

According to Teece (2007), strategy is about selecting and developing technologies and business models that create competitive advantage by creating and managing valuable and rare assets. Thus the strategy of the firms appears in the form of business models in the value network. The strategic challenge for a firm is to manage the fit between its competencies and customer value (Gardner, 2001; Kothandaraman and Wilson, 2001; Normann and Ramirez, 1993; Ulaga and Chacour, 2001). Moreover, the management of the firm’s partnership portfolio and the firm’s position in the network are crucial for success (Parise and Casher, 2003).
Eisenhardt and Sull (2001) argue that strategy should be just simple rules. Traditional strategy thinking assumes that advantage comes from exploiting resources or stable market positions. In the new, fast changing markets strategy must be simple and as flexible as the environment in order to exploit the emerging opportunities, i.e. dynamic capabilities (Eisenhardt and Sull, 2001). Dynamic capabilities are abilities to transform the resource base to fit the changing environment (Eisenhardt and Martin, 2000; Teece, 2007). Confusion and change are the greatest sources of competitive advantage in turbulent markets (Eisenhardt and Sull, 2001).

The dissertation is based on basic economic theories, transaction cost economics (Coase, 1937; Williamson, 1975) and the resource-based view (Barney, 1991; Wernerfelt, 1984), which are widely used in explaining the value network and business models. The transaction cost economics perspective tells the optimal structure of the network through make-or-buy decisions (Barney, 1999). From the perspective of the resource-based view the value network is a source of complementary and substitutive resources for a firm (Kothandaraman and Wilson, 2001). Treated as part of the value network from the point of view of the examined firm, the business model describes the way the firm does business (Magretta, 2002). It model is the architecture of business that includes a description of the business actors and their roles, of the potential benefits for the various business actors and of the sources of revenue (Timmers, 2000). To access the business models in a firm, the easiest way is to simplify the model by dividing it into smaller pieces, namely business concepts. Business concepts combine customer needs and opportunities enabled by technologies in new, innovative and effective ways (Hamel, 2002). The difference between the business strategy and the business model is that the former defines the relationship between the firm and its environment and the latter is more an implementation tool for the strategy (Mansfield and Fourie, 2004). The business model analysis allows the firm to anticipate the changes in the business environment and their effects on its own business.
1.2. Research gap

The business model is an important element of the value network as describing the role of the organization in contrast to other organizations. When considering the value networks in the ICT industry, change is in a focal role. The business model is the mechanism that has to be able to adapt to change. The research gap originates from the problems in the business model concept in handling change and in taking customer value into account when managing the business model. Business model is a quite a new concept in the management literature and it has been the focus in several studies trying to define the nature of the business model (e.g. Kraemer et al., 2000; Mahadevan, 2000; Stewart and Zhao, 2000; SWATMAN et al., 2006; Weigand et al., 1997). The problem in, for example, these studies is that they do not properly define or describe the business model concept nor do they explain how the business model evolves (Pateli and Giaglis, 2004). Even though, for example, Magretta (2002) claims that business model is a good planning tool because it focuses on explaining how the elements of the system work together, research lacks a comprehensive explanation of how the business model dynamics really work.

The current state of business model related research suffers from poor operationalization of the construct. For example, Pateli and Giaglis (2004) claim that the research has focused on the conceptual definition of business models and the holistic change mechanism of the business model has not been studied. Moreover, the complete linkage of customer value and the business model needs to be reviewed (Pateli and Giaglis, 2004). Applicable definitions are often related to the value network theory (e.g. Timmers, 2000) which has more profound explanations for change. The value network theory provides some help when explaining the change logic of the business model concept.

The problems of the business model construct are not purely conceptual weaknesses. They stem from weaknesses in the theories explaining the change logic of value network and business model concepts and the role of customer value in the business model. Already Wernerfelt (1984) states that optimal product-market activities, which
can be loosely understood as a business model, are defined by the resource profile of the firm. According to Foss and Robertson (2000), the resource-based view takes demand as given rather than as a dynamic factor that firms can manipulate strategically. Srivastava et al. (2001) suggest that the resource-based view needs research on how customer value is managed; more precisely, the customer changes need to be related to the need for changes in key resources. These gaps in current research are the standpoints of this dissertation and they are addressed in more detail in the following chapter.

1.3. Goals and research questions of the study

The objective of this study is to provide a business model framework that connects customer value to firm resources and explains the change logic of the business model. This dissertation also provides tools and processes for analyzing the customer value preferences of ICT services, constructing and analyzing business models and business concept innovation and conducting resource analysis.

The main research question of this study is derived from the gap in the literature pointed out in the previous chapter. The main question is divided into five sub-questions that form the basic research problems for the separate case studies presented in Publications 1 to 5. The main research question can be formulated as follows:

- How should the changing customer values be taken into account when planning business in a networked environment?

The sub-questions of this study are numbered according to the Publication they refer to. The Publications present constructs as approaches to these questions. The sub-questions for the case studies are:

1. How do the basic economic theories explain the ICT value network dynamics?
2. How can customer value preferences related to the product or service be efficiently identified?
3. How can the business model be mapped in a networked environment?
4. How can new business models be developed to fit customer preferences?
5. How are customer value preferences related to the elements of the business model and value network?

The research questions are examined through several constructs. The attempted solution to the main research question is the customer driven business model framework presented in this dissertation. Sub-question 1 seeks an answer to the dynamic nature of the business model and value network and the construct that attempts to solve the problem is a conceptual framework of network dynamics in Publication 1. Sub-questions 2 to 4 are investigated with constructs that are i) the customer value model (Publication 2), ii) the business mapping framework (Publication 3) and iii) the business concept innovation process (Publication 4). The solution to Sub-question 5 is the method to study the transformation of customer values into a value network (Publication 5). The relationships between the research questions, concepts and propositions are clarified in the Figure 1.
Figure 1. Research structure

The constructs that are provided as attempted solutions to the research questions are connected with two propositions: 1) The business model can be designed or redirected by a business concept innovation process to meet the customer value preferences. 2) By identifying customer value preferences and their connection to the firm resources the business model can be streamlined to better serve the customer. Proposition 1 connects the business concept innovation process to the business mapping framework and to the customer value preferences, whereas Proposition 2 connects the customer value preferences to firm resources through the business model. Both of the propositions use the conceptual framework as platform. These propositions are tested in Publications 4 and 5, and they are drawn together and discussed in this dissertation.
1.4. Structure of the study

The study consists of two sections, and its outline is illustrated in Figure 2. Section I is an introduction and overview of the research consisting of the introduction and background of the study, theoretical foundation, conceptual framework, methodology and research process, review of the Publications and the conclusion. Section II consists of five Publications that are: 1) Network dynamics and developing business models: a conceptual view, 2) Applying a customer value model in mobile communication business, 3) Mapping business: value stream based analysis of business models and resources in ICT service business, 4) From business concept innovation to a business system: a case study of a virtual city portal, 5) Transforming customer values into value network of multi-play operator – a resource based approach.

![Outline of the study](image)

Figure 2. Outline of the study
The first chapter of Section I introduces the research context and the research gap of the study. It also states the research problem and objectives of the study. Finally it introduces the structure of the study. Chapter 2 concentrates on the transaction cost theory and the resource-based view of the firm as the theoretical foundation of the study. Chapter 3 introduces the building blocks of the conceptual framework of the customer driven business model. The concepts introduced are value network, business models in the value network, business concept innovation and customer value preferences. Chapter 4 presents the methodology and research design of the study. This chapter consists of the methodology of the study, the introduction of the research process, material collection and data analysis. Chapter 5 reviews the relevant results and contributions of the Publications to the customer driven business model framework. Finally Chapter 6 concludes the study results. The issues that are discussed are the contribution of the study, reliability and validity of the results, limitations and further research areas of the study and finally the managerial implications of this dissertation.

Section II can be seen to have three parts that are the study setup, the instrument construction and the construct application. The study setup part consists of Publication 1 which provides the initial conceptual framework for this dissertation. In the instrument construction part the basic constructs of the customer driven business model are introduced. Publication 2 deals with the customer value model, and Publication 3 introduces the business mapping framework. In the construct application part the business mapping framework and the customer value model are applied. Publication 4 introduces first the method for business concept innovation and then applies the business mapping framework. The first part of Publication 4 actually contributes more to instrument construction, and the second part concentrates on construct application. Publication 5 presents a framework to connect the firm resources into customer value preferences through a business model by applying the customer value model and the business mapping framework.
2. THEORETICAL BACKGROUND

This chapter is about two economic theories and their applicability to the study of ICT industry change. The central issues of the theories and their relations to the concepts of firms and markets are clarified. Also, the linkage of the transaction cost economics theory and the resource-based view to the value network, business model, innovation and customer value concepts is discussed. The value network concept can be used to analyze the structure of an industry, but to understand the logic of value creation and dynamics of change in a network, transaction cost economics and the resource-based view must be connected to the value network concept. Another issue related to value networks and the industry structure is the role of firms. A concept that is often related to value networks, and especially describing the firms in them, is business model. The business model concept can partly be explained with transaction cost economics, but a full explanation also requires some assistance from other theories like the resource-based view. In the following Chapters 3.1 and 3.2 the basic theories are reviewed in detail and discussed in relation to the concepts defining the customer driven business model.

2.1. Transaction cost theory

Transaction cost economics originates from Coase’s (1937) idea that there always seems to be some costs in using the price mechanism or operating in the market and these costs can sometimes be saved if the resources are organized as a firm. The basic assumption of the theory is that transactions are performed in the most economical way (Thompson and Yuanyou, 2004; Watjatrukul, 2005).

Transaction costs can be divided into outsourcing costs and management costs. According to Dekker (2003), outsourcing costs are related to, for example, searching, planning, negotiating, monitoring and enforcement, whereas management costs are related to administration, control, monitoring and costs of inefficient organization structures (Dekker, 2003). The Internet has allowed cheaper monitoring, better cost
comparison and increased frequency of transactions because of the decreased information asymmetry which generally can lower both the outsourcing and management costs (Li and Whalley, 2002; Power and Singh, 2007).

Any transaction can be characterized with three dimensions which are frequency, uncertainty and asset specificity (e.g. Dekker, 2003; Malhotra and Grover, 2003; Thompson and Yuanyou, 2004). Frequency tells how often the transaction takes place. Uncertainty refers to the fact that there can appear to be problems during the transaction caused by opportunistic behavior of the parties involved (Dekker, 2003). Transaction costs increase when investments become more asset specific (Aubert et al., 2004; Barney, 1999; Thompson and Yuanyou, 2004). Specialized assets are such that require irreversible investments from one party and will become valueless if the relationship of the parties breaks down (Teece, 1986). Good examples of this kind of investments in the ICT industry are the proprietary networks of operators (Li and Whalley, 2002).

According to Coase (1937), the firm acquires the needed transactions from markets when the costs caused by decreased efficiency become bigger than the costs of carrying out the transactions in open markets. This make-or-buy decision leads to a transaction between two firms. From the network perspective, when the number of transactions and firms that handle them increases, a business network of firms is formed. Where Coase (1937) has defined only two main relationship types (governance structures) – markets and hierarchies – Williamson (1975) has also defined an intermediate relationship type called the hybrid. The hybrid structure can be defined as a partnership (Blomqvist et al., 2002). In the value network firms have different kinds of partnership and coalition relations with each other.

A transaction has traditionally only been viewed as a source of costs. However, especially in the networked environment transactions can be a source of benefit. In the transaction benefit view, the transaction is defined as a contract between parties, which aims to create joint surplus through cooperation to benefit all the parties concerned (Blomqvist et al., 2002). Benefits of cooperation come, not only from sharing the costs
and risk (Chang, 2003), but also from generating new knowledge and innovations and learning from them (Blomqvist et al., 2002).

Transaction cost economics affects the boundaries of the firm and further the structure of the network through governance, opportunism and transaction-specific investment (Barney, 1999). The theory suggests that in the birth of a new value network when the product is new and the business roles are not sophisticated, the structure is centered (Teece, 1986). This is because establishing new business in, for example, ICT usually contains asset-specific investments (networks, software etc.) and carries a risk of opportunism. Moreover, the theory suggests that the outsourcing costs are bigger than management costs because of the unestablished business processes and the need to monitor the transactions. In theory the risk of this kind of situation can be handled with a hierarchical governance structure (Barney, 1999) which means that most of the business concepts are implemented inside the firm and the number of firms in the network is therefore limited. Anyhow, in a stabilized situation, the ICT and especially the Internet technologies let companies cooperate at lower transaction costs which can lead to radical changes both inside and between companies (Timmers, 2000).

When business stabilizes, the products become more popular, the roles of firms become clearer and the value network starts to expand. This is because firms realize that certain business functions or business concepts are clear business models and viable on their own. Internal organizing also becomes more expensive than buying the service from the market (outsourcing) because of the lower transaction costs (Watjatrakul, 2005). Furthermore, the risk of opportunism and the need of protection decreases when the former transaction-specific investments become more common and more widely applicable (Brothers and Nakos, 2004). This transaction cost economics-based decision-making has effects on the business models of firms. When a firm decides to outsource some part of its business model, it simultaneously focuses its business model on a clearer and more specific business area and creates business opportunities for other firms. Contrarily, when a firm acquires a business concept from the market and includes
it into the existing business model, the firm widens the scope of its business and increases the size and complexity of its business model.

Transaction cost theory development is aimed towards the theory of the firm. According to Garrouste and Saussier (2005), the theory of the firm has to include three aspects, which are i) the nature and the boundaries of the firms, ii) the internal structure of the firm and iii) the relations between the firms and the market. The transaction cost theory explains the logic of the value network and, in a way, the existence and boundaries of the firm. However, it clarifies neither the source of dynamics in the industry nor the source of value in the network. With certain limitations the theory explains the business model concept, but it treats the firm and therefore also the business model as a black box. The theory suggests that a transaction should be performed in markets when the costs of internal organizing are higher than the market cost. This does not explain, for example, how the firm should be organized or how the resources should be allocated. This leads to a conclusion that transaction cost economics must be supplemented with other theories to get a full picture of how the firm works. One such theory is the resource-based view. This issue of resources defining the firm will be discussed in the following chapter.

2.2. Resource-based view

These reflections on the resource-based view complete the theoretical foundation of the customer driven business model with an internal view of the firm’s value creation. The resource-based view explains the sources of value which are the company resources and capability to use them in a creative manner (Barney, 1991; Teece, 2007).

The resource-based view of the firm assumes that the firm is a bundle of resources and that they can be different between firms (Barney, 1991; Wernerfelt, 1984). According to Amit & Schoemaker (1993), the resource-based view explains the company profitability using information on its resources and capabilities. Barney et al. (2001 p. 625) argue that “… resources and capabilities can be viewed as bundles of tangible and intangible
assets, including a firm’s management skills, its organizational processes and routines, and the information and knowledge it controls.”

The basic assumption of the resource-based view is that the firm resources are in a critical role when the firm is creating sustainable competitive advantage. However, not all resources are potential for creating sustainable competitive advantage. Barney (Barney, 1991) presents criteria for evaluating the potential of the resources for creating sustainable competitive advantage based on four attributes that are valuable, rare, imperfectly imitable and non-substitutable (VRIN). Valuable resources are such that they enable the firm to implement efficiency and effectiveness improving strategies. (Barney, 1991)

According to Bowman and Ambrosini (2003), resources are often assumed to be valuable or rent generating even though the theory suggests that not all resources meet the conditions of this criterion, and therefore they use the term assets of not rent generating resources. For example, assets can be bought from the market and that is why they cannot secure distinctive competitive advantage to the firm. Resources have to be relatively rare to create competitive advantage. The resource must also be difficult to imitate so that the firm can be ahead its competitors. Finally, in order to create sustainable competitive advantage, the resource must be non-substitutable. This means that no other resource can be the source of strategically equivalent outcome. (Barney, 1991; Bowman and Ambrosini, 2003) Resources that meet the conditions of VRIN criteria are argued to be such that cannot be bought from markets, namely, abilities, relationships, skills and knowledge (Barney, 1991; Bowman and Ambrosini, 2000; Clulow et al., 2007).

An important issue in the context of the resource-based view is the firm’s value creation for customers (Bowman and Ambrosini, 2000; Wernerfelt, 1984). Wernerfelt (1984) argues that the firm’s resource profile is related to its optimal product-market activities. This means that the firm uses its resources to generate value to its customers, and by
identifying the link between a specific resource and a specific product the value can be optimized for both the firm and the customer (Clulow et al., 2007).

According to Bowman and Ambrosini (2000), the firm creates value by combining the assets with the work of organizational members into new values. However, this new value has to be coherent with the customer needs in order to realize the value and create profits for the firm. If the resources used to generate value are similar in different firms, it leads to identical products (perfect competition) (Bowman and Ambrosini, 2000), which is normally not the situation in real life markets. However, the firms can have slightly different resource profiles which results in differentiated products between them and the role of, for example, marketing skills, the business model or distribution channel is emphasized.

The firm does not automatically own the resources and capabilities it needs to produce value to the customer. According to Barney (1999), a firm that does not have the resources it needs to be successful has three options: i) it can cooperate with another firm, ii) it can develop the resources by itself and iii) it can acquire a firm that already possesses them. However, two of the latter are costly to implement. In many technology intensive industries the governance structure is non-hierarchical (Barney, 1999; Power and Singh, 2007). This is because the costs of creating and acquiring capabilities are greater than the costs caused by an increased threat of opportunism (Barney, 1999). This also applies to ICT value networks because of, for example, the high costs of establishing networks and developing software. The degree of integration in a cooperation relationship depends on the resources firms are seeking from the value network. Chen and Chen (2003) argue that if a firm is dependent on the value network’s (partners’) R&D resources, the alliance is tighter than if the firm seeks for marketing of production resources. Moreover, if the resource profiles of partner firms are similar, the alliance structure is more integrative than in the case of complementary resource profiles (Chen and Chen, 2003).
The ICT industry has so far been quite turbulent and resources that a couple of years ago were considered as sources of fairly sustainable competitive advantage (e.g. proprietary networks) no longer hold the potential. Because not all resources are accessible through cooperation, the firm has to have some kinds of routines and processes to develop its resources to fit value creation, for example, in a changing market situation or different customer needs. This approach to resources is called the dynamic capability view. Dynamic capabilities, according to Eisenhardt and Martin (2000), are abilities to transform the resource base by creating, integrating, recombining and releasing resources. Dynamic capabilities can be processes of coordination replication, learning and reconfiguration (Teece et al., 1997). The basic assumption in the dynamic capability view is that the orchestration capacities are the enterprise’s key capacity to innovate and capture value to deliver superior performance (Teece, 2007).

The process of innovating and developing business models that take customer values into account is an important dynamic capability (Teece, 2007). These processes are important in order to understand the connection between changing customer value preferences and the resources creating the competitive advantage of the firm. At this point it could be argued that managing the value creation according to changing customer value preferences with a customer oriented business model (process of reconfiguration) is a dynamic capability for the firm.

The resource-based view explains the role of resources and capabilities in managing the firm’s position in a network with creating sustainable competitive advantage. The resource-based view furthermore explains the link between resources and customer value. However, it does not explain the change in the industry, only the mechanism to correspond to dynamic capabilities. Together with transaction cost economics they provide a fairly good theoretical basis for business models in a value network.
3. CONCEPTUAL FRAMEWORK

This chapter clarifies and defines the concepts used; namely, value network, business model, business concept innovation and customer value preferences. The role of the concepts value network and business model is to explain the industry and the organizations. Business concept innovation is a mechanism to change the business model according to changing customer value preferences or what customers need with certain limitations like money. First the value network and the business model concepts are discussed in contrast to the chosen two basic theories, second the business concept innovation as a change driver and a process is introduced, third the concept of customer value preferences as a change causing driver is defined, and finally the concepts and the basic theories are summarized as a conceptual framework for a customer driven business model.

3.1. Value network

According to Normann and Ramirez (1993 pp. 65-66), the “…focus of strategic analysis is not the company or even the industry but the value-creating system itself, within which different economic actors – suppliers, business partners, allies, customers – work together to co-produce value.” These network members have relationships with each other and they perform different transactions with each other to achieve their own goals or those of the network. The resource-based view sees the value network as a collection of complementary and substitutive resources possessed by different firms (Kothandaraman and Wilson, 2001). From the perspective of transaction cost economics the value network is a set of transactions between firms that are ruled by make-or-buy decisions (Barney, 1999).

In the modern business world there are numerous different organizational structures which contain a varying number of business relationships and all the firms are somehow part of a value network (Kothandaraman and Wilson, 2001). This is because producing value to customers with fast changing needs requires flexibility and a fast response that
business networks can provide (Hameri and Paatela, 2005). Bovet and Martha (2000) state that value networks are customer-aligned and collaborative. Customer choice is the key force that activates the forming of the value network. A firm can also improve its capability to create knowledge by collaborating with other firms (Blomqvist et al., 2002). Value networks bring positive feedback and learning effects for their members and are therefore a good source of new knowledge (Hamel, 2002).

The value network could be compared to a firm that has a number of different strategic processes; only that in the value network there are several companies which all have their own roles (Cartwright and Oliver, 2000; Hagel III, 1996; Tapscott et al., 2000) and take care of certain processes based on their capabilities (Eisenhardt and Martin, 2000; Prahalad and Hamel, 1990). From the value network’s point of view it is important to have capabilities to connect assets and resources. Furthermore, companies form strategic alliances with partners to get access to the external resources needed in their businesses (Yasuda, 2005). The competition that has been between firms is shifting to the network level (Kothandaraman and Wilson, 2001). Not only can there be several firms in the same industry, but there can also be several value networks and they can compete with each other like firms (Hagel III, 1996).

Networks differentiate themselves on the axes of economic control and value integration (Barney, 1999; Chen and Chen, 2003; Tapscott et al., 2000). Tapscott et al. (2000) provide a classification of different network structures, which are open market, aggregation, distributive network, alliances and value chains. In the open market or the agora, anyone can buy/sell and no single entity is in control. On aggregation one company usually leads in a hierarchical fashion, positioning itself between customers and producers. Distributive network businesses are the infrastructure of the entire economy; they provide the backbone for the digital economy – communications, bandwidth, delivery services, banking services, etc. Alliances have no hierarchy in control; no one can force anyone to be part of it, and one can leave anytime. In a value chain the focus is on process optimization, and there is one primary company that maximizes value integration. (Tapscott et al., 2000)
According to Allee (2000), in the network economy there are three layers of value exchange (transactions): i) goods, services and revenue, ii) knowledge and iii) intangible assets. In ICT business the knowledge and intangible assets are in important roles, among the traditional “goods, services and revenue” approach. Based on Allee (2000) and Cartwright and Oliver (2000) a value network can be illustrated by economic actors and value exchange streams between them.

Positioning a firm in a network and orchestrating its position in it is a challenge for the strategic leadership (Venkatraman and Henderson, 1998). This is due to the make-or-buy decisions related to the management and protection of resources providing sustainable competitive advantage. According to Kothandaraman and Wilson (2001), there are different roles for firms in value networks as some firms are the shapers of the network and some are shaped by the network. The power relationships gained from competitive advantage are an important issue in the network dynamics.

To conclude, the value network system is formed of actors and their relationships. At the conceptual level the value network can be described with business models that are connected to other business models and customers. The value network is formed to create value for customers and for the participating firms. The business models are in different positions in capturing the value from customers depending on their position and power in the network. The role of business models in positioning and orchestrating the value network is discussed in the next chapter.

3.2. Business models in value network

According to Bowman & Ambrosini (2000), the power relations of the players in the network determine the capability of a firm to capture value. Power relations of firms, according to the resource-based view arguments, are related to the different resource profiles of the firms’ business models. Because the firm often does not have direct access to all the resources it needs it has to cooperate and outsource (Barney, 1999). For example many ICT offerings do not have one dominating asset because of the great
amount of integration and the resources acquired from value network are important (Mikkonen et al., 2008). In value networks, even quite critical resources are often outsourced, and this gives a certain amount of negotiation power to the suppliers of particular resources. In other words, the aim of the strategy (and the business model) should be to create a relative monopoly situation (Cox, 1997) in terms of sustainable competitive advantage (Barney, 1991) for a firm in its market. However, the business model is not the same as strategy (Magretta, 2002; Mansfield and Fourie, 2004). Where business strategy defines the relationship between the firm and its environment, the business model is more an implementation tool for strategy (Mansfield and Fourie, 2004). Strategy is about selecting and developing business models that support the generation and development of sustainable competitive advantage. This is why the business model implicitly reflects the firm strategy.

According to Magretta (2002), the business model is briefly a description of how the firm does business. This means that the business model is not the same as the firm; it is a more abstract concept. Business models have become common tools in describing the organization (governance structure) and its linkages to the value network. The business model concept based on Hamel (2002) describes the elements of a business model. These are customer interface, core strategy, strategic resources and value network (Hamel, 2002). Following this definition the business model actually describes the value network from the firm’s perspective. The problem in many business model frameworks (see e.g. Chesbrough, 2003; Hamel, 2002) is that they are fairly static because of their descriptive nature (Pateli and Giaglis, 2004). The framework should be simultaneously holistic and informative to be able to explain the change. So far most of the frameworks have included a built-in assumption that change in some part of the system creates a completely new business model. To take change into account in the business model it has to be more than a descriptive framework and to allow the adjustment of the parts of the system dynamically. Timmers (2000) provides one such general definition: The business model is the architecture for a product, service and information streams. It also includes a description of the various business actors and their roles, of the potential benefits for the various business actors and of the sources of revenue (Timmers, 2000).
In this dissertation these streams between the actors in the business model architecture are called value streams.

Many studies on ICT business models have concentrated on the benefits and efficiency provided by those models (Bakos, 1998; Horsti, 2007; Swatman et al., 2006). For example, Bakos (1998) has characterized the typical benefits of especially Internet-centric business models as follows: reducing search costs by facilitating the comparison of price, products and services; reducing lead times; improving production and supply capability; managing demand; and improving personalization and customization of product offerings. Horsti (2007), on the other hand, provides a detailed framework for evaluating business models. Although it is important to know the strengths and weaknesses of one’s business model, the evaluation perspective does not provide a method for reconfiguring the business model accordingly.

Business model development or reconfiguration requires a profound understanding of the dynamic nature of the business model system. The literature has limited examples of holistic explanation of the interdependencies of business model elements (Pateli and Giaglis, 2004). Osterwalder (2004) provides an ontology of the business model consisting of nine building blocks and their connections: the value proposition, target customer, distribution channel, relationship, value configuration, capability, partnership, cost structure and revenue model.

For analyzing purposes the company’s whole business model is often too wide. To assess the business models in a firm, the easiest way is to simplify the business model by dividing it into smaller pieces, namely business concepts. Business concepts combine customer needs and opportunities enabled by technologies in new, innovative and effective ways, and balance the implementation of the concepts with external competition and internal learning capability (Hamel, 2002). The business concept can support the business model or it can have internal customers or it has not yet been launched to the markets. The firms’ actual business model is normally a combination of these business concepts.
In this study the business model is treated as a construct that states the role of the actor in the value network. The business model also defines the offering (value proposition) of the firm with value streams from a studied actor to the customer, other actors in the value network, resources acquired from the network, and the resources and capabilities of the studied actor.

Ineffectiveness is the motive of developing business models (Chung et al., 2004). Magretta (2002) argues that business models fail because they are based on wrong assumptions of customer behavior. The business model has to be aligned to meet the customer value preferences, and to be able to reconfigure the business model the firm has to have capabilities to innovate (Chung et al., 2004). These issues of customer aligned innovation capabilities are discussed in the following chapters.

3.3. Business concept innovation

Kalakota et al. (1999) claim that business model innovation is a critical tool to create competitive advantage. Business concept innovation creates internally competing alternatives to the existing business model (Hamel, 2002). This helps the firm not only in new product development and R&D, but also in its ability to react fast and in time with regard to the product development of competitors and disruptive innovations (Christensen, 2000) that enable product substitutes inside or outside its own industry. The process of business concept innovation is a basic tool to change the business model to better fit, for example, the changed need of the customers. Lawson and Samson (2001) argue that the capability of innovation is, by definition, a dynamic capability.

The definition of innovation includes technological development, market introduction and the iterative nature of the process. However, the notion of innovation is not unambiguous. The terms used to describe the innovation types also vary depending on the author. Garcia and Calantone (2002) have examined the innovation literature and created a typology to define the types of innovations. According to them there are two important aspects in innovation. Firstly, the innovation process includes both the
technological development and the market introduction aspect. Secondly, the process is iterative, and therefore it includes an introduction of new innovation and reintroduction of improved innovation. The iterative nature of the innovation process leads to different types of innovations. Typically these types are called *radical* and *incremental* innovation. (Garcia and Calantone, 2002; Hamel, 2002)

Open (collaborative) innovation is grounded on the idea that innovations form when information is shared between organizations. In open innovation the internal and external ideas are combined into new innovations to reach new markets and they are implemented with completely new business models (Chesbrough, 2003). The main idea in open innovation is that customer value is created not only inside a single firm but also between several firms (Chesbrough, 2003; Fjeldstad and Haanæs, 2001; Shapiro and Varian, 1999). Furthermore, innovation can reach the market from inside or outside the firm. Generally, collaboration in a business network that produces value generates better innovations and more value to customers (Bovet and Martha, 2000; Cartwright and Oliver, 2000; Fjeldstad and Haanæs, 2001; Tapscott et al., 2000).

In this study the role of innovation is to create new business opportunities and develop business. The innovation is an important capability for a firm and when connected to customer value creation it helps firms to align their business models to better meet the customer preferences. To ensure the creation of services that fit the customer needs and create maximum customer value, the customer view should be taken into account already in the early stages of business planning. Therefore the customer driven business model should have a mechanism to recognize the customer value preferences and also the changes in them.

3.4. Changing customer value preferences

Customer preferences are an important element in the value network of actors, since the value is captured from customers (Bowman and Ambrosini, 2000). In consequence from the standpoint of value networks, customer requirements and preferences are essential in
order to understand the changes in value network structures. Although it is important that customers are satisfied, it is the total value of the offering to customers that matters. As Gardner (2001) states, a perfectly satisfied customer can shift to the competing offering if it provides significantly greater value. Customer satisfaction does not create real (voluntary) customer lock-in (Hamel, 2002); it is the overall value of an offering that does (Gardner, 2001).

The aim of the customer value analysis is to integrate the customer into the R&D process of the firm (Ulaga and Chacour, 2001). Although the idea was originally presented in a business-to-business environment, the basic idea can be transferred to the consumer markets as well (Thomke and von Hippel, 2002). One main view of the connection between the customer and the firm is the study of the customer need assessment (see e.g. Elfvengren et al., 2004; Kärkkäinen et al., 2001; Kärkkäinen and Elfvengren, 2002). In this view the aim is mainly to recognize the unarticulated needs of customers. The customer need refers to what the customer ultimately wants.

Customer value, on the other hand, refers to what the customer wants with certain limitations like money. Another approach for integrating the customer into the firm’s processes is the customer value view (Anderson and Narus, 1998; Flint et al., 1997; Flint and Woodruf, 1998; Thomke and von Hippel, 2002; Ulaga and Chacour, 2001). This view is also linked to the value creation of firms (Bowman and Ambrosini, 2000; Clulow et al., 2007; Wernerfelt, 1984).

Integrating the customer into the R&D process certainly generates value to the customer, but to capture the value generated, firms have to reconfigure their business models accordingly (Thomke and von Hippel, 2002). Building a customer value model helps the firm to recognize the customer values and to modify the business model suitable for capturing them. The customer value model is a data-based representation of the worth (in monetary terms) of the product or service to the customer (Anderson and Narus, 1998). The customer value model can be opened and analyzed by defining the single attributes of value elements that can be technical, economic, service or social in
nature (Anderson and Narus, 1998). Garvin (1987) has presented eight dimensions of product quality which are performance, features, reliability, conformance, durability, serviceability, aesthetics and perceived quality.

Although the value in the customer value model should be addressed in monetary terms, the concept of value is approached from a wider point of view. Flint et al. (1997) argue that value is either received or desired value. Received value is the value that the customer actually gets from a certain service. According to Flint and Woodruff (2001 p. 323), the desired value is “the bundle of product attributes and resulting consequences, both positive and negative, and monetary and non-monetary, that the customer wants to happen.” When assessing changing customer perceptions it is useful to concentrate on the analysis of the customer-desired value. Flint and Woodruff (1998) also point out that the concept of customer-desired value should not be mixed with the concept of personal value – personal values are abstract core beliefs that guide human behavior. Where personal values are generic and fairly stable, customer-desired value is more tied to a service or a product and it faces more changes (Flint and Woodruff, 1998).

A change in the customer-desired value is caused by trigger events (new opportunities, supplier problems etc.) that stimulate the customers to change their opinions (Flint et al., 1997). The value of some service to the customer is a subjective matter (Kortge and Onkonkwo, 1993), and it depends on the customer’s user profile, namely, the way he or she likes to use the service, or is used to using it. In a group of people with similar user profiles, the value of the service is quite comparable.

In the global competition of ICT services it is essential to know the customer value preferences to create services that attract and bring value to customer. The capability to align the business model according to changing customer value preferences is important in keeping the customers satisfied. In this study the changing customer value preferences are the key driving force of change. The mechanism of customer driven change is discussed in the following chapter.
3.5. Customer driven business model framework

Although transaction cost economics explains the existence of firms and also is somehow the foundation of the value network theory and the resource-based view explains the business model concept, they still do not really define the dynamics of the industry. Especially in fast developing industries like ICT, industry dynamics are an important issue that must be taken into account. The role of this theoretical framework is to connect the sub-research questions, constructs and propositions to the main research question and conceptually together (see Figure 1 in chapter 1.3).

The industry is usually explained with two key concepts: the value network and business model. The value network concept describes the industry and the business model is the description of a firm in the industry. A central issue in the business model is the effects of change on the existing business model (Chung et al., 2004; Magretta, 2002) and on the new business opportunities (Hamel, 2002). In the value network, the main issues are the structure of the network (Barney, 1999; Chen and Chen, 2003; Tapscott et al., 2000) and the power relations of the players (Bowman and Ambrosini, 2000; Kothandaraman and Wilson, 2001; Venkatraman and Henderson, 1998). In this framework (see Figure 3) the assumption is that the business model and value network are the systems that filter the change. Based on the literary, the focus of the change at the business model level is in the existing business models or in new business opportunities. At the value network level the change affects the structure of the network or the power relations of the firms.

The framework is based on transaction cost economics and the resource-based view. They explain the role of the organization and their boundaries in the network and set the rules of change. The dynamics of the framework stem from firms that produce innovations to create new products and services for customers whose value preferences change according to the industry offerings and their own perceptions. The theoretical framework of the customer driven business model is presented in Figure 3 below.
The dynamics inside a business model are ultimately caused by management decisions. The decisions are based on the management’s knowledge, capabilities and information available. In this framework the decisions are based on information from customers’ value preferences and implemented through the business concept innovation process. Transaction cost economics and the resource-based view create the rules for the decisions which then activate the process of change. These changes in business models migrate to other business models through their linkages in the value network. The power relations of the firms and the structure of the value network affect the migration.
of change. To test and implement the framework, several case studies were established. The methodology and the research process of these studies are discussed in Chapter 4.
4. METHODOLOGY AND RESEARCH DESIGN

This chapter concentrates on introducing the methodology used in this study and clarifying the research design which is summarized in Table 1. The table states the role of each *Publication* in the dissertation, the cases and data used in the *Publications* and the analysis methods used.

Table 1. The research design of the study.

<table>
<thead>
<tr>
<th>Role</th>
<th>Case</th>
<th>Data</th>
<th>Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Publication 1</td>
<td>Initial framework (Sub-research question 1)</td>
<td>Mobile multi-player game value network</td>
<td>Pilot case, research data of WISE, literature review</td>
</tr>
<tr>
<td>Publication 2</td>
<td>Instrument for analyzing customer value preferences (Sub-research question 2)</td>
<td>“Smart phone” and “Skype mobile” services</td>
<td>Delphi customer panel data</td>
</tr>
<tr>
<td>Publication 3</td>
<td>Instrument for analyzing business models and resources (Sub-research question 3)</td>
<td>Business models of AOL, eBay, Google, Amazon and Telecom operator</td>
<td>Financial statements and company internet pages</td>
</tr>
<tr>
<td>Publication 4</td>
<td>Business concept innovation as a change process (Sub-research question 4 and Proposition I)</td>
<td>“Virtual City Portal” business system</td>
<td>Delphi expert and customer panel data</td>
</tr>
<tr>
<td>Publication 5</td>
<td>Customer value connection to firm resources through the business model (Sub-research question 5 and Proposition II)</td>
<td>Multi-play offering</td>
<td>Research reports concerning multi-play offerings, company internet pages</td>
</tr>
</tbody>
</table>

The research design is discussed in detail in the following chapters. First the methodology of the study is discussed, second the cases and research process are introduced, third the data and data collection are presented, and finally the methods used in the data analysis are reviewed.
4.1. Methodology

When considering customer desired value and changing preferences, the research is future oriented. The problem with customer value and future orientation is that they are not exact. Customer value is strongly tied to the social context of the person. Moreover, the future is bound to the social context because the history and present reality draw the guidelines for future possibilities.

This research adopts the case study research strategy, and the constructive research approach within it. According to Voss et al. (2002 p. 197), “case research is the method that uses case studies as its basis.” This dissertation consists of five case studies. Case studies are the preferred strategy when questions like who, how or why are being posed, when the investigator has little control over events and when the focus is on a contemporary phenomenon within some real-life context (Yin, 1994). Eisenhardt (1989) understands case study research as a research strategy, which focuses on understanding the dynamics present in a particular situation (the business model). Case studies typically combine several data collection methods such as archives, interviews, questionnaires, and observations (Eisenhardt, 1989). The evidence can be qualitative (e.g., words), quantitative (e.g., numbers), or both. Case studies can be used to achieve different aims: for instance, to provide a description, to test theory, or to generate theory (Eisenhardt, 1989; Yin, 1994).

Bacharach (1989) sees theory as a system of constructs that are related to each other with propositions, and the system is bounded by the assumptions of the theory builder. Theory must explain which factors describe the phenomena (constructs), how they are related (propositions) and answer the questions why, who, where and when (assumptions) (Whetten, 1989). The case study method relies on continuous comparison of data and theory. The general research process has five stages: i) defining the research question, ii) instrument development, iii) data gathering, iv) analysis and v) dissemination (e.g. Stuart et al., 2002). The research process of this study is presented in Chapter 4.2.
According to Kasanen et al. (1993), the constructive research approach is used when the problems of the real world need to be solved with an innovative construct and to make a contribution to the existing theory. A construction is an entity that produces a solution to a specific problem in a novel way (Kasanen et al., 1993). One characteristic of the constructive research method is that the researcher’s empirical intervention is explicit and strong and the interpretation of the results is based on the understanding of the researcher (Kekälä, 2001). This is why constructive research is experimental by nature. The new construction should be seen as a test instrument in testing, illustrating, or refining a theory or creating a completely new one (Kekälä, 2001). According to Eisenhardt (1989), preceding specification of constructs helps to shape the initial design of theory-building research. If these constructs prove important as the study progresses, then researchers have a firmer empirical grounding for the emergent theory (Eisenhardt, 1989). An ideal result of constructive research is that the original problem is solved and both practical and theoretical contribution has been provided. Shaping the hypotheses (propositions) includes refining the definition of the construct and building evidence, which measures the construct in each case (Eisenhardt, 1989). The most expected theoretical result of this kind of research is theory refinement.

Essential issues in case studies and in constructive research are the validation and generalization of the construct. Kekälä (2001) suggests that the validity testing should be done by using the market mechanism that includes two stages: a weak and a strong market test. The weak test is passed when a manager of a firm is ready to take the construct in use in their decision-making. The strong market test is passed when the construct is proved to improve the performance of the firm. Kasanen et al. (1993) argue that even the weak market test is very demanding and hard to pass. The generalization of constructive case studies can be conceptual frameworks and descriptive, explanatory and prescriptive models (Lukka and Kasanen, 1995).
4.2. Research process

The research process of this study follows the basic process of case study research (e.g. Stuart et al., 2002) and can be divided into five phases. The process of this study is illustrated in Figure 4.

![Research process diagram](image)

Figure 4. The research process.

The overall research process started with the conceptual case study presented in *Publication 1*. The aim of this study was to construct a theoretical framework that would explain the dynamics of a network. This was implemented with a case of a mobile multi-player game and its value network. The case game was partly imaginary but the game idea is based on a pilot software of an Information Society Technologies (IST) project called Wireless Internet Service Engineering (WISE) (European Communities, 2005). The value network and its structure are based on the research results of a work package of this project and a literature review. One conclusion of this study was that the intra-firm perspective should be studied to fully explain the dynamics of networks. The point of view in the study was economic and therefore the customer demand was not analyzed. However, the customer demand was one of the key drivers in the case network’s dynamics.

These open questions of the firm’s internal aspect and the role of customer demand were the motivators of this research project. The theoretical framework was improved by a literature review which led to adding the resource-based view to the framework to explain the role of company resources in network dynamics. Business concept innovation as the company’s internal change driver and customer value preferences as
the external change driver were also added to the theoretical framework. The framework, however, is not enough to explain how the construct works (Whetten, 1989). The framework and its logic need to be explained in detail. The framework was thus used to generate the propositions (see Chapter 1.3) for the study as, for example, Whetten (1989) suggests. Constructs and propositions were then created and tested with separate case studies presented in Publications 2–5.

As stated, customer demand was one of the main drivers in the theoretical framework in *Publication 1*. The issue of customer value preferences and demand had to be dealt with. If customer value preferences are changing rapidly, the process of monitoring has to be quite simple to be agile enough. The traditional customer survey approach used in marketing is not simple enough and often it does not force the respondent to give consistent answers. To find a solution to this problem a customer value model was first constructed and then implemented. The whole study is presented in *Publication 2*.

To consider the relation of the business model and customer value preferences, it was essential to build a business model construct that is analytic enough. It had to be able to deal with the dynamic nature of customer value preferences and allow the direct connection of resources to the elements of the system. The business mapping framework and method is based on the case study of five business models and it is reported in *Publication 3*.

Having identified the constructs to analyze customer value preferences and map business, the business concept innovation had to be connected to the business mapping framework. The innovation process is the mechanism to change the firm’s business model according to the customer value preferences. The case study presented in *Publication 4* reveals the method for creating business models from innovation process results with the business mapping framework. This supported Proposition 1.

Finally the customer value model construct and the business mapping framework had to be connected to illustrate the nature of the customer driven business model. The study
also shows how the customer values transfer into the value network through the resources of the business model. The case study is presented in Publication 5. This supported Proposition 2. The finalizing phase of the research is to summarize and conclude these separate case studies into a customer driven business model framework. This is the research reported in Section I of this dissertation.

4.3. Material collection

The material of this research consists of data from several Delphi panels (Linstone and Turoff, 1975), material from expert workshops, software pilot documents, company financial statements and material on investor relations on the companies’ internet pages. The material is gathered mainly in different projects at the Technology Business Research Center (TBRC) of Lappeenranta University of Technology (LUT). The projects have been partially funded by the Finnish Funding Agency for Technology and Innovation (TEKES) and partially by companies in the ICT industry. The organizations have affected the case selection by providing information especially for the Delphi panels. The cases used in this study are:

- A mobile multi-player game value network in Publication 1.
- “Smart phone” and “Skype mobile” services in Publication 2.
- The business models of AOL, eBay, Google, Amazon and Telecom operator in Publication 3.
- Multi-play offering in Publication 5.

Publication 1 is based on a pilot case and research data of the WISE project as well as on a comprehensive literature review of economic theories. The game pilot has been documented and these documents form the data of the case game. The documents contain information about the software architecture and the parties who would handle the different roles if the game was implemented.
The Delphi method was used in gathering data in Publications 2 and 4. Delphi is a method for structuring communication between groups of people who can provide a valuable contribution in order to resolve a complex problem (Linstone and Turoff, 1975). With the Delphi technique, participants state their opinions in an anonymous questionnaire (Ozer, 1999). The characteristics of a Delphi study are iteration, anonymity, controlled feedback and group statistical response (Landetta, 2006).

The aim of using the Delphi method in Publication 2 was to assess the value preferences of a customer panel of advanced users of mobile services. For the first Delphi round, the model was formed into an anonymous web-based questionnaire where the customer value attributes were placed as pairs so that every attribute was compared to each other. The second iteration of the study addressed the fit between the value attributes and the selected two communication systems. The aim of this second Delphi round was to analyze what communication system best realizes the desired values. This part was based on an expert workshop where a group of experts rated the attributes’ realization in the case services. The group analyzed and discussed each attribute and decided which system best realized the attribute.

The goal of the Delphi process in Publication 4 was to capture the ideas of the parties involved in the designed “Virtual City portal” business model and also to bring customer needs and values into the business planning process that has traditionally been implemented by firm experts. The first phase of the study was to define the possible business concepts that are related to the case applications. This phase was implemented by a group innovation session (Elfvengren et al., 2004; Laaksonen, 2005) where the experts and lead users stated their opinions. The phases of the group innovation session were brainstorming, categorization and commenting the ideas, and finally clarification and specification of the ideas. The second phase of the study was prioritizing the business concept proposals by combining the innovations into groups and evaluating their importance in an e-commerce business model. The ideas were prioritized in a new expert session to fit the purposes of the parties involved.
Publication 3 is solely based on public data. The data is gathered from financial statements and investor relations sections on the companies’ Internet pages. The material is information on the case firms’ products and services as well as on their partners, alliances, competitors and customers. Publication 5 is partially based on similar public material but it also contains data from research reports concerning multi-play offerings and data from the customer value model.

4.4. Data analysis

The Analytic Hierarchy Process (AHP) has been used in analyzing the customer value preferences in Publications 1 and 5 and also in Publication 1 to analyze the realization of the value attributes in case services. The idea of the AHP is to decompose a decision problem into a hierarchy of parts. According to Saaty (1999), by structuring a system into clusters and subdividing clusters into smaller pieces, it is possible to form a complete picture of the whole system. The hierarchy is formulated by starting from the goal of the decision-making and proceeding to objectives and covering them. The single elements of the problem are compared to each other with respect to a parent element. A pair-wise comparison is used throughout the hierarchy to derive the priorities of the elements. Finally, the performance of each alternative is evaluated with respect to objectives. One advantage of the analytic hierarchy process is that it provides a rational way to conduct expert opinions by taking into account the inconsistency of judgment. It also harmonizes the comparison between tangible and intangible measures by allowing the usage of a verbal linguistic scale in the assessment. (Saaty, 1999; Wang et al., 1998)

In this study the Quality Function Deployment (QFD) process is used to connect the customer value preferences (whats) to the value streams of the business model (hows) in Publication 5. QFD is an analytical tool that is designed to convert high level business objectives (what the business stakeholders want), into processes (how the business delivers those whats) (Clegg and Tan, 2007). QFD is also a method for converting customer demands into quality characteristics and for developing product design by systematically deploying the relationships of customer demands and product characteristics (Lee and Ko, 2000).
The qualitative public data in several cases has been analyzed with a business model framework to construct a business model. In Publication 4 the business concept ideas were analyzed with Chesbrough’s (2003) business model framework. This framework suffers from the problems mentioned in Chapter 3.2 and therefore the business mapping framework based on Allee (2000) and Timmers (2000) was developed in Publication 2 and used in Publications 4 and 5 to map the business models.
5. REVIEW OF THE RESULTS

The results of this dissertation realize through the Publications (see Figure 1 in Chapter 1.3). In this chapter the results and contribution of the Publications are discussed and linked to the research questions, propositions and the conceptual framework. Shortly summarized and discussed in the following, the Publications contribute to different aspects in connecting customer value to firm resources.

5.1. Publication 1

The role of the article “Network Dynamics and Developing Business Models: A Conceptual View” is to answer Sub-question 1: How do the basic economic theories explain the ICT value network dynamics? The article also grounded the theoretical framework presented in the chapter 3.5.

The focus of this article is on analyzing the economic theories explaining the change in the value network and business models on a conceptual level by using a case study approach. The effects of network dynamics on business models are demonstrated with a simple case of a value network for a mobile multi-player game. The case includes three phases of evolution and each of them has effects on the business models of the actors and the structure of the value network. The aim of this Publication was to explain the role of network dynamics on the development of the business models and the value networks of the mobile gaming industry.

The economic theories were applied in a case of a mobile multi-player game and its value network. Transaction cost economics was used to explain the structure and formation of the value network. The market power theory explained the different power relations between the firms, and the game theory was used to explain the role of network dynamics in the development of the industry. Reviewing the case as a whole, it can be said that the make-or-buy decision is the first force that starts the formation of the network. The change in the value network was caused by the decisions made by the
players (firms) that have some negotiation (monopoly/market) power against other firms. The decisions are based on the players’ strategy, which ultimately aims to achieve as much monopoly power in the industry as possible. The purpose of this case study was to construct a theoretical framework as a starting point for the research. The main conclusion of this study was that the intra-firm perspective should be studied more profoundly to understand the dynamic nature of the value network. Moreover, the study revealed that the customer demand was one of the key drivers in the case network’s dynamics.

5.2. Publication 2

This chapter summarizes the contribution of the article “Applying a Customer Value Model in Mobile Communication Business”. The role of this article is to answer Sub-question 2: How can customer value preferences related to the product or service be efficiently identified? The article also contributes on the theoretical framework by presenting a construct to analyze the customer value preferences.

The objective and research problem of this Publication was to apply a customer value model for analyzing the customer’s values that drive and explain the changes in the business model and on entire value network levels. The paper sheds light on the business-to-consumer perspective of the service quality in communication services. The aim of the empirical part of the paper is to rate customer values in mobile communication systems and to analyze what communication system best realizes the desirable values. The Delphi method is used to formulate the customer value model. The Delphi is implemented by using a web-based questionnaire, and the responses are then analyzed with the analytic hierarchy process. The value evaluation is made by using the pair-wise comparison technique, where each attribute is compared to another to find out the preference order.

As a result, the paper provides an improved customer value model for understanding customer value preferences and their connection to the value creation in networks. The
contribution of this paper is a framework for analyzing customer value preferences and their realization in different communication systems. The study revealed the critical user values and the different attributes related to communication services. In this study, the Delphi method, implemented with the analytic hierarchy process, has proven to be a powerful and valid method for evaluating complex customer preferences. It has also provided insight into the formulation of different user profiles in mobile services. From the standpoint of this dissertation Publication 2 provides a method for identifying customer value preferences when designing business models. This information can then be used in a company’s R&D processes and new business development. The model presented in this Publication is also used in Publication 5.

5.3. Publication 3

The role of the article “Mapping business: value stream based analysis of business models and resources in ICT service business” is to answer Sub-question 3: How can the business model be mapped in a networked environment? The Publication presents a method and semantics for business model mapping.

The concept of business model is unestablished and many attempts to define it have been quite managerial. The existing frameworks do not combine resources with the business model in a sufficient way. This article contributes to the business model literature (Allee, 2000; Hamel, 2002; Pateli and Giaglis, 2004; Timmers, 2000) by introducing a systemic, value network based definition of the business model and its resources. The framework also allows such dynamic consideration of the business model where changing an element of the system does not require a totally new system.

The main idea of this article is that emerging business models have become more complex through the increasing interdependencies between actors in value networks. This article presents a comprehensive exploration of value streams and the interdependent nature of value streams, as well as their enablers (resources) in the industry value networks. The article introduces a value stream profile framework which extends the existing value stream based frameworks of Timmers (2000) and Allee
(2000) by connecting the resource to the value stream. Furthermore, the paper provides insights into and presents an analysis of case business models and concepts, their value streams and enabling resources. The framework is based on the idea of mapping the value stream structure systematically in a value network. It is based on i) identification of key actors in a value creating system, ii) mapping of tangible and intangible value streams between the actors, and iii) association of necessary resources and capabilities with the value streams. The main result of this paper is a methodology and semantics for business model mapping in value networks. The presented framework allows systematic mapping of a value network that also covers non-monetary transfers of value. The contribution of this article to the customer driven business model framework is the methodology for categorizing the value streams, actors, and resources into a business model. The method presented in this article is used in Publications 4 and 5.

This article concentrates on existing companies and their business models. To design new business a different approach is needed. The business concept innovation approach is presented in Publication 4.

5.4. Publication 4

The article “From business concept innovation to a business system: a case study of a virtual city portal” answers Sub-question 4: How can new business models be developed to fit customer preferences? The question is essential for creating and managing a customer driven business model. The question is approached by constructing a business system based on the results of a concept innovation process. This article also provides support to Proposition 1: “The business model can be designed or redirected by a business concept innovation process to meet the customer value preferences.”

This article briefly summarizes the business concept innovation process for two communal applications providing a basis for applying e-government services in cities. It also presents a business system of a Virtual City Portal aligned to create maximum value for the customer. The main argument of the article is that including the customer
into the innovation process and creating a business system based on value flows are the key elements of creating new efficient business models in electronic services. The article contributes to the customer centric business concept innovation literature (see e.g. Chesbrough, 2003; Hamel, 2002; Thomke and von Hippel, 2002) by applying the Delphi method in the business concept innovation process. It applies the business mapping method of Publication 3 in the analysis of the results of the customer need assessment. The paper provides a method for creating a detailed business model from ideas and also to form business models from applications and business concepts. The process of creating business models from business concept ideas is critical when considering the management of the firm’s business model especially when the customer perceptions change. In the context of this dissertation the main contribution of this article is the comprehensive method and process for managing the transformation of a customer driven business model. This article widens the scope of the business mapping framework from the analysis of existing business models to new business development.

5.5. Publication 5

The article “Transforming customer values into value network of multi-play operator – a resource based approach” provides insights into Research question 5: How are customer value preferences related to the elements of the business model and value network? The question is probably the most critical one in this study because the answer clarifies the customer related change mechanism of a business model. This article supports Proposition 2: “By identifying customer value preferences and their connection to the firm resources the business model can be streamlined to better serve the customer.”

The article is anchored to the well noticed research gap of the resource-based view. The resource-based view lacks an explicit explanation of how the resources of the firm are connected to customer value in a value network context where the end-customers’ demand drive the supply side, and actors are integrated into each other with complementary resources (Srivastava et al., 2001; Wernerfelt, 1984). In brief, the attempt is to explore the transformation of customer requirements into business models,
and resources and capabilities with the special characteristics of an integrated multi-play offer. In general, the matrix presentation follows the quality function deployment principle for assessing correlations. The conclusion is that one of the most valuable service elements for customers is provided with resources that are not controlled by the multi-play operator. Furthermore, most of the service elements are produced with the resources of other players in the network. The multi-play operator is thus dependent on the other players in the network. The major contribution of this study is in bridging the research gap of the resource-based view by proposing an integrated approach for transforming customer value into resources. In the context of the customer driven business model, the contribution of this paper is a framework that provides a novel approach for transforming the customer requirements into a value network of actors through the business model.
6. DISCUSSION AND CONCLUSION

The objective of this dissertation is to provide a business model framework for explaining the logic of change caused by changing customer value preferences. Moreover, this dissertation provides different tools and processes for analyzing customer value, constructing and analyzing business models, business concept innovation and resource analysis.

The main research question of this dissertation is: how should the changing customer values be taken into account when planning business in a networked environment? The main question is divided into five sub-questions: i) how do the basic economic theories explain the ICT value network dynamics, ii) how can customer value preferences related to the product or service be efficiently identified, iii) how can the business model be mapped in a networked environment, iv) how can new business models be developed to fit customer preferences and v) how are customer value preferences related to the elements of the business model and value network? The Publications 1 to 5 present constructs as approaches to these questions.

The constructs presented in the Publications are connected to each other with two propositions: 1) The business model can be designed or redirected by a business concept innovation process to meet the customer value preferences. 2) By identifying customer value preferences and their connection to the firm resources the business model can be streamlined to better serve the customer. Proposition 1 is tested in Publication 4 and Proposition 2 in Publication 5.

The results and findings of this dissertation are discussed in the following. First the theoretical contribution of this study is discussed, second the managerial implications are presented, third the issues of reliability, validity and generalization of results are considered, and finally the limitations of this study and future research areas are discussed.
6.1. Contribution

The main contribution of this dissertation is bridging the gap between firm resources and customer value. This has been done by theorizing the business model concept and connecting it to both the resource-based view and customer value. This dissertation contributes on the resource-based view, which deals with customer value and firm resources needed to deliver that value but has a gap in explaining how the customer value changes should be connected to the changes in key resources (Clulow et al., 2007; Srivastava et al., 2001; Wernerfelt, 1984). This dissertation provides a theoretical framework of the customer driven business model and tools as well as methods for its implementation and management. The significance of this dissertation partly realizes through the five Publications the contribution of which is reviewed in the following.

In Publication 1 economic theories were applied in the case of a mobile multiplayer game and its value network. Transaction cost economics was used to explain the structure and formation of the value network. The market power theory explained the different power relations between the firms and the game theory was used to explain the role of network dynamics in the development of the industry. Reviewing the case as a whole, it can be said that the make-or-buy decision is the first force that starts the formation of the network. The change in the value network was caused by the decisions made by the players (firms), who have some negotiation (monopoly/market) power against other firms. The decisions are based on the players’ strategy, which ultimately aims to achieve as much monopoly power in the industry as possible.

The customer value preference framework of Publication 2 is based on the grounding theoretical frameworks for measuring service quality (Gardner, 2001; Garvin, 1987; Ulaga and Chacour, 2001) with the characteristics of information service attributes. Customer preferences are usually derived from surveys with many customers. Large samples are, however, not always a prerequisite (Gardner, 2001). For example, in the studies on the lead user method in developing new product concepts (von Hippel, 1986), it was found that a small number of lead user experts can provide essential information
for development purposes. Similar implications have been found in the literature of expert judgments such as the Analytic Hierarchy Process (AHP) (Saaty, 1999). In this study, the Delphi method (Linstone and Turoff, 1975) implemented with AHP has proven to be a powerful and valid method for evaluating complex customer preferences.

As stated earlier the current literature is missing holistic frameworks for analysis of value creation in large business systems. The presented approach of Publication 3 fills this gap. It is based on the idea of systematic mapping of the value stream structure of a value network (Allee, 2000; Timmers, 2000) and the analysis of the resources enabling (Bowman and Ambrosini, 2000; Wernerfelt, 1984) the value streams. However, it must be emphasized that the construction of useful semantics (as claimed by: Pateli and Giaglis, 2004) for the value stream map is an important aspect of the framework.

Publication 4 contributes to the customer centric business concept innovation literature (see e.g. Chesbrough, 2003; Hamel, 2002; Thomke and von Hippel, 2002) by applying a Delphi process to the customer need assessment (Laaksonen, 2005) and combining the results of the process into a business mapping process (Allee, 2000; Timmers, 2000). The process used in formulating the business possibilities for these applications is well suited for managing application service development when the approach is innovation based and the application already exists. The Publication 4 also provides support to Proposition 1: “The business model can be designed or redirected by a business concept innovation process to meet the customer value preferences.”

Publication 5 concentrates on the research gap in linking customer requirements with the value streams of actors in a business model and especially with actor resources and capabilities (Clulow et al., 2007; Wernerfelt, 1984). The major contribution of this study is in bridging this gap by proposing an integrated approach for transforming customer value into resources. The framework presented in this paper provides a novel approach for transforming customer requirements (Ulaga and Chacour, 2001) through the mapped business model (Allee, 2000; Timmers, 2000) into actors’ resources (Bowman and Ambrosini, 2000) in the value network. This article supports Proposition
2: “By identifying customer value preferences and their connection to the firm resources the business model can be streamlined to better serve the customer.”

The dissertation also contributes to the methodology of analyzing customer value preferences (Ulaga and Chacour, 2001), mapping business models (Allee, 2000) and their resources, generating business models with the business concept innovation process and transforming customer values through the business model into the resources of different actors in the network.

6.2. Managerial implications

The framework and constructs have several practical implications for firms. The customer driven business model framework is useful when conceptualizing business opportunities or developing existing business. The business mapping framework can be used as a visual support tool in the planning or innovation process of new business. It allows the visual creation of the value network in workshops and helps to communicate the structure of the business throughout the company. The customer value model can be used to align the business model with customer value preferences. After analyzing the customer value preferences, the knowledge can be transferred to the business model to see the importance of its elements. Because people usually have different preferences it is important to align the business model according to the selected groups of customers. The customer value model allows the segmenting of the customer according to their preference profiles. The framework also helps in recognizing critical resources and capabilities in delivering the preferred value to customers. If the critical resources and capabilities are not owned by the firm it is essential to know the sources of these resources and capabilities in the network. This analysis helps the make-or-buy decisions in the value network.

The managerial capability to renew and redesign the business model according to changing customer value preferences is important in global competition. When establishing new business, customer information is used to generate business concepts
that offer customer desired value. Following Proposition 1 “The business model can be
designed or redirected by the business concept innovation process to meet the customer
value preferences”. This refers to the capability to manage the change process of the
customer driven business model. Furthermore, it is important to know who in the value
network possesses the resources that the new or changed business model needs if not
owned by the firm. These problems are related to Proposition 2.

When considering functioning business, customer information has to be continuously
monitored. When changes are noticed, the new preference profiles are analyzed with the
framework of Publication 5 to see whether or not they change the importance of the
elements of the offering. If the importance order of the elements in the business model
is changed moderately, the situation can be corrected with, for example, a new kind of
marketing message. However, if the customers prefer elements that the business model
does not have or the importance order is changed radically, the business model has to be
redirected.

When establishing or redirecting the business model according to the customer value
preferences, it is essentially important to identify the critical resources in creating the
preferred value. It is also important to know who in the value network possesses them if
not owned by the firm. These problems are related to Proposition 2: “By identifying
customer value preferences and their connection to the firm resources the business
model can be streamlined to better serve the customer.”

6.3. Reliability, validity and generalization of results

The reliability of the case study stems from the strict following of case study principles
(Stuart et al., 2002). Following the principles allows other researchers to repeat the
process. This study follows the basic steps of case study research illustrated in Chapter
4. In addition, the use of methods, like the Delphi, in data gathering and both the
analytical hierarchy process and the quality function deployment in the analysis are to
raise the reliability of the results.
As mentioned earlier, the validity testing of the constructs should be done by using the market mechanism that includes two stages: the weak and the strong market test (Kekälä, 2001). Kasanen et al. (1993) argue that even the weak market test is very demanding and hard to pass. The constructs used in this dissertation have been exposed to market tests by discussing and offering the results to the managers of the firms participating in the research projects. The constructs of the customer value model and business mapping framework have raised positive interest and they have been adapted to the strategic offering conceptualizing process at the corporate strategy level in a large multinational firm, which means that the weak market test is passed (see: Mikkonen et al., 2008).

The generalization of case studies has to be done with certain cautiousness. Lukka and Kasanen (1995) argue that the generalization of constructive case studies can be conceptual frameworks, descriptive models, explanatory models and prescriptive models. As the objective of this study was to provide a framework and tools for creating and managing the customer driven business model, the results of this study are also mainly frameworks and methods that can be applied in new contexts with certain limitations. The limitations and future research areas of the study are discussed in the following.

6.4. Limitations and further research

The limitations of this study stem from the general issues related to case studies and the constructive research approach. Some of these limitations are potential points for further research. It should be remembered that the context of this study is the turbulent and evolving industry of ICT and it is possible that the frameworks do not apply in other kinds of industries. Moreover, the context of this study is in the developed countries with a high standard of living and this is reflected in the customer values. The unit of analysis is a business model, so the generalization only applies to business models, not actual firms. The issues limiting the use of the results and constructs are discussed in the following.
The conceptual framework of a customer driven business model only considers the change factors of customer value and business concept innovation. There are several possible factors, such as regulation, that are affecting the dynamics of business models that have been ruled out from the analysis. This is also a potential area for further research.

A general limitation of this study and also a relevant research direction is the sample size of the panels. Future research should also be conducted with a larger sample size in order to generalize the findings. The future research directions of this study can be divided into two main categories: improving the customer value model and deepening the resource analysis. The customer value model can be improved by adding more customer profiles into the analysis and by linking supplier strategy attributes with the investigation of what resources and capabilities a firm should own, develop and outsource. The resource analysis can be improved by developing the quality function deployment model and going deeper into the resource criticality analysis and the resources of other players in the network. On the whole, the value preferences need an explicit connection to the value network strategies.
REFERENCES


SECTION II
THE PUBLICATIONS
Network Dynamics and Developing Business Models: A Conceptual View


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Network Dynamics and Developing Business Models: A Conceptual View

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Abstract—A mobile Internet market is merging from the Internet and mobile communications markets. The convergence of these industries causes constant change, when the firms seek continuously new business opportunities. The change can be seen in the industry structures and the power relations of the firms, which on conceptual level means changes in the value network structures of the industry. These changes have effects on the business models of the firms in the value network. In this paper we focus on analyzing the economical effects causing the change in the value network and business models on conceptual level by using a case study approach. We demonstrate the effects of network dynamics on business models with a simple case scenario of a value network for a mobile multiplayer game. The case includes three phases of evolution and each of them has effects on the business models of the actors and the structure of the value network. The aim of this paper is to explain the role of network dynamics on development of the business models and value networks of mobile gaming industry.

I. INTRODUCTION

A mobile Internet market is merging from the Internet and mobile communications markets. The convergence of these industries causes constant change, when the firms seek continuously new business opportunities. Mobile multiplayer games are a good example of the convergence that is causing change in Internet and mobile communications market. The change that can be seen in the industry structures and the power relations of the firms is caused by many different factors, e.g. political, economical, social, technological and environmental (PESTE). We focus on analyzing the economical factors that cause the change. In this study we focus on explaining the economical factors behind the network dynamics.

We ground the analysis on basic economic theories and analyze how they linked with the mobile multiplayer game industry. Network dynamics is analyzed on the business model and value network level. We demonstrate the effects of change with a simple case scenario of a value network for a mobile multiplayer game. Our case includes three phases of evolution and each of them has effects on the business models of the firms and the structure of the value network. The aim of this paper is to explain the role of network dynamics on development of the business models and value networks of mobile gaming industry.

II. THEORETICAL BACKGROUND

First we introduce the transaction cost economic theory (TCE) and its linkage to the value network forming. The birth of TCE can be traced to R.H. Coase’s article, “The Nature of the Firm” [1]. The second theoretical view is the imperfect competition and market power. Where the TCE theory explains the existence of the firms and value networks, the Market (Monopoly) Power Theory (MPT) [see e.g.: 2] explains the competition and power relations between the firms in the value networks. The third approach is the Game Theory (GT) by John von Neumann and Oskar Morgenstern [3], which we use to explain the network dynamics.

A. Transaction Cost Economics

Transaction costs can be divided into outsourcing costs and management costs. Outsourcing costs are, for example, related to searching, planning, negotiating, monitoring, and enforcement, while management costs are, for example, related to administration, control, monitoring and costs of inefficient organization structures [4]. A firm can organize all transactions internally or buy them from some other firm. Internal organizing is a good choice to some point, but when the firm size grows the efficiency of internal transactions decreases. In other words, when a firm grows it will face costs caused by the decreased efficiency. Taking these transactions to the market causes also some costs to a firm. According to Coase [1], a firm acquires the needed transactions from the market when the costs caused by decreased efficiency become bigger than the costs of carrying out the transactions in the open market. The decision, whether to make or buy leads to a transaction between two firms. When the number of transactions and firms increases, a business network of firms is formed.

Transaction has traditionally been viewed only as a source of costs. Blomqvist et al. [4], however, define transaction as a contract between parties, which aims to create joint surplus through cooperation to benefit all parties concerned. Benefits of cooperation come, not only, from sharing the costs and risk [5], but also from generating new knowledge and innovations and learning from them [4].

B. Market Power Theory

Normally markets are not perfect in real life. Firms operating in a market have more or less monopoly power over the other firms. Globalization of markets, regulation policy, especially in North America and in Europe, and the strict definition of a pure monopoly make it, however, almost as theoretical case as perfect markets. This means that the real markets exist somewhere in the middle of a perfect market and pure monopoly situation. Despite these facts, firms’ strategies and business models are generally aimed to achieve a temporary monopoly in their market [6,7]. Inside one industry there are firms that have different power
relations with each other. Market Power Theory (MPT) explains two cases of competition between perfect competition and monopoly. These are monopolistic competition and oligopoly.

The idea of a monopolistic competition market structure can be originated to Joan Robinson's "The economics of imperfect competition" [8] and to Edward H. Chamberlin's "A theory of monopolistic competition" [9]. Monopolistic competition is a situation much like perfect competition, with a distinction that in monopolistic competition the products of firms are heterogeneous [e.g. 2]. We consider the game development market as a monopolistic market because there are a great number of small game developer firms that have more or less differentiated games. The game device manufacturing is also considered as a monopolistic market, although the firms are quite big.

Oligopoly is a market dominated by a few big firms [e.g. 2]. The products of oligopolies can be identical or differentiated, though oligopolies often differentiate their products so that they are "unique" in the eyes of the customers. These "unique" products, however, serve the same customer needs than those of competitors. We regard the market of service operators and game publishers as oligopolistic because in both markets there are a few big firms that dominate the market.

C. Game Theory

Game Theory analyses the behavior of decision makers, so called players, whose choices affect one another. In a game, there must be at least two players whose decisions have an influence on each other. The game begins by one or more players making a choice, or "move", among a number of specified alternatives. Following the choice or choices, a certain situation results determining which player makes the next move and what alternatives are open to that player. The choices made by some or all of the players may or may not become known; therefore, when it is the next player's turn to make a move, the information each player has about the previous choices of all other players must be specified. There is a termination rule determining when the possible plays of the game are completed. Finally, each situation defining an end of a play determines a payoff to each of the players. The game allows for chance moves by nature (uncertainty), but if nature intervenes in the game, it is considered a dummy player in the game deriving no payoff. [10;11]

There are two disciplines of decision-making, individual and interactive, and they have an important distinction between them. In the individual decision making the goal is to find a clear optimal decision but in the interactive decision-making, the meaning of an "optimal decision" remains unclear, because no player completely controls the final outcome of the interaction. In the interactive decision making the Game Theory concerns both of the conceptual issues; defining the problem before providing procedures for solving the problem. It defines "solution concepts" to various classes of interactive decision-making situations. Solution concepts are divided in terms of a basic distinction between cooperative games and non-cooperative games. The non-cooperative approach focuses on the strategic choices of players – how they play the game and what strategies they choose in order to achieve their objectives. The cooperative approach focuses on the options available to a group of players – what coalitions to form and how their members disburse their joint payoff. The former is also strongly influenced by the details of the interactive process and the rules governing the game [10;11].

In this paper we have approached the effects of network dynamics on a mobile multiplayer value network through the game theory. We concentrate on the cooperative game. We regard partnership as a specific case of cooperative game. We also notice that the value network that is formed around a specific product or service is a coalition and so an example of cooperative game. Competition between value networks is considered as non-cooperative game and it is not discussed in this paper.

III. Value Network

The Internet has reduced especially the transaction costs of outsourcing, but also those of management. This has lead to an increasing number of business networks in the Internet and knowledge based industries. It is cheaper to buy the needed resources from the market than to make them inside a firm. In the value network there can be a number of different firms which all have different relationships with each other. Where Coase [1] has defined only two main relationship types (governance structures): markets and hierarchies (vertical integration), has Williamson [12] defined also an intermediate relationship type called hybrid. The hybrid structure can be defined as a partnership [4]. In the value network firms have different kinds of partnership and coalition relations with each other.

In business networks the business actors perform activities and create value through transforming resources such as know-how or capital [13]. In networked service development service is developed by a companies’ network that is a long-term, purposeful arrangement among distinct companies that allows them to gain competitive advantage over their competitors outside the network [14].

Cooperation between business actors occurs in business networks that change dynamically over time and usually lack a given centre [cf. for example, 15], although, in some cases one actor is the centre of the business network [16]. The value of a network increases in proportion to the square of the number of nodes on the network, which means that the more subscribers the network has the more valuable it is [17].

Wireless business networks are customer centric and deliver new, unique value [18]. Mobility is a unique function of a wireless system and means the end-users' ability to move freely from one place to another [19]. The business networks have the following benefits:

- zero inventory, distribution, product merchandising and marketing costs,

- lower marketing costs,

- lower transportation costs,

- lower inventory carrying costs,

- lower storage costs,

- lower overhead costs,

- lower insurance costs,

- lower employee turnover costs.
near zero product liability, content development, marginal growth costs and revenue risk, and focusing on networks makes the final total cost of the product/service lower because of the diminished transaction costs [14].

A functional business network requires much trust between the network partners, and this raises the question of how this can be created. Jarillo [14] considers that relating to partners that have similar values and/or a worse situation without the network can create trust. The juridical responsibilities of the network actors are defined by SLAs (Service Level Agreements).

In e-business communities a set of players (firms) with shared interests together seek market dominance within the industry environment (for example Wintel and Java). E-business communities differentiate on axes of economic control and value integration (see the Figure below). In the open market, i.e. agora, (for example eBay) anyone can buy/sell and no single entity is in control. On aggregation one company usually leads in hierarchical fashion, positioning itself between customers and producers. Distributive Network businesses are the infrastructure of the entire economy; they provide the backbone for the digital economy – communications, bandwidth, delivery services, banking services, etc. Alliances have no hierarchy in control; no one can force anyone to be a part of it, one can leave anytime. Instead, a few rules and standards evolve which governs how the Alliance works. In a value chain the focus is on process optimization and there is one primary company that maximizes value integration. [18]

Positioning a firm in a network and orchestrating its position in it is a challenge of the strategic leadership [20]. In other words, the aim of strategy (and business model) should be in creating a relative monopoly situation for a firm in its market [7].

IV. BUSINESS MODELS

In the value network there are lots of firms with different organization structures, which contain a different amount of market power and business relationships. A business model has become a common tool in describing the players’ (firms’) organizations and their linkages to the value network. Business model is quite recent term and it has many meanings. According to Cartwright and Oliver [21], a business model describes “how and where the firm engages in business, who its customers are, and often, who its major competitors are. Typically, the firm will also describe the major activities that it performs in the course of its business”. [21] Timmers [22] defines the business model as architecture for product, service and information flows, including a description of the various business actors and their roles; and a description of the potential benefits for various business actors; and a description of the sources of revenue [22].

The most of the existing business model frameworks concentrate on one part of the value generation (for example the extended value stream). For example, Hamel’s [6] business model framework combines the internal and external analysis of a firm’s value creation. It also includes the innovation aspect of the strategy formulation and it has the connection to the value network theory. Hamel’s business model framework is shown below in Figure 2.

![B-web typology](image-url)
V. CASE “BUSINESS PROGRESS IN TREASURE HUNTERS GAME”

We use an imaginary and simplified case scenario of a value network for a mobile multiplayer game “Treasure Hunters” to illustrate how the theories behind the business models and value networks are linked to mobile gaming business. In this study the industry level game begins when the game developer firm makes the first move by approaching the publisher. The starting point is imaginary, since there have been made a great number of decisions before this moment by this and other firms. The game, in this study, ends to a situation where the value network has six firms (players) and the end customer, although, the game could be followed to the eternity. The case presented here is, therefore, just a simplified, small fragment of a newer ending game in the industry.

A. Creation of Start-up Value Network

A small game developing company GFF – Game For Fun has a new bright, mobile, multiplayer game called “Treasure Hunters”, which can be played with modern, intelligent 3G phones. The game technology is new and it allows for millions of game users to play it simultaneously in the same game world. This novelty gives GFF some monopolistic power in the game developing market. GFF, however, becomes aware that the costs of internally organizing the publishing and delivery of the game are much bigger than the transaction cost of outsourcing these operations. GFF also benefits from the new knowledge that it can acquire from the partners. It can later use this knowledge to improve its business model and this is why it contacts game publishers to find a good channel to launch the game to users. A publisher GamePub offers the best deal for GFF, and they decide to co-operate. The game has begun.

GamePub is a big publishing firm that has published several successful games. It has a strong brand and good relationships with the other firms in the industry. These facts provide it with a certain amount of oligopolistic negotiation power in the game industry. The contract with GFF about publishing the “Treasure Hunters” game increases its negotiation power from before, but even a big firm like GamePub faces increasing costs of internal organizing, and as a result the game device manufacturing and the distribution of the game are outsourced. With the help of its market position GamePub is in a situation that it can choose its partners in delivering the game to the customers. GamePub decides to use the 3G intelligent communicator (InCom3G) manufactured by Ultimatum, and these firms form a partnership. The intelligent communicator offers a good development platform and it is also popular enough in the market (as a matter of fact, the “Treasure Hunters” game might significantly increase the market share, and consequently the monopoly power of InCom3G to make it the top one). Further, Ultimatum provides excellent support for further development of the game on their platform. After evaluating various possibilities to distribute the game GamePub comes to the conclusion that a wireless network service operator provides a best channel to distribute the game, as there are many synergy benefits to be achieved such as charging and billing, customer contacts, and customer care. Those are very much the same as in the business of providing wireless services. GamePub analyses different wireless service operators and negotiates with them. Service operator 3G4E is the best match, and they come to an agreement that 3G4E both hosts the game server and offers the wireless connections to the game server. Again a partnership is formed. Hosting the game comprises both running the game server and distributing the game to customers including management of payments.

Now, there is a properly working value network (coalition) for launching the “Treasure Hunters” game into the market, and big promotional events are organized. The first phase value network of the game is shown in the next Figure.

![Value network, phase 1](image-url)
B. Decision of Establishing a Fan Site

The “Treasure Hunters” game turns out to be a big success, and private fan sites are established in the Internet as users want to get more inside information and knowledge of the game and share their experiences with other users. GamePub carries out a market survey and finds out that an organized fan site might significantly increase both the number of users and the profit of the game. But again, organizing the hosting of a fan site inside the firm is more expensive than acquiring the service from the market. This is due to the reason that hosting a fan site is not in the range of GamePub’s business and, thus, it has no experience in it. GamePub explores various small companies offering fan site services. A small company called CraGa – Crazy for Games has the best offer, and they make a deal. GamePub pays a monthly fee for the hosting of the fan site, and in addition CraGa gets income by offering advertisement service for various companies. CraGa has now exclusive rights to run the fan site of the “Treasure Hunters” game. It collects statistical and other information about the fans and supplementary material for other actors to use. CraGa benefits from the agreement also by achieving monopolistic power against its competitors.

Now, there is an enhanced value network for further promoting the success of “Treasure Hunters” game. This causes changes in the business models of GFF and GamePub. The second phase value network of the game is shown in the next Figure.

C. High Usage of Game Promotes a Start-up Company

As the popularity of the game increases and more users join the game community, the more resources the game hosting requires. 3G4E soon realizes that game hosting could be more efficient if it were organized outside the firm. But as it seems to be a profitable business, 3G4E does not want to give it away. Therefore, 3G4E establishes a start-up company called S4E – Service for Ever. All the personnel and equipment (servers and software, etc.) including game hosting are transferred from 3G4E to S4E. This creates a new upgraded value network, which better serves the further development of the “Treasure Hunters” game by providing fitter business environment and more efficient money flow and customer support. This also causes changes in the business models of 3G4E, GFF, GamePub and CraGa. Here is where we end the industry level game. The third phase value network of the game is shown in the next Figure.

VI. CONCLUSION

The economic theories were applied to a case of mobile multiplayer game “Treasure Hunters” and its value network. The TCE was used to explain the structure and formation of the value network. The MPT explained the different power relations between the firms and the GT was used to explain the role of network dynamics in the development of the industry.

Reviewing the case as whole we can say that the make or buy decision is the first force that starts the formation of the network. The change in the value network was caused by the decisions made by the players (firms), which have some negotiation (monopoly/market) power against other firms. The decisions are based on the players’ strategy, which ultimately aims to achieve as much monopoly power in the industry as possible.

The structure of the value network is centered in the beginning when the game is new and the business roles are not sophisticated. When the “Treasure Hunters” game becomes more popular and the roles clearer, the value network starts to expand. The firms realize that, for example in phase 2, operating a fan site is a clear business model and the internal organizing becomes more expensive than buying the service from the market (outsourcing). TCE-based decision-making has effects on the business models of the firms. When a firm decides to outsource some parts of its business model, it simultaneously focuses its business model on a clearer and more specific business area and creates business opportunities for other firms. Vice versa, when a firm acquires some business concept from market and includes it into the existing business model, it widens the scope of its business and increases the monopoly power of the business model.

The goal of a firm’s strategy and business model is to achieve monopoly power in its market. However, in
monopoly position, even though it outsources some parts of its business (like the fan site in the case). The next Table summarizes the impacts of economical factors on development of business models and value network.

### TABLE 1. NETWORK DYNAMICS.

<table>
<thead>
<tr>
<th>Change drivers</th>
<th>Focus of the change</th>
<th>Business models</th>
<th>Value network</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transaction Cost Economics (TCE)</td>
<td>TCE based decisions either widen the BMs or simplify them, depending on the maturity of the industry.</td>
<td>Changes in existing business models (BM):</td>
<td>Structures of the network:</td>
</tr>
<tr>
<td>Market Power Theory (MPT)</td>
<td>By aiming towards a monopoly, the firm simultaneously strengthens its BM in some level (see Figure 3) that increases the monopoly power.</td>
<td>New business opportunities:</td>
<td>Make or buy decision originates the birth of the value network. TCE also defines the scope of the network.</td>
</tr>
<tr>
<td>Game Theory (GT)</td>
<td>Decision making is based on the TCE and MPT, therefore they define the changes in business models.</td>
<td>Decisions of outsourcing based on TCE, and choices about the potential partners create new opportunities.</td>
<td>TCE and MPT are the driving forces in decision making and therefore behind the developing structures of the value network.</td>
</tr>
</tbody>
</table>

This paper has shed light on the economical factors causing change in the mobile multiplayer game industry but also opened some issues that demand further research. Here we have looked the mobile multiplayer game industry from the market’s perspective. The economic dynamics of the market, however, do not explain how a firm can achieve a monopoly position in the market. The next research topic will address the intra-firm aspect as a driving force of the industry change. Also the non-cooperative game between coalitions should be included in this framework.

### REFERENCES

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Applying a Customer Value Model in Mobile Communication Business

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Abstract: Communication services are currently confronted with large changes due to the price erosion of services and entering new service providers. The gap is filled with different services that are hoped to be successful in the near future. The problem, however, is that firms do not necessarily know what their customers value. One solution to the problem is applying a Customer Value Model in firms business. This paper applies the Delphi method to formulating the Customer Value Model which is implemented by using the Analytic Hierarchy Process. The result is a model for understanding customer value preferences which includes the relative value preferences of the value elements and their attributes, the preference profiles for deeper segmentation of customers, and finally the performance analysis of the case systems.

Keywords: Mobile communication services, customer value, customer value model, customer value audit, business model, value network, Delphi, analytical hierarchy process.


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1. Introduction

Mobile communication services can be understood as services and devices that enable the information and communication transfer between persons. These kinds of services are currently confronted with large changes due to the price erosion of services and entering new service providers. These new services are often based on Internet technologies such as Voice over IP (VoIP) applications. The gap is filled with different services that are hoped to be successful in the near future. The problem, however, is that firms do not necessarily know what their customers value. This leads to creating services with no users and to even greater problems. On the other hand some of the current business models in communication services are not vital in situations where customers value services above low prices. For example, service operators have adjusted their business to allow low prices by cutting R&D operations down and downsizing the staff. If customers’ preferences drift towards services, the operator cannot provide these, firstly because of the ignorance of the changed situation and secondly because of the lack of capability to provide new services. It can be assumed that in the changed situation some other party has the capability to act.

There are several investigations in the research literature on the usage of service quality attributes in measuring the information system (IS) service quality (see e.g. Pitt et al, 1995). Recently, the research focus of IS service quality has extended to cover also the ASP (Application service provider) environment (MA et al., 2005). This has been mainly due to extensive outsourcing of IS services. Nevertheless, these applications are mainly focused on the business-to-business environment, where rational organizations evaluate the service value. The increasing amount of IS and communication services are, however, provided to the consumers. Our paper sheds light on the business-to-consumer perspective of service quality in communication services.

One solution to these above mentioned problems is applying a Customer Value Model (CVM) with the Customer Value Audit (CVA) (Ulaga and Chacour, 2001) process. The aim of the CVA process is to integrate the customer with the R&D process of the firm. Integrating the customer into the process generates value to the customer, but the real challenge is how the firms can benefit from this as well.

1.1. Scope of research

The objective and research problem of this study is to apply a CVM for analyzing the customer’s values that drive and explain the changes in the business model and on entire value network levels. The overall framework is presented in Figure 1.
Applying a customer value model in mobile communication business

In the framework, the proposition is that the dynamics between present and future business model scenarios are driven by the development of different customer value profiles. Further, these profiles are comprised of the combination of various customer value attributes. To reveal the real preferences of the customer of mobile communication services, a case of two mobile communication service systems was established. The following characters of these communication systems were taken into the analysis: voice service, contact information management, status service, file transfer, call screening, and SMS/instant messages.

![Figure 1. The research framework](image)

The aim of the empirical part of the paper is to rate customer values in mobile communication systems and to analyze what communication system best realizes the desirable values. We use the Delphi method to formulate the CVM. The Delphi is implemented by using the Analytic Hierarchy Process (AHP). The value evaluation is made by using the pair-wise comparison technique, where each attribute is compared to another to find out the preference order. As a result we provide an improved customer value model for understanding customer value preferences and their connection to the value creation in networks.

2 Customer value analysis

2.1 Creating value in networks

From the value network perspective, the concept of value creating system has been added in the strategic management literature to illustrate the entire set of activities and companies linked to produce value for both the end-customers and the actors in the system. According to Normann and Ramirez (1993), “the focus of strategic analysis is not the company or even the industry but the value-creating system itself, within which different economic actors – suppliers, business partners, allies, customers – work together
to produce value.” By this definition, customer preferences are an important element in the value network of actors, since the value is captured from customers (Bowman and Ambrosini, 2000). In consequence from the value networks standpoint, customer requirements and preferences are essential in order to understand the changes in value network structures.

A concept that is often related to value networks, and especially describing the firms in them, is business model which is briefly a description of how the firm does business (Magretta, 2002). According to Cartwright and Oliver (2000), a business model describes “how and where the firm engages in business, who its customers are, and often, who its major competitors are. Typically, the firm will also describe the major activities that it performs in the course of its business” (Cartwright and Oliver, 2000).

The value in the network is ultimately brought in by the customer who purchases the product or service because it has elements that the customer considers valuable. The business model of a firm is in a central role in capturing this value. This is why identifying the elements of value and changes in the preferences of customers are critical for business. The efficiency and flexibility of the business model are essential for maintaining the competitive advantage.

2.2 Analyzing customer value

The aim of the customer value analysis is to integrate the customer with the R&D process of the firm. Although the idea is originally presented in a business-to-business environment, the basic idea can be transferred to the consumer markets as well (Thomke and von Hippel, 2002). One main view of the connection between the customer and the firm is the study of the customer need assessment (see e.g. Elfvengren et al., 2004; Kärkkäinen et al., 2001; Kärkkäinen and Elfvengren, 2002). In this view the aim is mainly to recognize the unrecognized needs of customers. The customer need refers to what customer ultimately wants. Customer value, on the other hand refers to what customer wants with certain limitations like money. Another approach for integrating the customer into the firm’s processes is the customer value view (Anderson and Narus, 1998; Flint and Woodruff, 2001; Flint and Woodruff, 1997; Thomke and von Hippel, 2002; Ulaga and Chacour, 2001). This view is also linked to the value creation of firms which makes it more suitable for this research.

Integrating the customer with the R&D process certainly generates value to the customer, but to capture the value generated, firms have to reconfigure their business models accordingly (Thomke and von Hippel, 2002). Building a CVM helps the firm to recognize the customer values and to modify the business model suitable for capturing them.

The CVM is a data-based representation of the worth (in monetary terms) of the product or service to the customer (Anderson and Narus, 1998). Although the value in the CVM should be addressed in monetary terms, we approach the concept of value from a wider point of view. We use the value definition of Flint and Woodruff (1997) who argue that value is either received value or desired value. Received value is the value that the customer actually gets from a certain service. According to Flint and Woodruff (1997), the desired value is “the bundle of product attributes and resulting consequences, both positive and negative, and monetary and non-monetary, that the customer wants to happen.” We concentrate on the analysis of the customer-desired value. Flint and Woodruff (2001) also point out that the concept of customer-desired value should not be
Applying a customer value model in mobile communication business

mixed with the concept of personal value: personal values are abstract core beliefs that guide human behavior. Where personal values are generic and fairly stable, customer-desired value is more tied to a service or a product and it faces more changes (Flint and Woodruff, 2001). The value of some service to the customer is a subjective matter (Kortge and Onkonkwo, 1993), and it depends on the customer’s user profile, namely, the way he or she likes to use the service, or is used to using it. In a group of people with similar user profiles, the value of the service is quite comparable.

We use the CVA as a tool for applying a CVM. The CVA process has three phases: start-up, survey, and strategy formulation (Ulaga and Chacour, 2001). In this study we concentrate on the start-up phase of the CVA process.

3 Applying a customer value model

3.1 Establishing the case study

It has been stated (Saaty, 1980; Cheng and Li, 2001) that AHP and pair-wise comparison outweights the simple rating methods as it helps to ascertain the consistency of responses. We have chosen the AHP for two reasons. Firstly, the issues of value are profound, and reliable answers require deep thought into which surveys usually do not force respondents. Secondly, it may be hard to get differences in the answers because respondents do not have to pay attention to the consistency of their judgments relative to the other questions in the instrument. The pair-wise comparison has a built-in feature of choice making. When favoring one attribute of the pair, it means that the other one is not favored. For example, in this study within the pair security vs. prices, preferring security means that customer accepts higher prices. This represents the sacrifice side of the value; when favoring one attribute you have to give up some other attribute. Despite of the advantages of AHP, it is not possible to argue that customer surveys with larger sample size cannot provide better statistical validity and deeper insights to the customer satisfaction. In our study, however, the argument for using AHP method is on the connection of the application to the decision making, and the ability to test the attractiveness of alternative service and product offerings with the small amount of experts. Furthermore, the ability to conduct sensitivity analysis provides insights into changing priority weights of customer value attributes. This kind of sensitivity analysis is valuable in what-if scenario analysis based on the grounding assumption that the weights of customer value attribute changes in different future scenarios.

To formulate and test the CVM in practice, we have conducted a case study in mobile communication services. The case systems are specified as Skype Mobile and Smart Phone. Smart Phone is an ordinary phone with high quality data transfer and other advanced features, and it uses the mobile telecommunication network as an access network. The limitation is that this phone does not have a Wireless Local Area Network (WLAN) connection. Skype Mobile is a phone with above-mentioned features and the WLAN connection. This phone also has Skype application integrated into the operation system. Basically, the Skype Mobile can be any kind of VoIP application integrated into the mobile terminal.

We use the AHP decision model where each quality attribute is pair-wise compared with each other to find their relative importance order. The selection of the customer
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segment is the start point of building a CVM (Anderson and Narus, 1998). We have selected the consumer segment and formed a customer panel of lead users and advanced users of mobile services. According to von Hippel (1986), lead users are people who “face needs that will be general in a marketplace, but they face them months or years before the bulk of that marketplace encounters them, and ... are positioned to benefit significantly by obtaining a solution to those needs.” Advanced users are users that are experts on the subject of mobile services through their personal interests or their work.

The CVM can be opened and analyzed by defining the single attributes of value elements that can be technical, economic, service or social in nature (Anderson and Narus, 1998). Garvin (1987) has presented eight dimensions of product quality, which are performance, features, reliability, conformance, durability, serviceability, aesthetics, and perceived quality. The studies of service quality were furthermore applied to address the special features of services. For example, Parasuraman et al. (Parasuraman et al., 1985) have modified and added some intangible attributes in the assessment of services quality. These attributes include tangibility, reliability, responsiveness, assurance, and empathy among others. We have combined and modified these categories to fit the case of assessing services of mobile communication systems. The list of the modified value elements and their attributes is presented in Table 1.

<table>
<thead>
<tr>
<th>Value attributes of mobile communication system</th>
</tr>
</thead>
<tbody>
<tr>
<td>Availability of services:</td>
</tr>
<tr>
<td>1. Coverage of the network</td>
</tr>
<tr>
<td>The network can be used everywhere or just at some hotspots.</td>
</tr>
<tr>
<td>2. Reachability</td>
</tr>
<tr>
<td>Call receivers’ reachability. Relevant issues are e.g. is the device always on and is it in the network area. Networks available GPRS, UMTS, WLAN, etc.</td>
</tr>
<tr>
<td>3. Terminal updating</td>
</tr>
<tr>
<td>Easiness to take new services in use. Availability of device and software updates.</td>
</tr>
<tr>
<td>4. Size of network user base</td>
</tr>
<tr>
<td>Size of the device or software user base. Possible contacts.</td>
</tr>
<tr>
<td>5. Potential new services</td>
</tr>
<tr>
<td>Possible new services. The innovativeness of services.</td>
</tr>
<tr>
<td>Features and their usability:</td>
</tr>
<tr>
<td>6. Using the voice service</td>
</tr>
<tr>
<td>Ordinary call. Making the call, speaking, and ending the call.</td>
</tr>
<tr>
<td>7. Using the conference call</td>
</tr>
<tr>
<td>Telephone call among several people at the same time. Making the call, speaking, and ending the call.</td>
</tr>
<tr>
<td>8. Management of contact information</td>
</tr>
<tr>
<td>Numbers, names, addresses, etc.</td>
</tr>
<tr>
<td>9. Using the status services</td>
</tr>
<tr>
<td>Status affects the device’s signaling features. E.g. “in meeting” or “not available” have different signal tones. Can also be visible to caller e.g. Skype.</td>
</tr>
<tr>
<td>10. File transfer</td>
</tr>
<tr>
<td>Sending and receiving photos, text documents, etc.</td>
</tr>
<tr>
<td>11. Using the SMS/MMS/instant messages</td>
</tr>
<tr>
<td>Writing, sending and receiving messages.</td>
</tr>
<tr>
<td>Security:</td>
</tr>
<tr>
<td>12. Information security</td>
</tr>
<tr>
<td>Protection against eavesdropping. Anonymity. Personal data protection.</td>
</tr>
<tr>
<td>13. Call screening</td>
</tr>
<tr>
<td>The easiness of defining from whom or which number calls can come.</td>
</tr>
<tr>
<td>14. Trusting the service provider</td>
</tr>
<tr>
<td>Assurance of the service. Confidentiality of the customer data. Stability of the terms of contract.</td>
</tr>
</tbody>
</table>

Table 1. Modified CVM for mobile communication systems
Applying a customer value model in mobile communication business

15. Independency of the service provider
   Possibility to change the subscriber connection and use services provided by other service providers.

Costs:

16. Initial set-up
   Affordability of initial set-up. Purchasing the devices and software, setting up the connections.

17. Local calls
   Affordability of local calls.

18. International calls
   Affordability of long-distance calls.

19. Conference calls
   Affordability of conference calls.

20. File transfer
   Affordability of data transfer.

21. SMS (MMS)/ instant messages
   Affordability of messaging.

The Availability of services represents the service and Features and their usability the technical value element. The social element is taken into account in the Security category and the economy element in the Costs category. The attributes that illustrate the product quality dimensions are modified to fit the case services.

3.2 Methodology and process

We used the Delphi method to formulate the CVM by structuring communication between groups of people who can provide valuable contributions in order to resolve a complex problem (Linstone and Turoff, 1975). With the Delphi technique, participants state their opinions in an anonymous questionnaire (Ozer, 1999). The characteristics of a Delphi study are iteration, anonymity, controlled feedback, and group statistical response (Landetta, 2006).

The Delphi iteration rounds were implemented by using the AHP tool. The fundamental principle of the AHP is to decompose a decision problem into a hierarchy of parts. According to Saaty (1999), by structuring a system into clusters and subdividing clusters into smaller pieces, it is possible to form a complete picture of the whole system. The hierarchy is formulated by starting from the goal of the decision making and proceeding to objectives and covering objectives. In making the judgments, the elements of the problem are looked at in isolation, one element compared against another with respect to a parent element. A pair-wise comparison is used throughout the hierarchy to derive the priorities of the elements. Finally, the performance of each alternative is evaluated with respect to objectives. One advantage of the AHP is that it provides a rational way to conduct expert opinions by taking into account the inconsistency of judgment. It also harmonizes the comparison between tangible and intangible measures by allowing the usage of the verbal linguistic scale in the assessment.

For the first Delphi round, the model was formed into an anonymous web-based questionnaire where the attributes were placed as pairs so that every attribute was compared to another. This evaluation was performed by conducting a customer panel where experts made judgments of their relative preferences of the value attributes. The functionality of the AHP also allowed direct ratings to be made.

The final part of the case study addressed the fit between the value attributes and the selected two communication systems. The aim of this second Delphi round was analyze
what communication system best realizes the desirable values. This part was also based on the AHP tool where a group of experts rated the attributes’ realization in the case services. The group analyzed and discussed each attribute and decided which system best realized the attribute. The assessment was made on a scale from 1 to 9. Figure 2 presents the AHP model used in comparing the relative importance of the value elements and their attributes.

Figure 2. The AHP model of customer value elements

3.3 Customer panel data

The improved CVM was tested in an expert customer panel consisting of 14 users of communication systems and ICT researchers. The aim was to analyze how different options perform with different attributes.

Table 2 presents the value preferences of the customer expert panelists after AHP supported comparisons of the value attributes. The value preferences in the model present the relative weights of each attribute in the above hierarchy. The values of each of the panelists (p2–p14) have been illustrated in the table. P1 shows the combined values of group judgments. The combined value was calculated by using the mathematical algorithms in the Expert Choice AHP software.
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Table 2. Relative Value Preferences of Attributes in the Model

<table>
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<tr>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Availability of services</td>
<td>0.176</td>
<td>0.328</td>
<td>0.128</td>
<td>0.144</td>
<td>0.123</td>
<td>0.111</td>
<td>0.104</td>
<td>0.119</td>
<td>0.177</td>
<td>0.134</td>
<td>0.184</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coverage of the network</td>
<td>0.200</td>
<td>0.233</td>
<td>0.445</td>
<td>0.142</td>
<td>0.174</td>
<td>0.117</td>
<td>0.179</td>
<td>0.191</td>
<td>0.200</td>
<td>0.165</td>
<td>0.143</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reachability</td>
<td>0.389</td>
<td>0.067</td>
<td>0.307</td>
<td>0.142</td>
<td>0.237</td>
<td>0.101</td>
<td>0.245</td>
<td>0.191</td>
<td>0.230</td>
<td>0.179</td>
<td>0.143</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Price</td>
<td>0.154</td>
<td>0.076</td>
<td>0.154</td>
<td>0.076</td>
<td>0.154</td>
<td>0.076</td>
<td>0.154</td>
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<td>0.076</td>
<td>0.154</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size of network user base</td>
<td>0.123</td>
<td>0.114</td>
<td>0.285</td>
<td>0.142</td>
<td>0.237</td>
<td>0.101</td>
<td>0.245</td>
<td>0.191</td>
<td>0.230</td>
<td>0.179</td>
<td>0.143</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Features and their usability</td>
<td>0.224</td>
<td>0.290</td>
<td>0.121</td>
<td>0.107</td>
<td>0.232</td>
<td>0.208</td>
<td>0.163</td>
<td>0.080</td>
<td>0.269</td>
<td>0.215</td>
<td>0.193</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Using the voice service</td>
<td>0.426</td>
<td>0.419</td>
<td>0.336</td>
<td>0.257</td>
<td>0.266</td>
<td>0.457</td>
<td>0.585</td>
<td>0.461</td>
<td>0.382</td>
<td>0.212</td>
<td>0.416</td>
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<tr>
<td>Using the conference call</td>
<td>0.052</td>
<td>0.043</td>
<td>0.073</td>
<td>0.094</td>
<td>0.096</td>
<td>0.098</td>
<td>0.020</td>
<td>0.031</td>
<td>0.082</td>
<td>0.036</td>
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<tr>
<td>Management of contact information</td>
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<td>0.206</td>
<td>0.217</td>
<td>0.242</td>
<td>0.285</td>
<td>0.091</td>
<td>0.234</td>
<td>0.167</td>
<td>0.195</td>
<td>0.234</td>
<td>0.082</td>
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<tr>
<td>Using the data services</td>
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<td>0.114</td>
<td>0.028</td>
<td>0.060</td>
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<td>0.032</td>
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<td>0.031</td>
<td>0.044</td>
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<tr>
<td>File transfer</td>
<td>0.124</td>
<td>0.088</td>
<td>0.161</td>
<td>0.023</td>
<td>0.098</td>
<td>0.072</td>
<td>0.022</td>
<td>0.023</td>
<td>0.041</td>
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<td>File transfer</td>
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<tr>
<td>Information security</td>
<td>0.205</td>
<td>0.102</td>
<td>0.291</td>
<td>0.069</td>
<td>0.067</td>
<td>0.048</td>
<td>0.048</td>
<td>0.027</td>
<td>0.037</td>
<td>0.031</td>
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<tr>
<td>Information security</td>
<td>0.205</td>
<td>0.102</td>
<td>0.291</td>
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<td>0.048</td>
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<td>0.031</td>
<td>0.025</td>
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<tr>
<td>Call screening</td>
<td>0.119</td>
<td>0.078</td>
<td>0.037</td>
<td>0.093</td>
<td>0.172</td>
<td>0.156</td>
<td>0.172</td>
<td>0.047</td>
<td>0.169</td>
<td>0.025</td>
<td>0.071</td>
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<tr>
<td>Trusting the service provider</td>
<td>0.078</td>
<td>0.039</td>
<td>0.038</td>
<td>0.037</td>
<td>0.038</td>
<td>0.037</td>
<td>0.027</td>
<td>0.028</td>
<td>0.021</td>
<td>0.050</td>
<td>0.075</td>
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<tr>
<td>Independence of the service provider</td>
<td>0.023</td>
<td>0.028</td>
<td>0.046</td>
<td>0.121</td>
<td>0.225</td>
<td>0.101</td>
<td>0.123</td>
<td>0.104</td>
<td>0.156</td>
<td>0.206</td>
<td>0.402</td>
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<tr>
<td>Local calls</td>
<td>0.506</td>
<td>0.198</td>
<td>0.658</td>
<td>0.210</td>
<td>0.233</td>
<td>0.633</td>
<td>0.312</td>
<td>0.537</td>
<td>0.652</td>
<td>0.287</td>
<td>0.655</td>
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<tr>
<td>International calls</td>
<td>0.300</td>
<td>0.300</td>
<td>0.030</td>
<td>0.030</td>
<td>0.030</td>
<td>0.030</td>
<td>0.030</td>
<td>0.030</td>
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<td>0.030</td>
<td>0.030</td>
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<td></td>
</tr>
<tr>
<td>Conference calls</td>
<td>0.040</td>
<td>0.052</td>
<td>0.312</td>
<td>0.944</td>
<td>0.942</td>
<td>0.359</td>
<td>0.319</td>
<td>0.323</td>
<td>0.326</td>
<td>0.636</td>
<td>0.963</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>File transfer</td>
<td>0.149</td>
<td>0.078</td>
<td>0.262</td>
<td>0.165</td>
<td>0.164</td>
<td>0.351</td>
<td>0.127</td>
<td>0.179</td>
<td>0.240</td>
<td>0.538</td>
<td>0.805</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SMS (MMS)/instant messages</td>
<td>0.227</td>
<td>0.096</td>
<td>0.262</td>
<td>0.236</td>
<td>0.325</td>
<td>0.310</td>
<td>0.366</td>
<td>0.145</td>
<td>0.303</td>
<td>0.148</td>
<td>0.309</td>
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</table>

The data was gathered by conducting a pair-wise comparison between each cluster, for instance, the availability of services, and between single items of the value attributes inside the cluster, for instance, the coverage of the network. The panelists were asked to compare the relative importance of each attribute with respect to case mobile services. After the assessment, the AHP model was used to calculate the weighted preferences for each cluster of service attributes and the single items of the attributes.

4 Testing the CVM for mobile communication systems

4.1 Reliability

Inconsistency indicates the illogicality of the respondent (reliability), and it is automatically calculated by the used Expert Choice software. The inconsistency ratio for judgments ranges from 0 (= consistent) to 1 (= random). In normal conditions, good inconsistency is under 0.1; however, when the assessment is conducted as a survey, we accept a higher inconsistency ratio in the study. The study revealed that comparing the attributes is difficult even for an expert. The security element was the most difficult to piece together. The reason can be the ambiguous nature of the subject. Inconsistency was also the reason for eliminating one answer. Figure 3 shows the combined inconsistencies of the value elements.
4.2 Customer value preferences

Although the test group was technologically oriented, it valued the affordable cost above the other elements. Security was ranked second, even though, standard deviation was quite high implicating different opinions of the test group on this subject. The share of costs element in total value preferences is 39.5%. This is valued above other elements, however, the sum value of other elements (the benefit side) represents approximately 60% of the total value indicating the value potential of mobile communication services. The average preference weights of value elements are shown in Figure 4.

The average preferences of four main value elements were distributed rather evenly between the elements. Not surprisingly, costs were preferred significantly higher than other elements in the model. This implies the important trend of low-cost services. However, remarkable business potential was related to the relative high level of preference in all the explored value elements. For example, security as a service seems to provide a lot of potential. It should be noted that the prices of mobile services have dropped significantly in Finland in recent years, which has perhaps increased the relative importance of other value elements.
Applying a customer value model in mobile communication business

Inside the availability of services element the reachability and coverage of the network attributes were preferred. From the business perspective this means that seamless interoperability between networks and applications is critical in order to provide services. On the other hand, the potential new services attribute was not preferred. This can imply that it is hard to compare the potential of possible new services with existing ones. Also the issue of demand for new services is more related to the customer need assessment (see e.g. Elfvengren et al., 2004; Kärkkäinen et al., 2001; Kärkkäinen and Elfvengren, 2002).

In the features and their usability element, voice services and messaging dominated with over a 60-percent share of the total. This means that the usability and interoperability of these features should be improved. The file transfer had quite high standard deviation. This implies that the preferences are different in different user groups, and there are potential new customer segments that prefer file transfer.

The security element is quite interesting because it was ranked second after costs in the total model. This makes security a very attractive service component. It has the highest inconsistency (illogicality) within the test group, and this could mean insufficient knowledge among customers about the subject. To get benefits from this element some additional marketing and service packaging is needed.

The costs element revealed that the comparison between initial costs and the costs of usage is difficult. This allows firms to benefit from asymmetric information at customers’ expense. The inconvenient preference of low costs can be turned into an advantage by bundling the services to create additional value for customers. A harder way is cutting the costs of service production, which is reality in many firms.

4.3 Customer profiles

Firms face technology selection decisions and service customization decisions in their business that can anticipated by monitoring changes in customer value preferences (Flint and Woodruff, 2001). Although the sample was small and no statistical evidence could be shown, the study brought up three profiles. These are security, low cost and service profile. It is also reasonable to assume that there is at least a usability profile, but because the customer panel has a technical background the usability issues were not raised.

The results indicate that there are similar preference combinations among different persons, and the customers can be profiled based on the CVA process. The answers tend to form similar patterns according to the similar preferences of the respondents. An example of the profiles is shown in Figure 5. It illustrates the security profile.
Figure 5. Security profile

The profiles are based on the relative preference weights of the panelist. If the panelist prefers one quality over others it shows as a peak in the diagram. When similar answers are combined, it forms a group of similar preference combinations. For example, in the security profile, security is preferred significantly over other elements of value. The explanation can be the higher awareness of the issue based on, for example, the technical background of these three panelists. The reason can also be the experiences they have gained using the services. Also, the real reasons for the preference patterns in the low cost and service profiles are connected to the usage history and knowledge of the panelists.

Knowing the connecting factors of these answers is the key to form the segments that are connected to the customer values and the firm’s business model. The connecting factors can be based on demographic information, among others.

4.4 Performance of case services

To link the value elements back to the firm’s R&D process (Thomke and von Hippel, 2002) and furthermore to the strategy and the business model (Ulaga and Chacour, 2001), we tested the performance of the case communication systems Smart Phone and Skype Mobile against the weighted customer values of combined values (P1 in Table 2). The performance of the case systems against each attribute was analyzed. The result was that Skype Mobile performed better than Smart Phone in every element except security. The performance of the case services is shown in Figure 6.
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This result has several implications for the firms. First of all, the message from customers is clear: integrating VoIP technology into the mobile phone significantly increases the customer value. However, this has a downside for operators. The current business model designed for delivering voice through traditional telecom networks is out of date when the voice and data traffic switches to the WLAN, which is usually free of charge and not necessarily controlled by the operators. The situation of mobile device manufacturers is easier. To capture the value from customers, they have to integrate the VoIP and WLAN into the mobile phones and adjust the pricing accordingly. No major changes in the business model are needed. This development has recently started with a leading mobile device manufacturer.

Second, the issue of the security element requires some attention. The reason why the Smart Phone performs better here can be found inside the element. Information security and trusting the service provider are the problems with Skype Mobile. The information security of the internet is not as high as in the telecom networks. Also, the service provider of this case example is new and uses technology that is novel and protected.

Third, the features and their usability element is only slightly better in Skype Mobile. This is due to the fact that the devices compared can be externally almost identical; only the software and technology need to be different. This makes most of the features as easy or difficult to use.

5 Conclusions and discussion

The subject of customer value preferences has been the topic of research interest for years in the industrial management literature. The usage of demographic information (e.g. age, sex, income) in the analysis of customer preferences provides several advantages for recognizing and anticipating the customer needs of different user groups. However, the diffusion of mobile service has revealed that customer segmentation can only partially be based on demographic factors. For example, the diffusion of VoIP services cannot solely be explained by the lead-user theory or demographic information. Instead, an in-depth analysis of customer values may result in advantageous customer segmentation.
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The contribution of this paper is a framework for analyzing customer value preferences and their realization in different communication systems. With the data of the customer panel, we have built a customer preference profile tool based on different styles of using the communication systems and therefore different value preferences. We have also found out the critical user values and the different attributes. The customer value audit revealed three major issues of customer preferences in mobile communication systems:

- The affordable costs are valued above other elements even in the technologically oriented test group.
- The security element is the most difficult one to piece together (highest inconsistency).
- The comparison of initial start-up cost to the costs of usage is difficult.

The applied model for assessing the service quality and customer preferences in mobile services was developed through several iteration rounds within a test group of advanced users and researchers. The selected test group was advanced users in the sense that they had the capability to conduct an AHP assessment from the customer value audit perspective. The AHP analysis is often conducted with a small group of experts who are capable of performing subjective pair-wise comparisons of decision criteria. The reliability of the assessment is then automatically calculated by the AHP software. This inconsistency ratio calculates the degree of inconsistency in the judgments. We used the inconsistency ratio to improve the reliability of the study and reveal the areas that are the most difficult to perceive. Only one participant had to be dropped from the expert panel due to unacceptable inconsistency.

The framework of the AHP model is based on the grounding theoretical frameworks for measuring service quality (e.g. Garvin, 1987) with characteristics of information service attributes. Additionally, the application of the AHP was developed for constructing a hierarchy and assessing the relative preferences of each value attribute. Customer preferences are commonly derived from surveys of several hundreds or thousands of customers, by relying on that large masses are logical in their judgments. This may work well in several cases providing essential information for marketing and R&D. Large samples are, however, not always a prerequisite. For example, in the studies on the lead user method in developing new product concepts (von Hippel, 1986), it was found that a small number of lead user experts can provide essential information for development purposes. Similar implications have been found in the literature of expert judgments such as the AHP (see: Saaty, 1999) where several methods and applications have been developed to elicit expert knowledge on the studied phenomena. In this study, the Delphi method implemented with AHP has proven to be a powerful and valid method for evaluating complex customer preferences. It has also provided insight into the formulation of different user profiles in mobile services.

One clear limitation of the study is, however, that the AHP method is not well suited for generalizability and statistical validation model building, but constructing and testing of complex decision structures. Therefore the results of the study are not generalizable in larger settings rather they provide relevant indication of customer preferences. Other limitation is that the users were rather homogeneous in their demographic characteristics limiting the variety of customer profiles. In a normal expert assessment situation, there is generally an opportunity to re-evaluate the assessment based on feedback. In this session
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this was not allowed due to anonymity and time limit restrictions of the study. It is reasonable to argue that many settled judgments would get better after iteration, since the learning and thus the capability to process information on the subject increases.

The analysis shows that mobile services are valued rather differently even within a small test group of mobile users. This implies that heterogeneous market segments exist already within the present mobile service portfolio. Different value creating attributes such as cost and security transfer are valued differently among different user segments, which allows customer preference profiles to be used for the segmentation of end-users.

Several managerial implications can be drawn from the results of the study. The Table 3. provides these managerial implications from service provider’s point of view. The implications are connected to the value elements and the main results of the study.

<table>
<thead>
<tr>
<th>Table 3. Implications of key findings</th>
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<tr>
<td><strong>Value elements:</strong></td>
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<td>Availability of services</td>
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Future studies on this area should address the role of the business model in capturing value from customers in different business scenarios. The capabilities and resources of the firm should be connected to the customer value elements to produce higher customer value. Also, the relations of the business model and value network as enablers for the value creation and capture should be examined. The preference data can be used in the scenario building by including these attributes into the scenarios as variables. By changing the importance order it is possible to have different “customer desired futures” where customers have different preferences. These changes in preferences reflect ultimately to the value network because they might change the customer behavior. Also the issue of possible new services should be taken into account when developing the
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CMV further. Future research should also be conducted with the larger sample size in order generalize the findings.

References


Applying a customer value model in mobile communication business


PUBLICATION 3

Pynnönen M., Hallikas J. and Savolainen P.

Mapping business: value stream based analysis of business models and resources in ICT service business

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Mapping business: value stream based analysis of business models and resources in ICT service business

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Abstract: This paper applies an approach which originates from the input-output and value network perspectives for mapping the value streams between actors. The analysis is also conducted for modifying and developing a schematic framework for mapping value streams in the Information and Communications Technology (ICT) sector. Case business models have been analyzed by using the value streams between actors as a primary data source. Additionally, the enablers of separate streams and assets have been identified in order to address the differences and similarities of the resource base in different business models.

Keywords: ICT; business model; value network; systemic approach; value streams; case study; resource-based view; transaction cost economics

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Mapping business

1 Introduction

In many industries, the focus of value creation activities is on the fundamental shift from the supply of physical goods to services and information. This development has been especially rapid in ICT (Information and Communications Technology) and industries where the different converging technologies and services are producing new business models and architectures. It has been stated that information technology has the capability of making radical changes to the organizational structure and practice (March, 1999). Furthermore, modern business processes, models, and networks are ruled with information and knowledge where ICT solutions are in a critical role (King, 2007). Technology has enabled new organizational structures to emerge.

The standpoint of this paper is that emerging business models have become more complex through the increasing interdependencies between actors in value networks. This implies that capturing value has become more dependent on the value streams between the organizations’ external partners and alliances (Doz and Hamel, 1998). Due to the interdependencies, the earning logic of the business models is not always clear and well-defined since value creation is the result of different levels of dynamic interaction with various actors. This has resulted in the blurring of the traditional one-to-one transactional environment where the value of the offering is always compared with financial streams. It follows that, in the service and knowledge business environments where the information and exchange of intangibles drive the successful business models (Allee, 2003), there is a danger that too heavy focus on single transactions provide only a reductionist view of the emerging business models. Aligning organizational elements inside a firm and between the firm and its environment is important for competitive success (Smith, 2007). Therefore, a more systemic and holistic approach is needed for the analysis of business models and value streams.

There are several strategy frameworks for analyzing the value creation and capture in industries. The five forces framework by Porter (1979) provides a systematic way to look at the structural attractiveness of value producing nodes through the five competitive forces of power and competition. These forces arise from 1) the bargaining power of suppliers and 2) customers, 3) the threat of new entrants, 4) the threat of substitute products, and 5) the threat of competitive rivalry. The generally identified shortcoming in the competitive positioning framework is the lack of complementary offerings. This emphasizes combination of competitive and cooperative aspects in strategy formulation, which is also defined as coopetition (Brandenburger and Nalebuff, 1995). The competitive positioning framework is mainly used in the analysis of structural position in the industry.

The recent literature on industry change suggests that the most radical changes arise outside the industry incumbents (McGahan, 2004). Firstly, this change may arise from different ways of producing customer value which cause a threat to the existing business models. For example, in the ICT sector there are several value streams that are under pressure to be blurred by the emergence of new value streams, such as free information service provided by Internet companies that are likely to challenge the services of traditional telecommunication providers. As an implication, the sources of value and business models are changing from value chains towards more complex value networks (Peppard and Rylander, 2006). There is also a threat that the current assets of the incumbent industry become obsolete. This view is particularly important in understanding the underlying patterns of successful business models and the robustness
of the value of these assets in the changing business environments. Research in the current literature does not fulfil the need to explore the information and service intensive business where the nature of interaction between actors is to a large extent based on the streams of intangibles and information rather than physical goods. Furthermore there are a limited number of useful tools for managers for analyzing and development purposes, as also stated by Osterwalder (2004). This is perhaps due to difficulties in measuring the value of intangible streams in relationships. Because the motives and advantages of being involved in a value network are not always directly related to the financial benefits, plenty of information will be lost if the valuation is purely based on the financial measures. Examples of value stream mapping are often presented at the dyadic level and from a single company’s perspective (e.g. Allee, 2003), or by analyzing the chains of events. This is not sufficient for the analysis of whole value networks, as it would require value streams to be mapped more broadly.

It is difficult to find examples from the current literature that would specifically combine the resource-based view (RBV) and the enablement of value stream production from the inter-company perspective. Furthermore, the taxonomy of assets and resources is not extensive enough for conducting the mapping of ICT value networks. Thereby, a purpose-built classification of resources is needed.

In this paper we aspire towards more comprehensive exploration of value streams and the interdependent nature of value streams, as well as their enablers (resources) in the industry value networks. The purpose is to present an in-depth investigation and comparisons of the emergence of Internet-based business models and to introduce a value stream profile framework which extends the existing frameworks of Timmers (1998) and Allee (2001). Furthermore, the paper provides insights and presents an analysis of case business models and concepts, their value streams and enabling resources.

The structure of this paper is as follows. Firstly, the theoretical background, research gap and process are described. The mapping framework and empirical study and their implications are then presented in Chapters 3 and 4. Finally the findings are concluded and discussed in Chapter 5.

2 Theoretical framework

2.1 About value networks

The concept of value network has also emerged in the business literature and research to emphasize the digitalized nature of value creation in a business system. Concepts and methods, such as Network Value Analysis (NVA), have been employed to analyze the value creation logic in the digitalized business ecosystem (Peppard and Rylander, 2006). In a new networked information economy (Benkler, 2006), innovations and business models emerge by collaborative and non-proprietary effort implying non-tangible information and knowledge transfer between actors in the value network.

All companies participate in value-creating networks in varying roles (Kothandaraman and Wilson, 2001). According to Allee (2000), a value network generates economic value through complex dynamic exchange between firms. This exchange goes beyond the transaction of goods and services among firms, covering the knowledge transfer and sharing of intangible benefits (Nonaka and Takeuchi, 1995).
These attributes have an important role in the analysis of value networks. The structure of the exchange is of key importance when value networks are mapped and analyzed.

When considering the creation of value from the customer’s standpoint, the value of offering is formed through a set of relationships with the customer and other stakeholders (Ramirez and Wallin, 2000). Within this context, the capability of the end customer and value creating actors to benefit from value creation and delivery is an important question. Thus, the value is based on a constellation of relationships generating and shaping the value split among the actors in a value creating system. Furthermore, we can identify the interaction between customer perceived value and the value creating system as an important underlying issue. Brandenburger and Nalebuff (1995) have suggested a value net framework where the focus is on the mapping of how much value each actor creates for other actors. Here, the added value of an actor is measured through the difference of value creation of the whole network when the actor is removed from the network. According to Parolini (1999), the net value obtained by the actors is related to the profits made by the value creating system as a whole. This value is distributed among the members in the system. The better the actors manage to control the valuable and critical resources and activities, the larger the profit share they obtain.

Analysis of value network can also be complemented by value stream or process activity mapping (Hines and Rich, 1997). The basic idea of process activity mapping is to model and analyze linkages between activities as business processes. The approach is originally developed to re-engineer the physical material streams; however, it also has potential usage in a wider range of analyses on inter-firm business processes. The analysis of non-value added activities and waste has implications for restructuring of the network and assessing and identifying the value creation activities vs. activities that have only marginal contribution to the value creating system as a whole.

When considering value creation from the cost and risk perspective, Transaction Cost Economics (TCE) offers a framework to analyze the effectiveness of different governance structures (Williamson, 1985). The transaction cost approach aims to explain the structure of different organizational forms, e.g. make-or-buy questions, by comparing the transaction and management costs with each other. The basic principle of the TCE framework is the assumption that there are diverse types of additional costs associated with doing business outside the organizational boundaries. These transaction costs may arise, for example, from asset specific investments resulting in high switching costs and lock-in situations, and the opportunistic behavior of partners. In addition to these, the costs assigned to coordinating and monitoring external resources may cause substantial transaction costs (Dyer and Singh, 1998). Furthermore, the spill-over of knowledge to a partner and appropriability may add risk and transaction costs to cooperation (Nooteboom, 1999).

What makes the TCE framework especially fascinating for the exploration of business models in the ICT industry is that information technology and the Internet allow companies to cooperate with business partners at lower transaction costs. Furthermore, information and communication technologies can lead to radical changes both inside and between companies (Timmers, 2000). This will make it appealing, for example, to outsource certain activities or functions to other companies. According to Coase (1937), the firm acquires the needed transactions from markets when the costs caused by decreased efficiency become bigger than the costs of carrying out the transactions in open markets. This make-or-buy decision leads to a transaction between two firms. From the network perspective, when the number of transactions and firms that handle them
increases, a business network of firms is formed. The structure of the network is centered in the beginning when the product is new and the business roles are not sophisticated. When the products and services of the network become more popular and the roles of firms become clearer, the value network starts to expand. This is because firms realize that certain functions or products are clear businesses and the internal organizing becomes more expensive than buying the service from the market (outsourcing). In the business modeling context this means that the initial network should be kept quite simple in terms of actors involved in the implementation of the model.

There are several theories that explain the characteristics of resources or capabilities to produce competitive advantage. An important issue in the context of value creation is the resource-based view (RBV) of the firm (Wernerfelt, 1984). According to the RBV the firm-specific resources determine the competitive advantage of the firm (Barney, 1991), namely the firm-specific resources that are i) valuable, ii) rare, iii) imperfectly imitable, and iv) non-substitutable. Moreover, it is essential to have control or influence over complementary and co-specialized assets provided by other actors in the network (Teece, 1986). Positioning a firm in a network and orchestrating its position therein is a challenge for strategic leadership (Venkatraman and Henderson, 1998). In other words, the aim of the strategy (and business model) should be to create a relative monopoly (Cox, 1997) or sustainable competitive advantage (Barney, 1991) for a firm in its market. From the value network’s standpoint it is therefore important to have capabilities to interconnect assets and resources. Furthermore, companies form strategic alliances with partners to get access to the external resources needed in their businesses (Yasuda, 2005). According to Bowman & Ambrosini (2000), the power relations of players in the network determine the capability of a firm to capture value. Power relations again are related to the efficiency of the firm’s business model. In value networks, even quite critical resources are often outsourced, and this gives a certain amount of negotiation power to the suppliers of particular resources. In this paper we use the terms enablers and assets to describe all the resources and capabilities to either produce value streams or provide substantial benefit to the business model.

2.2 Business models in network environment

A concept that is often related to value networks, and especially describing the firms in them, is business model which is briefly a description of how the firm does business (Magretta, 2002). The value network created around a given business shapes the role that suppliers, customers, and third parties play in influencing the value captured from the commercialization of an innovation (Chesbrough, 2003). Outside parties form a value network, and it complements and amplifies the firm’s own resources. Today many of the resources that are critical to the firm’s success lie outside its direct control. Elements of the value network include suppliers, partners and coalitions. The design and management of the value network can be important sources of innovation. (Hamel, 2000)

Although there are several definitions for the business model, we have applied the following general definition by Timmers (2000): Business model is the architecture for product, service and information streams. It also includes a description of the various business actors and their roles, a description of the potential benefits for the various business actors and a description of the sources of revenue. Many studies of ICT business models have concentrated on the benefits provided by those models. For example Bakos
Mapping business

(1998) has characterized the typical benefits of especially Internet-centric business models as follows:

• reducing search costs by facilitating the comparison of price, products and services;
• reducing lead times;
• improving production and supply capability;
• managing demand; and
• improving personalization and customization of product offerings.

To access the business models in a firm, the easiest way is to simplify the business model by dividing it into smaller pieces, namely business concepts. Business concepts combine customer needs and opportunities enabled by technologies in new, innovative and effective ways, and balance the implementation of the concepts with external competition and internal learning capability (Hamel, 2000). To find the business concepts, we have to identify the products and services of the firm (what) and analyze their customers (to whom). There also has to be business around the product or service. The concept can support the business model or it can have internal customers or it has not yet been launched to the markets. The firms’ actual business model is a combination of these business concepts.

Although there are several studies that attempt to characterize the business models, they provide a snapshot view based on separate cases (see for example: Greenstein and Ray, 2002; Mahadevan, 2000; Pateli and Giaglis, 2004; Swatman et al., 2006). Research furthermore lacks the depth and information needed for addressing the complex interaction of value streams between different nodes in the business models in a value network.

From the value network perspective, the concept of value creating system has been added in the strategic management literature to illustrate the entire set of activities and companies linked to produce value for both the end-customers and the actors in the system. According to Normann and Ramirez (1993), “the focus of strategic analysis is not the company or even the industry but the value-creating system itself, within which different economic actors – suppliers, business partners, allies, customers – work together to produce value.”

3 The mapping framework

Although there are several approaches to mapping the business value streams, all of them originate from a business process level analysis. More precisely, value stream mapping stems from the idea of input-output modeling where the sequential activities constitute logical chains or streams between activities. These streams are often associated with products and services offered by a company.

The mapping framework presented here views the value network as a collection of actors with value streams flowing between them, associated with requisite resources to produce and consume the streams. The framework can be used for case studies where actors and value streams correspond to real-life firms and products, or for construction of so-called archetypal value networks, where organizations and value streams are instead archetypes, e.g. "telecom operator" and "voice telecommunications service".
A value network of actors and value streams around an organization or archetype is thus constructed by identifying the consumed and produced value streams, precisely describing them, and associating them with required enabling resources. This can be thought of as a three-phase process, illustrated in Figure 1, and discussed in more detail next.

### 3.1 Offering collection and requirements identification

The value streams that an organization produces and consumes must somehow be identified. Given that an organization actively promotes its offering, determining the value streams that the offering consists of is much easier than finding information about the supply-side value streams. Depending on the business model, the offering can consist of elements offered for a price, and elements offered in return for something that is of no immediate monetary value, such as permission to send advertising. For purposes of mapping a value network, the commercial products and services are of course of key importance, even if the business model of the organization is based on, for example, the utilization of information received in return for free services.

Product and service offerings often initially seem equal to a single value stream that corresponds to the main deliverable of the offering. In reality, offerings are more complex product and service bundles or packages: they include various complementary elements associated with the main deliverable. Determining the structure of a complex offering may require domain-specific industry expertise.

With the offering broken down to constituent parts, the supply-side product and service elements – while hard to identify directly – can be identified and likewise broken down to their basic elements. It is conceivable that this requires domain-specific knowledge, for example, acquired in previous value network mapping case studies addressing the supply-side part of the value network. Value streams are selected and derived from the elements of the offering and its supply-side requirements.

### 3.2 Value stream derivation and actor association

Value streams are discrete product and service elements assigned to distinct categories and associated with the producing and consuming actor(s). This is an essential aspect of the framework. The following classification, modified based on Allee (2003) is used for categorization:

- Goods (e.g. books)
- Free Goods (e.g. web browser software)
Mapping business

- Services (e.g. ad space)
- Free services (e.g. ad-supported email)
- Information (e.g. user information)

A product or service stream usually implies an associated inverse monetary stream that the value stream producer receives in compensation from the stream consumer. This is unless a product or service is free, i.e. provided without a monetary fee (such as in the case of ad-supported services).

The case firm is of course always associated with a stream as either the producing or consuming actor. The other identified actors should be assigned a precise, domain-specific role, rather than just recognizing them as customers or suppliers. The actors and value streams can be conveniently presented using an illustration such as in Figure 2.

Figure 2  Example of a value stream map diagram

3.3 Resource association

The traditional view is that the enablers and capabilities enable the exploitation of the resources (Wernerfelt, 1984). We have used an outcome-driven view, where the production and consumption of value streams is enabled by the resources.

The association of resources with value streams is based on the idea that there are identifiable resources or capabilities that are needed to consume or produce various kinds of value streams. In other words, the resources can be considered as enablers of value streams and on the other hand, they define the possibilities of a firm to adopt new concepts through the consumption of (new kinds of) value streams. After classifying the value streams, the corresponding enabling resources for the streams were mapped. The resources are classified into following categories:

- Software development capabilities
- Service capabilities
- Technological capabilities
- Information
- ICT systems & technologies
- Immaterial assets
M. Pynnönen, J. Hallikas and P. Savolainen  

- Contracts & partnerships

The distinction between value streams and resources is sometimes ambiguous at first look: the resource of a single actor may appear equal to the value stream for another actor. An example of this kind of duplicated semantic meaning is the network access infrastructure which can be regarded as a resource for a service operator, and value stream for an infrastructure manufacturer. The connection of value streams, resources and resource categories is illustrated below in Table 1.

Table 1  Association of value streams with resources needed to produce or consume them

<table>
<thead>
<tr>
<th>Value stream</th>
<th>Resource</th>
<th>Resource category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value stream a</td>
<td>Resource i</td>
<td>Category 1</td>
</tr>
<tr>
<td>Value stream b</td>
<td>Resource ii</td>
<td>Category 2</td>
</tr>
<tr>
<td>Value stream c</td>
<td>Resource iii</td>
<td>Category 3</td>
</tr>
</tbody>
</table>

As described in the previous chapters, the framework provides means for systematic construction of value networks consisting of discrete, well-defined elements. It further refines value stream mapping techniques and makes them a more pragmatic tool. In essence, it provides a useful underlying methodology for the discovery of business models and for making overall sense of the complex interactions between actors within the value network. Value stream maps can thus be used as generic platforms for various practical and theoretical considerations. To illustrate this type of use of the mapping framework, we conducted a case study which is presented in the following chapter.

4 Empirical study

The objective of the case study was to develop a standard framework for business model analysis and to connect the RBV more profoundly with business model analysis. To implement the study we selected four case firms representing the Internet business, and a traditional telecom operator business model as a contrasting reference. The case firms in this study are Google, Ebay, Amazon and AOL. These business models were selected for exploration based on their relative business success, and because they present the new kind of business logics and value streams in the underlying convergence development in ICT. Telco’s business model was selected to compare these business models with the traditional ICT communication and service business in order to anticipate the future competition in the converging ICT sector.

4.1 Construction of the multi-organization value stream map

As stated earlier, the value streams that are most significant in the immediate economic sense are of course based on the products and services a company produces and markets: therefore the analysis is initiated using the major products and services of the case firms. The product and service information was taken from the annual reports and the firms’ websites following mainly the firms’ own announcement. Some products and services were added into the analysis outside the official announcement to increase the comparability of the results. Likewise, the major supply-side products and services used
by the case firms were identified. The chosen products and services of the firms are listed in Table 2.

### Table 2: Major products and services of the case firms

<table>
<thead>
<tr>
<th>AOL</th>
<th>Ebay</th>
<th>Google</th>
<th>Amazon</th>
<th>Telco</th>
</tr>
</thead>
<tbody>
<tr>
<td>AOL Instant</td>
<td>Content</td>
<td>Adsense</td>
<td>Alexa website tracking</td>
<td>Identity</td>
</tr>
<tr>
<td>Messenger</td>
<td>Delivery</td>
<td>Adwords</td>
<td>A9 search engine</td>
<td>(account, credit card)</td>
</tr>
<tr>
<td>(AIM), ICQ,</td>
<td>management</td>
<td>Browser sync</td>
<td>Advantage program</td>
<td>Internet access</td>
</tr>
<tr>
<td>AOL internet</td>
<td>integration,</td>
<td>Gmail, Gmail for mobile</td>
<td>Amazon Associates</td>
<td>service (virtual)</td>
</tr>
<tr>
<td>subscription</td>
<td>Identity</td>
<td>Google</td>
<td>Amazon E-commerce</td>
<td>Last-mile copper</td>
</tr>
<tr>
<td>service, AOL</td>
<td>(account, credit card)</td>
<td>Base, Google browser sync, Google Calendar, Google Checkout, Google Earth, Google Maps, Google search engine, Google Talk, Google search, YouTube, Identity and usage information, traffic exchange at peering point, News, pictures, web content, etc.</td>
<td>Service (sale of product info), Content, Electronic Funds Transfer (EFT), Identity (account, credit card), Product</td>
<td>lines for DSL, Location-based mapping, Mobile phone, SMS messages, Numbering, Routing, Outsourced customer support, Outsourced service billing, Content, Virtual mobile network</td>
</tr>
<tr>
<td>Mail, AOL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Music, AOL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Videos, AOL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OpenRide, AOL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shopping, AOL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radio, Identity and usage information,</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MapQuest</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(mobile), traffic exchange at peering point, News, games, pictures, free videos, free music, user videos etc.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Using the collection of offerings as a starting point, the input/output analysis was conducted, i.e. assignment of the value streams embedded in the (incoming and outgoing) products and services into different categories (Allee, 2003), and identification of the parties at both ends of the stream. One of these parties is always the case firm itself, but the other party has to be identified more precisely than just recognizing it as a customer or supplier. After mapping the value streams we associated the resources with them by gaining the understanding of what the resources required to consume and produce the value streams are (this is discussed more precisely in Chapter 4.2).

We mapped the value streams of all the five case business models to form a comprehensive picture of the value streams in the ICT services business. The Google’s business model is an illustrative example of the value stream mapping and can therefore be used to demonstrate it in practice. Table 3 lists the elements used in Google’s value stream derivation.

### Table 3: Actor roles and value streams in Google’s value stream map

<table>
<thead>
<tr>
<th>Category</th>
<th>Title</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actor roles</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Main actor</td>
<td>Google</td>
<td>The focal firm in the analysis</td>
</tr>
<tr>
<td>Associate</td>
<td>Peering partners</td>
<td>Internet traffic delivery providers Credit card companies, banks</td>
</tr>
<tr>
<td>Customer</td>
<td>Business customers</td>
<td>Firms</td>
</tr>
<tr>
<td></td>
<td>Consumers</td>
<td>Individuals</td>
</tr>
<tr>
<td></td>
<td>Advertisers</td>
<td>Companies advertising their products</td>
</tr>
<tr>
<td>Supplier</td>
<td>Content owners</td>
<td>Firms or individuals owning the content</td>
</tr>
<tr>
<td></td>
<td>Publishers</td>
<td>Companies publishing content</td>
</tr>
</tbody>
</table>
### Value streams

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information</td>
<td>User information, Identity and usage information, Ad space, Adswords, Ad placement, Adsense</td>
</tr>
<tr>
<td>Free products</td>
<td>Instant messaging client, Google Talk, Voice communications client, Google Talk, Maps client, Google Maps, Browser sync extension, Browser sync, Email client, Gmail for mobile</td>
</tr>
<tr>
<td>Free services</td>
<td>E-mail, Calendar, Google Calendar, Maps, Google Maps, Instant messaging, Google Talk, Voice communications, Google Talk, Content search, YouTube, Google search, Content, News, pictures, web content, etc., Content, Google Base, Browser sync, Google browser sync, Visibility, Visibility for advertisements, Google Checkout, Wholesale payment processing, Payment processing, Credit card and money transactions</td>
</tr>
<tr>
<td>Goods</td>
<td>Search engine appliance, Google search engine, Products, Advertised products to consumers</td>
</tr>
<tr>
<td>Services</td>
<td>Ad space, Adwords, Ad placement, Adsense, Traffic delivery, Traffic exchange at peering point, Traffic delivery, Traffic exchange at peering point, Services, Advertised services to consumers</td>
</tr>
</tbody>
</table>

The value stream derivation can be illustrated by combining the streams’ customers and actors into a network design (see Figure 2). The result is a snapshot of the value network tightly around the case firm. Example of a network design based on the value stream analysis of Google’s products is shown in Figure 3.

![Figure 3](image-url)  
**Figure 3**  
Example of Google’s value stream map
The value stream map shows the essence of the firm’s business in terms of relevant actors, money sources and the structure of the firm’s offering. It follows the conventions introduced in Chapter 3.2, connecting the case firm actor with other actors through incoming and outgoing value streams. Here, we have extended the basic value stream map. First, the value streams and actors have been numbered so that they can easily be referred to by number. Second, for each value stream, its category is included in the diagram (using classification from Chapter 3.2); the categories are indicated by category-specific arrow connector symbols.

In this map of Google, the nature of the Internet based business is clearly visible. For example, Google’s income comes from business customers in the form of search engine sales and from advertisers who pay for ad space in Google’s search results. The services and products are free to the consumer. Ultimately, however, the money comes into this value network from consumers who pay the advertisers for their products and services.

### 4.2 Business model analysis

The analysis usually also reveals new actors, customers and value streams that cannot be easily identified until the analysis has progressed. The analysis of the five case firms included 67 different value streams that are based on the offerings specified in Table 2. The value stream maps of the firms reveal differences, but also similarities in the firms’ business. Telco, for example, has no free product or service streams but has twice as many “€ service transaction” streams as the Internet models. The following Table 4 summarizes the value streams related to case firms’ business models.

<table>
<thead>
<tr>
<th>Value stream categories</th>
<th>Examples of value streams in category</th>
<th>AOL</th>
<th>Google</th>
<th>Ebay</th>
<th>Amazon</th>
<th>Telco</th>
</tr>
</thead>
<tbody>
<tr>
<td>Free goods</td>
<td>Instant messaging client, Voice communications client, Maps client, Browser toolbar, Email client, Web browser</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Free services</td>
<td>Billing, Business support, Content search, Delivery processing, E-mail, Instant messaging, Order-delivery process management, Payment processing, Product search, Product visibility, Shop portal, Value account, Web search, Voice communications</td>
<td>11</td>
<td>15</td>
<td>17</td>
<td>12</td>
<td>0</td>
</tr>
<tr>
<td>Products</td>
<td>Search engine appliance, Products, Instant messaging client, Voice communications client</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Services</td>
<td>Ad placement, Ad space, Billing service, Customer service, Data storage, Instant messaging, Integration services, Internet access service, Mobile access network capacity, Product information management, Retail sales statistics, Voice communications</td>
<td>7</td>
<td>5</td>
<td>5</td>
<td>8</td>
<td>16</td>
</tr>
<tr>
<td>Information</td>
<td>Advertising information, Product advertising information, Product information, Sales and inventory information, User information</td>
<td>3</td>
<td>3</td>
<td>5</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>25</td>
<td>28</td>
<td>31</td>
<td>28</td>
<td>20</td>
</tr>
</tbody>
</table>

The resource analysis of the business models is based on the value stream mapping and it explains the configuration of the business concepts to the firms’ business environment.
Resources enable value streams and they also define the possibilities of a firm to adopt new concepts. In our analysis one resource can be an enabler for several value streams.

Table 5 below shows the categorized resource frequencies, i.e. how many value streams a resource is enabling. For example in AOL’s business model the resources in “Software development capabilities” are, among other resources, enabling 15 value streams (this is over 50% of value streams in AOL’s business model as can be seen in Table 5).

Table 5  Number of resources included in the business models of case firms

<table>
<thead>
<tr>
<th>Resource categories</th>
<th>Examples of resources in category</th>
<th>AOL</th>
<th>Google</th>
<th>Ebay</th>
<th>Amazon</th>
<th>Telco</th>
</tr>
</thead>
<tbody>
<tr>
<td>Software development</td>
<td>Mobile software development, Server</td>
<td>15</td>
<td>14</td>
<td>8</td>
<td>13</td>
<td>2</td>
</tr>
<tr>
<td>Service capabilities</td>
<td>Customer service capability, Service</td>
<td>11</td>
<td>10</td>
<td>15</td>
<td>17</td>
<td>9</td>
</tr>
<tr>
<td>Technological capabilities</td>
<td>Integration capabilities, Scalability</td>
<td>12</td>
<td>14</td>
<td>3</td>
<td>12</td>
<td>9</td>
</tr>
<tr>
<td>Information</td>
<td>Consumer relationships, Complementary</td>
<td>1</td>
<td>2</td>
<td>5</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>ICT systems &amp; technologies</td>
<td>Billing systems, Complementary product</td>
<td>8</td>
<td>5</td>
<td>7</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Immaterial assets</td>
<td>Brand, Broadcasting rights (IPR, Copyright)</td>
<td>17</td>
<td>17</td>
<td>16</td>
<td>19</td>
<td>4</td>
</tr>
<tr>
<td>Contracts &amp; partnerships</td>
<td>Partnerships with publishers, Partnerships with advertisers</td>
<td>7</td>
<td>10</td>
<td>6</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>71</td>
<td>72</td>
<td>60</td>
<td>72</td>
<td>40</td>
</tr>
</tbody>
</table>

It can be seen that Ebay’s business model is operated with lesser resources than the other Internet business models, and the resource base of the Telco model is even smaller. In Telco’s case this can be partly explained by the smaller number of value streams in its business model. However, there are also differences in the nature of the resources of the Internet models and Telco. Where the Internet models have higher frequencies in capabilities, the models are quite even in information as well as in ICT systems and technology categories. The immaterial assets frequency is also significantly higher in the Internet models. This can be explained by the central role of brand and customer base in enabling the Internet models’ value streams. In the Telco model the material assets like networks enable a great number of value streams. In the Internet the enablers are often immaterial.

The analysis has revealed the resource pool of ICT service business which means all the different resources (n=44) that are in use in these case business models. The resource pool can be estimated by increasing the number of cases, but this analysis already shows that a great number of the resources included in these business models are in fact quite similar. The resources in this pool are common in the business and cannot be considered as critical assets. However, they are combined into quite unique bundles in the business models and also used with capabilities that are more firm-specific than the resources.

The RBV treats a firm as a bundle of resources (Barney, 1991). To get a look at the resource bundles of the case organizations, we have compared the relative resource profiles of the business models. These profiles are shown in Figure 4.
Mapping business

The above figure tells the percentage of resources in the category of firm’s all resources. Interestingly the profiles of Google and AOL are quite similar. Amazon and Ebay differ slightly from Google and AOL, and Telco has a totally different profile. In the Telco case this is reasonable because the business model is designed to operate in a different industry and it therefore combines different resources than the Internet models. However, the cases of Ebay and Amazon are more interesting ones. Amazon’s business model differs from others in applying the relatively highest immaterial assets and service capabilities in its business, whereas its relative amount of technological capabilities in use is the lowest. Ebay applies significantly less ICT systems & technologies than the other case models. These findings can be explained with the fact that Ebay and Amazon use the Internet more as a marketing channel and operating platform than, for example, Google and AOL which have built their models based on the Internet and would face serious troubles if the Internet would somehow fail. Ebay’s and Amazon’s models would operate significantly well even without the Internet. In the Telco model the relative amount of immaterial assets and software development capabilities are low, but the amount of service and technological capabilities and information resources are quite high. Also, the amount of ICT systems & technologies is higher than in other models, reflecting the asset intensive business of operators. Generally the relative amount of immaterial assets and software development is higher in the Internet models than in Telco.

According to Bowman & Ambrosini (2000), a similar resource pool would lead to similar products with similar costs, i.e. perfect competition. However, even the quite similar offerings are somehow differentiated, at least on the business model and resource levels. Therefore AOL’s and Google’s quite similar resource profiles are worth analyzing deeper.

Although the business model as a whole is quite a unique combination of value streams, actors, capabilities, assets and knowledge, some generalization can be made at the business concept level. The business concept can be understood as part of the business model that enables, for example, a service. The concept is not often viable in
itself, but when combined with other concepts they form a viable business model. It could also be said that business model is a combination of different business concepts.

This can be illustrated with a simple example. The content delivery service is a business concept common to both Google and AOL. The basics of this service are similar in both cases and they could be considered as competitors with similar products (from the customer point of view). The publishers and content owners provide Google and AOL with content which they deliver to consumers using a search service. The capabilities and assets needed to implement these value streams are tied into the concept. This means that to be able to apply the concept defined with a bunch of value streams, a firm has to have these assets and capabilities or access to them. The way that the concept is applied, however, depends on the firm’s strategy and how the concept supports the whole business model. Furthermore, the resource bundle of the firm determines the application of the business concept. Figure 5 presents the value streams of the content delivery business concept in the case business models.

First of all, the resource bundles of these business concepts are partly different. Google has search technology that enables its business concept within a well-known brand and wide service portfolio that attracts customers and partners. AOL’s content concept is enabled with own content and a wide portfolio of broadcasting and publishing contracts and partnerships. Second, the implementation of the business concept is different because of the different resource bundles. Google uses its resource bundle to provide customers with free content and makes money by selling ads. AOL sells its content directly to its customers and bundles it into the Internet connection.

5 Conclusion and discussion

The current literature is missing holistic frameworks for analysis of value creation in large business systems. The presented approach fills this gap. It is based on the idea of systematic mapping of the value stream structure of a value network, and analysis of the systematic means for mapping the structure. It is based on 1) identification of key actors
Mapping business

in a value creating system, 2) mapping of tangible and intangible value streams between
the actors, and 3) association of necessary resources and capabilities with the value
streams. The main results of this paper are:

• Methodology and semantics for business model mapping in value networks.
• Value stream maps of five ICT case business models.
• A resource pool of ICT service business.
• The relative resource profiles of five ICT companies.

An archetypal value network could be constructed directly, or built based on results of a
group of case studies on firms all belonging to the same particular archetype.

However, it must be emphasized here that the construction of useful semantics (as
claimed by Pateli and Giaglis, 2004) for the value stream map is an important aspect of
the framework. Construction of it is not a process step per se – but rather it is something
that occurs each step of the way; it is nevertheless perhaps the most challenging part of
the methodology. This is because it involves finding common denominatory terms for the
(near-) identical parts in the value stream maps of different case firms. This
harmonization of the stream descriptions, actor definitions and stream-specific enablers
and resources is the very basis of the analyses that are made possible by the methodology.

It follows that the said semantics are often industry domain-specific, given that they
are derived from terminology related to specific technological products and services.
Therefore, acquisition of some industry expertise is almost certainly a requisite to the
successful use of the value stream mapping technique described here.

It has been argued that especially due to lower transaction costs, the business models
that employ information as value streams and information technology as enablers, it is
easier to connect and combine different value streams from the existing and emerging
business models (e.g. Bakos, 1998).

The results of the value stream analysis seem to support this idea, given that
numerous businesses that flourish on the Internet consume and produce a large number of
information-based value streams, and that such streams seem to play a significant role in
their business models. At this point, the contribution of this paper is a methodology for
business model mapping and a resource-based analysis of the models. So far, the analysis
has mostly focused on value streams, the building blocks of business models. Sets of
resources that make it possible to consume and produce the value streams have also been
identified in each case.

From a practical standpoint, the approach of this paper allows for easy incorporation
of domain-specific knowledge about the value network. This of course implies that a
value network model built using this approach can also be validated by others. The
presented framework allows systematic (static) mapping of a value network that also
covers non-monetary transfers of value.

Some limitations to the analysis have to be raised. Firstly, the framework has a
critical source of error in the very beginning of the process when the offerings are
selected for analysis. The careful selection of the products and services is essential for an
accurate analysis of value streams and resources. Secondly, given the distinction that has
been made between information and knowledge (Nonaka and Takeuchi, 1995), it would
be important to more clearly distinguish information vs. knowledge streams. Knowledge
transfer requires an active transfer agent at both ends. The knowledge origin must prepare
knowledge for transfer as information, and the receiver must assimilate the information received. Only after the assimilation step can we define the transaction as knowledge transfer. Therefore we cannot really, in the context of value stream analysis, talk of knowledge transfer unless we specifically know and claim that the assimilation takes place for a particular purpose.

Further analysis of those resources will move the focus closer to the capabilities of the organizations themselves. Eventually, it will become possible to classify associations of key assets with corresponding aggregate value streams which will bring and thus establish the characteristics of various business models that the case firms employ. The future research challenges will include addressing the dynamic view for business models by applying scenario methods and change attributes, and valuation and measuring of different value network elements: the value streams, nodes in the network and resources that the nodes have.

References


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From business concept innovation to a business system: a case study of a virtual city portal

From business concept innovation to a business system: a case study of a virtual city portal

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Abstract: The growing ubiquity of information technology is enabling the development of new services which consumers can access with existing devices such as mobile or smart phones, PDAs, home and public computers. The services are accessed via community portals that host a variety of services in one convenient virtual place, like a virtual city. The function of the portal is to provide services to citizens whose needs can be better met via a virtual interface. The main argument of this paper is that including the customer into the innovation process and creating a business system based on value flows are the key elements of creating new business models in e-services. In this paper we introduce the business concept innovation process for applying e-government in cities in the form of a virtual city portal. Furthermore, we introduce a value flow-based business system for implementing the portal.

Keywords: business model; business concept; business system; value network; innovation; portal; e-government; customer need; customer value.


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1 Introduction

Information technology is enabling new services to be used in mobile or smart phones, PDAs, home computers and public computers. The services are accessed via community portals that host a variety of services in one convenient virtual place. Governments have also noticed the demand for accessible services and have started offering their services electronically in the internet. E-government is a new way of communication between government authorities and citizens via computers and the internet (Akman et al., 2005; Evans and Yen, 2005). Government services are usually offered through community portals and the portals provide many personal communication services in the form of e-mails, message boards, etc. most of which are free (Telang and Mukhopadhyay, 2005).

In this paper, we introduce a business concept innovation process for two communal applications that provide a good basis for applying e-government services in cities in the form of a city portal. We also present a business system of a virtual city portal aligned to create maximum value for the customer. The main argument of this paper is that including the customer into the innovation process and creating a business system based on value flows are the key elements of creating new efficient business models in e-services. There are two objectives for this research. The first objective is to analyse and configure several business concepts to a business system for implementing the business model of the virtual city portal of Kouvola city. The second is to use a Delphi process to integrate customer needs and values into a business mapping process. The case applications are analysed with the aim of clarifying their qualities, so, technical functions and issues regarding the applications have been excluded. The focus of the analysis is on the customer side of value creation, and therefore the economic benefits, in terms of money, of the firms participating in the customer value creation are not analysed.

The main idea of a virtual city portal is to offer city services to citizens and to enable them to participate in decision-making. The function of the portal is to provide services to those citizens that whose needs can best be met via a virtual interface, for example teenagers, handicapped persons, elders or just busy people. The city can provide a large variety of its services through the portal. The case portal includes both PC and mobile device user interfaces. This is because some services need a large screen and a powerful processor while others are more conveniently used on a mobile device that is not tied to one place. Such portals exist, but the launch and maintenance of a portal are not free and therefore the benefits must be well-justified. A common problem is that funding this kind of project is difficult or impossible for cities. As a solution, we provide a market funded business model to overcome the financial barriers in the way of creating better e-services.

Our case city Kouvola is a small city in Eastern Finland, with a population of 30,000. To demonstrate the benefits of the virtual city portal for Kouvola two applications were selected, one mobile and one PC, on which the business concept innovation process was started. The case applications are local by nature because the communities that they represent are more or less local. However, the applications can be tailored to serve any specified community. This widens the applicability of the results of this study. The first case is a virtual environment called SimKouvola. The second case is a communal chat application. The virtual SimKouvola idea is based on the SimCity game idea, in which a player can for example play the role of mayor and rule the city. The application can be used to learn about city administration, offices and social decision making. SimKouvola has, for example, a Council Hall in which it is possible to learn about the city’s
decision-making. The application can be used as a platform for local virtual amusement places, which are operated by computer or mobile phone. These virtual communities can be implemented for instance with a communal chat, which is a community-based graphical chat application in which the user’s personal traits and thoughts (through questions and answers) influence their appearance to other users. The chat room in the communal chat can represent a real world community like a school class, company or group of friends.

2 The theoretical background

According to Coase (1937), it seems that there are always some costs in using the price mechanism, that is, operating in the market, and these costs can sometimes be saved if the resources are organised as a firm. The basic assumption of the transaction cost theory (TCE) is that the transactions are performed in the most economic way (Thompson and Yuanyou, 2004). In the communal sector, there is a need for more efficiency, and often this means commercialisation and outsourcing of some operations. Also, services can be more efficient and economical by increasing customer satisfaction and loyalty. A satisfied customer will use the service again and this generates loyalty. This increases the frequency and lowers the uncertainty of customer transactions.

A transaction has traditionally been viewed only as a source of costs. Blomqvist et al. (2002), however, define the transaction as a contract between parties which aims to create joint surplus through cooperation to benefit all the parties concerned. The benefits of cooperation come not only from sharing the costs and risk (Chang, 2003), but also from generating new knowledge and innovations and learning from them (Blomqvist et al., 2002). The transactions are also no longer an asset specifically because they are created by the several parties with different resources. This transaction benefit view is also related to open innovation (Chesbrough, 2003). The main idea in open innovation is that customer value is created not only inside a single firm but also between the several firms (Chesbrough, 2003; Fjeldstad and Haanaes, 2001; Shapiro and Varian, 1999). Furthermore, innovation can reach the market from inside or outside the firm. Generally, collaboration in a business network that produces value generates better innovations and more value to customers (Bovet and Martha, 2000; Cartwright and Oliver, 2000; Fjeldstad and Haanaes, 2001; Tapscott et al., 2000). To ensure the creation of services that fit the customer needs and create maximum customer value, the customer view should be taken into account already in the early stages of business planning.

The connection between the customer and the organisation can be approached through customer need assessment (see e.g. Elfvengren et al., 2004; Kärkkäinen and Elfvengren, 2002; Kärkkäinen et al., 2001). In the customer need assessment view, the aim is mainly to recognise the unrecognised needs of customers. Whereas, the customer value view refers to what the customer wants with certain limitations like money (Anderson and Narus, 1998; Flint and Woodruf, 1997, 1998; Thomke and von Hippel, 2002; Ulaga and Chacour, 2001). In this study, the main aim was the recognition of customer needs, which then could be satisfied with the offerings of the business system. However, the customer value was taken into account in prioritising and selecting the business concept proposals for further analysis (see Chapter 3).
2.1 Value network

Value networks differentiate on the axes of economic control and value integration. In the open market, that is, an agora, anyone can buy/sell and no single entity is in control. On aggregation one company usually leads in hierarchical fashion, positioning itself between the customers and producers. Distributive network businesses are the infrastructure of the entire economy; they provide the backbone for the digital economy – communications, bandwidth, delivery services, banking services, etc. Alliances have no hierarchy in control; no one can force others to be part of the alliance and any one can leave anytime. In a value chain, the focus is on process optimisation and there is one primary company that maximises value integration (Tapscott et al., 2000).

The value network could be compared to a firm that has a number of different strategic processes. However, in a value network, there are several companies which take care of certain processes based on their core competencies (Prahalad and Hamel, 1990). As well as several firms in the same industry, there can also be several value networks and they can compete with each other like firms (Hagel III, 1996). Positioning a firm in a network and orchestrating its position therein is a challenge for strategic leadership (Venkatraman and Henderson, 1998). In other words, the aim of the strategy (and business model) should be to create a relative monopoly (Cox, 1997), or sustainable competitive advantage (Barney, 1991) for a firm in its market.

According to Bowman and Ambrosini (2000), the power relations of players in the network determine the capability of a firm to capture value. Power relations again are related to the efficiency of the business model of a firm. In value networks, even quite critical resources are often outsourced, and this gives a certain amount of negotiation power to the suppliers of particular resources. This power play is also a main factor in the industry dynamics. TCE-based decision-making has an effect on the business models of firms. When a firm decides to outsource some part of its business model, it simultaneously focuses its business model into a clearer and more specific business area and creates business opportunities for other firms. Vice versa, when a firm acquires a business concept from the market and includes it into its existing business model, the firm widens the scope of its business and increases the monopoly power of the business model.

2.2 Business models and innovation

A concept that is often related to value networks, and especially describing the firms in them, is business model, which is briefly a description of how the firm does business (Magretta, 2002). The value in the network is ultimately brought in by the customer who purchases the product or service because it has elements that the customer considers valuable. The business model of a firm is in a central role in capturing this value. This is why identifying the elements of value and changes in the preferences of customers are critical for business. The efficiency and flexibility of the business model are essential for maintaining competitive advantage. In the value network, there are lots of firms with different organisation structures. Firms also contain a different amount of market power and business relationships. The business model has become a common tool in describing the players’ (firms’) organisations and their linkages to the value network. Although,
there are several definitions for the business model, we have applied the general
definition by Timmers (2000) who states that the business model is the architecture for a
product, service and information flows, and includes a description of the various business
actors and their roles, the potential benefits for the various business actors and the
sources of revenue. “Typically, the firm will also describe the major activities that it
performs in the course of its business” (Cartwright and Oliver, 2000).

The design and management of the value network can be important sources of
business concept innovation (Hamel, 2000). The value network that is created around a
given business shapes the role that actors play in capturing value from the
commercialisation of an innovation (Chesbrough, 2003). Mitchell and Coles
(2003) argue that business model (concept) innovation is the management practice that
is most clearly associated with high growth. Business concept innovation creates
internally competing alternatives to the existing business concept, which also
promotes the success of the company in the long run. Business concept innovation helps
the firm not only in new product development, but also in its ability to react fast and
in time to competitors’ product development and radical innovations or product
substitutes outside its own industry. Business concepts combine customer needs
and opportunities enabled by technologies in new, innovative and effective ways, and
balance the implementation of the concepts with the external competition and internal
learning capability. We use the term business system to refer to the construct, resulting
from the analysis, which combines the value network, business model and business
concept approaches.

According to Garcia and Calantone (2002), there are two important aspects in
innovation. Firstly, the innovation process includes both technological development and
market introduction aspects. Secondly, the process is iterative, and therefore it includes
an introduction of a new innovation and the reintroduction of an improved innovation.
The iterative nature of the innovation process leads to different types of innovations.
(Garcia and Calantone, 2002) Typically, these types are called radical innovation and
incremental innovation (Garcia and Calantone, 2002; Hamel, 2000). Radical innovation
needs to meet one or more of three standards. It has to change the customer expectations,
change the basis for competition, or it has to change industry rules (Hamel, 2000).
Incremental innovation concentrates on improving that which already exists, not on
creating something completely new.

In a business concept innovation process, the idea of open innovation plays
a central role. As several parties are involved that have functioning businesses, it is
essential to integrate their contribution and knowledge into the process. Otherwise,
the result of the innovation process will not represent the actual situation. Our
study applies the concept of open innovation to form a business system around the
case applications.

3 Business concept innovation – method and process

This research adopts a case study research strategy, and within this strategy a
constructive research approach. The case in our study is a virtual city portal and the
construct refers to the business system for its implementation. The research process is
described in Figure 1.
To carry out this study, we applied the Delphi method to formulate the business model by structuring communication between groups of people who can provide a valuable contribution in order to resolve a complex problem (Linstone and Turoff, 1975). With the Delphi technique, participants state their opinions in an anonymous questionnaire (Ozer, 1999). The characteristics of a Delphi study are iteration, anonymity, controlled feedback and group statistical response (Landetta, 2006). The aim of the Delphi process in our study was to capture the ideas of the parties involved in the business model and also to bring customer needs and values into a business planning process that has traditionally been implemented by firm experts (Pynnönen and Hallikas, 2006; Pynnönen and Kytölä, 2006).

Choosing the right persons for a Delphi study is a difficult task, and it is crucial for a successful result. The group or panel for our Delphi study consisted of five business experts that could also be considered as lead users of city portal services. According to von Hippel (1986), lead users are people who

“…face needs that will be general in a marketplace, but they face them months or years before the bulk of that marketplace encounters them, and … are positioned to benefit significantly by obtaining a solution to those needs.”

The business mapping panel(s) should include lead users in order to provide innovations valuable to the end-customers of the business model. Integrating the customer into the business mapping process certainly generates value to the customer, but to capture the value generated, firms have to reconfigure their business models accordingly (Thomke and von Hippel, 2002). Building a business model on customer needs is essential for the firm in order to recognise customer value and to create a suitable business model for capturing the value.

The business concept innovation process is based on the lead-user method developed by von Hippel (1986, 1988) and von Hippel et al. (1999) and business concept thinking (Chesbrough, 2003; Hamel, 2000). The research, in this case, can be described as a process in which there are several phases (or Delphi rounds). The first phase of the research was to define the possible business concepts that are related to the case applications. This phase was implemented by a group innovation session (Elfvengren et al., 2004; Laaksonen, 2005). The phases of the group innovation session were brainstorming, categorisation and commenting the ideas, and finally clarification and specification of the ideas. The innovation session was held at Lappeenranta University of Technology in Finland. The session was divided into two parts so that in the first part the aim was to generate business concept ideas for the SimKouvola application. The second part of the session considered a communal chat and again the aim was to generate
business concept ideas for this application. The ideas were divided into the following groups:

1. **SimKouvola**: city planning, education, organisational activities, virtual city, healthcare and operative management and decision making.

2. **Communal chat**: the community is formed by action, by location and by floating chat.

The second phase of the research was prioritising the business concept proposals by combining the innovations into groups and evaluating their importance in an e-commerce business model. After analysing the ideas and regrouping them, there were 48 ideas under the SimKouvola heading and 21 ideas under communal chat. The ideas were prioritised in a new session to fit the purposes of the parties involved. The criteria used to select the ideas for further analysis were empowerment, communality and participation (Heikkinen and Cavén, 2004). Also, the possibility to form value producing business concepts of the ideas was taken into account when selecting the ideas. With these guidelines, five ideas and idea groups (business concept proposals) were selected for business concept analysis.

The case applications were originally selected so that there are plenty of synergies. The innovation session strengthened this synergy as the ideas for one case supported the other case and vice versa. The idea of a virtual city portal also came up. The selected ideas were regrouped under **Virtual City Portal**, where there are five different functions that connect the city and the citizens. These functions are operative, planning, empowerment, education and service functions. The business concept proposals of the Virtual City Portal are:

1. **City forum**: an idea bank for storing the citizens’ ideas concerning city development, mayor’s question time where citizens can discuss with the mayor, and an environmental care forum where people can discuss neighbourhood issues.

2. **City role-playing game**: an educational game to learn about the functions and roles of the city.

3. **Virtual design platform**: a design platform for engineering offices and public construction and a channel for citizens to influence city planning.

4. **Virtual meeting place**: a student counselling chat, virtual park, virtual conference room and social services coffee house.

5. **Chat radio**: local floating weather channel and road information.

Figure 2 shows how the application based business concept proposals cover the city functions.

With this data, we started the business mapping phase of the study. We applied the Chesbrough’s (2003) business model framework to form business concepts from the proposed ideas. After forming the business concepts we applied a business mapping framework (Pynnönen et al., 2007) that is built on Timmers’s (2000) business model definition and Allee’s (2000) value network analysis to form a business system for implementing the business concepts. This analysis is introduced in the next chapter.
4 Mapping business – the business system framework

A business system framework consists of business concepts, business models and a value network description. The main idea of the portal is to offer city services to citizens and to enable them to participate in decision making. The services were analysed with a business model framework to form a picture of the business opportunities of the services. The different nature of the applications (mobile and PC) led to a decision (supported also by the empirical fact that in the ICT industry the mobile and PC service providers are normally different firms) that they are provided by two different firms. These roles have been named **PC and mobile service provider**. The analysis focuses on these roles due to their strategic importance for the virtual city portal. Other roles, such as the operator and device manufacturer, are replaceable and not crucial for the portal business. We have constructed the business concepts by modifying and applying (Chesbrough’s, 2003) business model framework. The modified framework includes the following elements:

- market segment
- value proposition
- elements of value chain
- cost structure
- value network
- formulated competitive strategy.

The first three elements; market segment, value proposition and elements of the value chain are attributes that define the business concept. As a whole, the framework is a description of a business model. The business concepts and the business model of the PC service provider are presented in Table 1.
The business model of the PC service provider is based on two core products (see Prahalad and Hamel, 1990) that are the city role-playing game and virtual design platform based on the SimKouvola application. The products have slightly different market segments and value propositions, and therefore the business concepts are analysed separately for each product. The cost structure, value network and strategy are rather business model level attributes than business concept ones, and they are usually quite similar in one firm.

The mobile service provider was analysed similarly. The business model is based on three core products, which are: the chat radio, city forum and virtual meeting place based on the communal chat application. These business concepts were also analysed separately for each main product. The business concepts and the whole business model of the mobile service provider are introduced in Table 2. In this business model of the mobile service provider, the cost structure is not similar in all business concepts and this illustrates the ambiguous nature of the notions of business concept and business model.

The business of the virtual city portal consists of these products and also of additional products and services. The number of different products and services is so great that it is not reasonable to analyse the business of the portal on the product, business concept or even business model level. This is why we applied the business mapping framework (Pynnönen et al., 2007). To form a complete view of the business opportunities around
From business concept innovation to a business system

the virtual city portal, the value flows between the actors in the value network were mapped. The results of value flow analysis are presented in Table 3.

Table 2  Business model of the mobile service provider

<table>
<thead>
<tr>
<th>Mobile service provider</th>
<th>Chat radio</th>
<th>City forum</th>
<th>Virtual meeting place</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market segment</td>
<td>People who live or visit a certain area.</td>
<td>Citizens, visitors and holiday home owners.</td>
<td>Citizens of all ages.</td>
</tr>
<tr>
<td>Value proposition</td>
<td>Local information about weather, activities and shops, free for end customers. Road information. Advertisers pay for their advertisements.</td>
<td>A mobile virtual arena for discussion about important topics in the city and the region. Services: Idea bank, mayor’s question time, environmental care. Portal pays for the services.</td>
<td>Virtual meeting places for different groups, for example, the elderly, disabled, teenagers. The portal pays for the ‘places’.</td>
</tr>
<tr>
<td>Elements of value chain</td>
<td>Mobile portal operating, chat moderating, chat hosting and customer support.</td>
<td>Mobile portal operating, chat moderating, chat hosting and customer support.</td>
<td>Mobile portal operating, chat moderating, chat hosting and customer support.</td>
</tr>
<tr>
<td>Cost structure</td>
<td>Costs mainly induced by personnel, programme rights and weather service costs. Also equipment (PC, etc.) and office rents.</td>
<td>Personnel costs and programme rights. Also equipment (PC, etc.) and office rents.</td>
<td>Personnel costs and programme rights. Also equipment (PC, etc.) and office rents.</td>
</tr>
<tr>
<td>Value network</td>
<td>City, virtual city portal, content provider, mobile service provider, PC and mobile application developer, PC service provider, weather service firm, advertising firms, graphical designer, end customers/citizens and business customers.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Formulated competitive strategy</td>
<td>Forming a tight partnership with the City and the portal to maintain the position (sustained competitive advantage) in the value network.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

To better illustrate the role of advertisement-based funding of the services and the free end-customer products, we used the modified value exchange model (Allee, 2000) and analysed the free service flows and the money transaction flows separately. The modified model includes six categories of value flows, which are benefits, information, services (free), products (free), product transactions and service transactions (Pynnönen et al., 2007). The business system of a virtual city portal, however, does not include any flows that could be considered as free product flows.
### Table 3  Value flows in a virtual city business system

<table>
<thead>
<tr>
<th>Flow category</th>
<th>Shape ID</th>
<th>Flow</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benefits</td>
<td>43</td>
<td>Empowerment</td>
<td>Opportunity to influence decision making</td>
</tr>
<tr>
<td></td>
<td>44</td>
<td>Sense of community</td>
<td></td>
</tr>
<tr>
<td></td>
<td>45</td>
<td>Participation</td>
<td>Elections, voting, expressing opinions, etc.</td>
</tr>
<tr>
<td>Information</td>
<td>33, 36</td>
<td>Product development feedback</td>
<td>Test information, user experience, etc. (Thomke and von Hippel, 2002)</td>
</tr>
<tr>
<td></td>
<td>34, 35, 37</td>
<td>User information</td>
<td>Repeat use, stickiness, frequency of use (Telang and Mukhopadhyay, 2005)</td>
</tr>
<tr>
<td>Services (free)</td>
<td>9, 10, 11, 20, 22, 23</td>
<td>Support</td>
<td>Support for the chat radio, city forum, virtual meeting place, the game, the virtual design platform and portal software</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>City role playing game</td>
<td>See Table 2</td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>Virtual design platform</td>
<td>See Table 2</td>
</tr>
<tr>
<td></td>
<td>18</td>
<td>Content</td>
<td>Free content, news, music, games, etc.</td>
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<tr>
<td></td>
<td>29</td>
<td>Chat radio</td>
<td>See Table 1</td>
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<tr>
<td></td>
<td>30</td>
<td>City forum</td>
<td>See Table 1</td>
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<tr>
<td></td>
<td>31</td>
<td>Virtual meeting place</td>
<td>See Table 1</td>
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<td>41</td>
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<td>Portal operating software</td>
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<tr>
<td>Service transaction €</td>
<td>7, 24, 25, 19, 13</td>
<td>Application development</td>
<td>City forum, virtual meeting place, chat radio, game development and virtual design platform</td>
</tr>
<tr>
<td></td>
<td>8, 14, 26, 27, 28</td>
<td>Service operation</td>
<td>Game service, virtual design platform, virtual meeting place service, chat radio service and city forum service</td>
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<tr>
<td></td>
<td>17</td>
<td>Virtual design platform</td>
<td>See Table 2</td>
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<tr>
<td></td>
<td>32</td>
<td>Ad space</td>
<td>Ad space sales for advertisers</td>
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<tr>
<td></td>
<td>40</td>
<td>Content</td>
<td>Charged content</td>
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The analysis has been limited only to the necessary roles, and all supporting roles have been ruled out of the analysis. The roles used in the analysis are presented in Table 4.

Based on the analysis a visual illustration of the business system is presented in Figure 3.
From business concept innovation to a business system

Figure 3  Virtual city portal business system
The business system of the virtual city portal consists of eight business roles and 35 value flows in five value categories and the business model descriptions (Tables 1 and 2). About 40% of all the flows are money transactions and about 25% are immaterial flows. The business system framework clearly reveals the revenue flows in the system. The revenues for the main actor come from advertisements and from business customers. The benefits of the system for the end customers can also be seen clearly. The business system framework is linked with the information flows to the continuous customer need assessment (see Table 3).

<table>
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<tr>
<th>Role category</th>
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<th>Definition</th>
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<tr>
<td>Actor</td>
<td>Virtual city portal</td>
<td>Focal role in this value network</td>
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<td>Customer</td>
<td>Business customers</td>
<td>Engineering offices, public construction, etc.</td>
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<td></td>
<td>End customers/citizens</td>
<td>Individual persons, consumers</td>
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<td>Local advertisers</td>
<td>Shops, restaurants, movie theatres, etc.</td>
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<td>Supplier</td>
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<td>PC and mobile application developer</td>
<td>Application development</td>
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<td>PC service provider</td>
<td>City role-playing game and virtual design platform services</td>
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</table>

5 Conclusions and discussion

The study addressed the commercialisation of communal e-services in order to increase their efficiency. The process was based on two software applications. In this paper, we concentrated on transforming innovations creating customer value into a value producing business system using case applications as a basis for the services. We used the Delphi process for business concept innovation to assess customer needs and to structure business offerings for the business model of a virtual city portal. We also analysed the business concept proposals with a business concept framework and value flow-based business mapping framework. The case applications were developed into commercial services to connect the city and its citizens virtually in some very important functions of the city and to improve the efficiency of public service production. Many of the customer segments of these services benefit from affordable services as well as from the services themselves.

This paper contributes to the customer centric business concept innovation literature (see e.g. Chesbrough, 2003; Hamel, 2000; Thonke and von Hippel, 2002) by applying a Delphi process to customer need assessment and combining the results of the process into the business mapping process. The process used in formulating the business
possibilities for these applications is well suited for managing application service development when the approach is innovation based and the application already exists. This process could be modified to fit the analysis of other cities and firms, even globally. The business mapping process and the used framework is suitable for planning and service development where there are just a few concepts to analyse. Even though, the business concepts are quite abstract they still provide important information for the R&D about the service attributes: for example, what kind of terminal devices and operator services are needed to implement the concepts. The business system is also abstract but it illustrates the value creation possibilities of the parties involved and separates the services into customer value creating flows.

The process and results have some limitations. It should be noted that the business system is a construction and the roles as well as the flows are influenced by the network dynamics. When implemented, the roles may integrate or divide and the structure of the network will vary. Also, the products and services of the system are just a small fragment of a range of possibilities. The framework might be too heavy when the number of analysed business concepts or roles increases.

Future research directions should address the resources of the business system in terms of what resources are needed to implement certain services. Moreover, the process should be tested with a functioning organisation to be able to tell whether it can be used in innovating new directions to existing business and to study the process in other business cases. Although the customer view was represented already in the beginning of the process, it would be beneficial to assess customer values with a detailed framework.

References


From business concept innovation to a business system


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Pynnönen M., Hallikas J. and Savolainen P.

Transforming customer values into value network of multi-play operator – a resource based approach


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Transforming customer values into the value network of a multi-play operator – a resource-based approach

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Abstract
To date, only little research has been conducted in the field of integrated offers. Furthermore, there is not much literature or research available that profoundly considers the characteristics of an integrated offering. The novelty of this study is in that it addresses the integrated offering from the customer preference perspective and transforms this into valuation of resources and capabilities. One example of an integrated offering is a bundled “multi-play” offering. It combines a set of telecommunications and multimedia content products and services into a new kind of convenient, innovative entity. We explore the transformation of customer requirements into business models, and resources and capabilities with the special characteristics of an integrated offer. The theoretical foundation is based on value network and resource-based approaches. We use a mapping framework that connects different levels together in a system hierarchy. The prioritized customer value attributes are connected to the attributes of the offering (value streams) with the Quality Function Deployment (QFD) process. These prioritized value streams are connected to resources with a new QFD process. This way it is possible to transform customer value attributes into assets, and further into actor capabilities.

Keywords: Customer value, value network, business model, multi-play, operator, resource-based view.

1. Introduction
To date, only little research has been conducted in the field of integrated offers. Furthermore, there is not much literature or research available that profoundly considers the characteristics of an integrated offering. The novelty of this study is in that it addresses the integrated offering from the customer preference perspective and transforms this into valuation of resources and capabilities. The theory of the resource-based view of the firm (RBV, see e.g. [1]) offers valuable insights into the identification, valuation and management of resources from the internal perspective. It, however, lacks the explicit explanation of how these methods should be used in a value network context where the end-customers’ demand drives the supply side (e.g. the VRIN model), and actors are integrated with complementary resources [2; 3]. In brief, our attempt is to explore the transformation of customer requirements into business models, and resources and capabilities with the special characteristics of an integrated offer.

This cross-cutting case study attempts to increase the understanding of how a particular value network changes when a transition from a set of more separate offerings into a single more integrated bundled offering takes place. It also explores what some of the prerequisite changes are for the transition to be successful, and how customer preferences affect changes in the value network. These questions are primarily approached from a telecom operator point of view. We explore the transformation of customer requirements into business models, and resources and capabilities with the special characteristics of an integrated offer. The research questions of this paper deal with customer and supplier requirements for an offering, resources and capabilities needed in producing the offer and the value of resources and capabilities.

The structure of the paper is that next Chapter 2 presents the theoretical background of the value network and business model analysis. Chapter 3 deals with the methodology of connecting the customer value attributes to the resources of a firm. Chapter 4 then presents
the customer value model for multi-play service, and the business model construct is presented in Chapter 5. Subsequently Chapter 6 introduces the example of connecting the customer value preferences to resources, and finally the findings are discussed.

2. Resource-Based Value Network

The Resource-Based View (RBV) of the firm assumes that the firm is a bundle of resources and that they can be different between firms [1; 2]. According to Amit & Schoemaker [4], the resource-based view explains the company profitability using information on its resources and capabilities. Barney et al. [5] argue that “… resources and capabilities can be viewed as bundles of tangible and intangible assets, including a firm’s management skills, its organizational processes and routines, and the information and knowledge it controls.” However, not all resources are potential for creating sustainable competitive advantage [1]. Barney [1] presents criteria for evaluating the potential of the resources for creating sustainable competitive advantage based on four attributes (VRIN): i) valuable, ii) rare, iii) imperfectly imitable, and iv) non-substitutable. Resources that meet the conditions of these VRIN criteria are argued to be such resources that cannot be bought from the markets i.e. abilities, relationships, skills and knowledge [1; 6; 7].

An important issue in the context of the RBV is the firm’s value creation for customers [2; 6]. Wernerfelt [2] argues that the firm’s resource profile is related to its optimal product-market activities. This means that the firm uses its resources to generate value to its customers, and by identifying the link between a specific resource and a specific product value can be optimized for both the firm and the customer [7]. According to Bowman and Ambrosini [6], the firm creates (use) value by combining assets with the work of organizational members into new (use) values. However, this new value has to be coherent with the customer needs in order to realize the (exchange) value and create profits for the firm. If the resources used to generate value are similar in different firms, it leads to identical products (perfect competition) [6], which normally is not the situation in real life markets. The firms can, however, have slightly different resource profiles which results in differentiated products between them, and the role of for example marketing skills, the business model or distribution channel is emphasized. The firm does not automatically own the resources and capabilities it needs to produce value to the customer. According to Barney [8], a firm that does not have the resources it needs to be successful has three options: it can cooperate with another firm, it can develop the resources by itself or it can acquire a firm that already possesses them. The two latter ones, however, are costly to implement. Barney [8] argues that in many technology intensive industries the governance structure is non-hierarchical because the costs of creating and acquiring capabilities are greater than costs caused by an increased threat of opportunism. This also applies to the ICT value networks. The degree of integration in a cooperation relationship depends on the resources firms are seeking from the value network. Chen and Chen [9] argue that if a firm is dependent on the value network’s (partners’) R&D resources, the alliance is tighter than if the firm seeks marketing of production resources. Also, if the resource profiles of partner firms are similar, the alliance structure is more integrative than in the case of complementary resource profiles [9].

In the modern business world there are lots of different organization structures which contain varying numbers of business relationships. All companies participate in value-creating networks in miscellaneous roles [10]. This is because producing value to customers with fast changing needs requires flexibility and fast response that business networks can provide [11]. A value network can be compared to a firm that has a number of different strategic processes. In a value network there are several companies to take care of the processes. In the value network firms have different kinds of partnership and coalition relations with each other.
Positioning a firm in a network and orchestrating its position in it is a challenge for the strategic leadership [12]. In other words, the aim of strategy (and the business model) should be in creating a relative monopoly situation for a firm in its market [13]. According to Bowman & Ambrosini [6], the power relations of players in the network determine the capability of a firm to capture value. Power relations again are related to the efficiency of the business model of the firm. According to Allee [14], a value network generates economic value through complex dynamic exchange between firms. This exchange goes beyond the transaction of goods and services among firms, covering the knowledge transfer and sharing of intangible benefits [15].

Business model is a description of how the firm does business [16]. Although there are several definitions for the business model, we have applied the following general definition by Timmers [17]: business model is the architecture for product, service and information streams. It also includes descriptions of the various business actors and their roles, of the potential benefits for the various business actors and of the sources of revenue. Many studies on ICT business models have concentrated on the benefits provided by those models [e.g. 18]. Although there are several studies that attempt to characterize the business models, they provide a snapshot view of the business. [19; See for example: 20; 21; 22]. Research furthermore lacks the depth and information needed for addressing the complex interaction of customer value preferences and business models in a value network.

Integrating the customer into the R&D process certainly generates value to the customer, but to capture the value generated, firms have to reconfigure their business models [e.g. 23]. Therefore the firm needs to build a Customer Value Model (CVM). The CVM is a data-based representation of the worth (in monetary terms) of the product or service to the customer [24]. Although the value in the CVM should be addressed in monetary terms, we approach the concept of value from a wider perspective. The desired value is “the bundle of product attributes and resulting consequences, both positive and negative, and monetary and non-monetary, that the customer wants to happen” [25]. Where personal values are often generic and fairly stable, customer-desired value is more tied to a service or a product and it faces more changes [26]. The value of some service to the customer is a subjective matter [27], and it depends on the customer’s user profile, namely, the way he or she likes to use the service, or is used to using it. In a group of people with similar user profiles, the value of the service is quite comparable. We use the customer value audit as a tool for developing a CVM [28]. We have modified the process to fit the study of customer desired value in multi-play services.

3. Method and Research Process
The empirical part of the paper focuses on the service providers’ business environment with specific attention to integrated offerings. Information, communication and media technologies have converged in a manner that makes it possible to produce new kinds of integrated products and services to be offered to the traditionally separate consumer telecommunication & media markets. One such integrated product offering is called a bundled “multi-play” offering. It combines a set of telecommunications and multimedia content products and services into a new kind of convenient, innovative whole. A multi-play offering integrates hardware, software and services and provides highly personalized service both to individuals and families, through both mobile and fixed channels. It encompasses many currently separately offered services, such as telephone (both fixed & mobile), broadband, TV, radio, video rental, email and instant messaging. It is important to understand that a higher level of a) integration, b) personalization, c) usability, d) ease of use and, finally, e) the share of the service component (both end-user and back-end/support) in the offering are what distinguish a multi-play offering from a plain package of products and services thrown together.
The value network approach is needed in investigating an integrated offering because it is argued that no single actor has sufficient resources and capabilities to handle the integrated offer properly. Furthermore, the multi-play environment seems to provide an appealing strategic path for the actors who have been caught in the silos of service provisioning. The value network approach is about to provide a novel approach for investigating the transformation of customer value into value delivery (value streams), and resources and capabilities of a value creating network providing the offering.

Given the models aim to represent the value network configuration both prior to the transition and after it, the differences of the models can then be analyzed as a whole, or from a particular actor’s point of view, in order to understand the changes of the transition. Figure 1 is a simplified illustration of the mapping framework that connects different levels together in a system hierarchy. It consists of sequential steps from customer needs to the actor resources and capabilities in a value network. The aim of the framework is to connect customer and resource-based strategies together. Customer needs are derived from the identification and evaluation of the relative weight of the customer value attributes. This way it is possible to detect the features that the customer really values and select the customer segments that best fit with an offering. Resource-based strategy, on the other hand, determines the importance of resources and capabilities in a business model in order to maximize the supplier value. Each actor should develop itself, acquire or create partnerships with resources that are most critical in a business model. In general, the matrix presentation follows the Quality Function Deployment (QFD) principle for assessing the correlations between “Whats” on the vertical axis and “Hows” on the horizontal axis. The chain of matrices is generated by translating the matrices and incorporating the elements from the next levels of the system into the matrix. Thus it is possible to transform the customer value attributes into assets, and further into actor capabilities.

The Analytical Hierarchy Process (AHP) expert ratings method is used in the assessment and prioritization of selected customer value attributes. According to Saaty (1999), the argument for using the AHP method is on the connection of the application to the decision-making, and an ability to test the attractiveness of an offering with a small number of experts. Here, the weightings of customer value attributes can be transformed directly into the service offering. A pair-wise comparison is used throughout the hierarchy to derive the priorities of the customer value attributes. Here, the relative importance of each customer value attribute is pair-wise compared against other value attributes by using the AHP ratings scale (1–9).

Figure 1. Connecting customer values to the resources and capabilities.
4. Customer Value Model

To rate the customer value preferences we constructed a Customer Value Model (CVM) [28] for multi-play service. The multi-play CVM consists of the following value elements: performance, features, reliability, usability, conformance fit, appearance, costs and socioeconomic factors. The elements are connected to the multi-play offering with multiple value attributes. The model was also tested against the selected consumer segments of the case telecom operator to see if the model gives similar preferences than the segmentation predicts. The test was implemented with three test persons presenting two different segments. The customer value elements and attributes are reflected to test customer profiles with the AHP model. Figure 2 presents the relative weights of customer value preferences of the test profiles in the customer value model for a multi-play offering.

According to the test case, the convenience, user interface, ease of use and software execution performance have the highest values; however, the attributes are preferred differently in the segments. The result of the test was that the model gives preferences predicted by the segmentation. Furthermore, the relative weights of the value attributes differ between segments and, at the same time are quite similar inside the “Hometown families” segment. After identifying the customer value preferences the offering and its business model have to be mapped.

5. Mapping the Value Streams

The next step in the integrated process is to map the value streams of the multi-play offering business concept. We applied the mapping frameworks by [17] and [14] for a systematic mapping of value streams in a case value network. The illustration of the business model of the multi-play operator is presented in Figure 3.

The value streams are based on the products and services. The value stream describes what is being transferred and where the origin of the transaction is and to whom it goes. The product or service value stream often includes indirect value streams that complement the product or
service based value streams. These are revealed by analyzing the actors and customers of the model. The analysis also reveals new actors, customers and value streams that cannot be seen until the analysis progresses. The value streams were categorized into the following categories:

- Goods (e.g. books)
- Free Goods (e.g. web browser)
- Services (e.g. ad space)
- Free services (e.g. email)
- Information & Knowledge (e.g. user information)
- Associate value streams (goods and services e.g. mp3 players)

The resources as enablers for the value streams were analyzed at this point. The traditional view is that capabilities enable the exploitation of resources. We have used an outcome driven view, where the producing of value streams is enabled by the resources which are categorized into software development capabilities, service capabilities, technological capabilities, information, ICT systems & technologies, immaterial assets, and contracts & partnerships categories. The aim of the resource analysis is to link the resources of the business model to the value streams. A further aim is to identify the critical resources in providing the ultimate customer value [see: 7]. The resource analysis of the business models is based on the value stream analysis and it explains the configuration of the business concepts to the business environment of a firm. The resources enable the value streams and they define the possibilities of a firm to adopt new business concepts. The resources in our analysis are capabilities and assets for providing and consuming the value streams. A framework for connecting resources to the value streams is presented in the following section.
### 6. Mapping Customer Value Preferences with Resources

We have used the business model framework as an instrument to map the customer value preferences to the resources of the firm. The prioritized customer values from the CVM are connected to the attributes of the service (value streams) with the application of the QFD process (see Figure 4.).

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Figure 4. QFD tool for connecting customer value preferences to firm offering.

The process is modified for assessing service qualities. The attributes of the service are the value streams from the main actor to the customer (e.g. TV, internet access, email). The result of this analysis is the relative priorities for the customer value streams in the business model. These prioritized value streams are then connected to resources with a new QFD process. As a result of this transformation, the relative priorities of resources of the business model can be evaluated.

The relative importance of an offering’s single element in producing value for the customer can be revealed by connecting the weighted value attributes of profiles to the elements of the multi-play offering with the QFD process. The importance of a “how” element is calculated by multiplying the correlation value in a single column in the matrix by the importance rate of the value attribute. The relative importance of an element is the sum of a column of “preference weighted” correlations. The summary of the relative importance of the multi-play...
The most important elements of a Multiplay offering are related to the devices and content services. This is because many of the preferred value elements can be fulfilled with easy and usable devices and high quality content.

Figure 5. Relative importance of value streams executing the customer values

The QFD analysis also reveals the most sensitive value attributes in contrast to the elements of the offerings. The sensitivity is calculated by multiplying the sum of a row by the importance rate of the value attribute. The summary of the sensitivities of the value attributes in the segments is presented in Figure 6.

Figure 6. QFD sensitivities of value attributes.
The most sensitive value attributes seem to be convenience, ease of use, information security, level of service error susceptibility and access reliability. This means that in this kind of an offering, the greatest systemic value is locked in these value attributes.

To assess the criticality of the resources in providing superior customer value we use the VRIN criteria [1] for analyzing the potential of resources holding sustained competitive advantage. VRIN is used as selection criteria. Each stage of assessment rules out some resources, and to be considered as critical, a resource has to pass each stage. In this analysis we concentrate on the value of a resource in producing a customer value stream. In our business model context the resources are somehow valuable by definition because they enable the production or consumption of the value streams. However, the relative value of a resource or a resource bundle can be measured by comparing the prioritized value streams to the resources with a QFD process (see e.g. Figure 7). This shows the relative value of a resource or a resource bundle in providing what the customer prefers.

To identify the resources that hold the potential to produce value to the customer we have turned the QFD matrix so that the value streams are the “Whats” and the resources behind these streams are “Hows”. The analysis is shown in Figure 7 with selected value streams and their resources.

<table>
<thead>
<tr>
<th>Resources</th>
<th>Importance</th>
<th>Correlation (1=low, 3=medium, 9=high, missing=correlation)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiplay box</td>
<td>0.063</td>
<td>9 3 1</td>
<td>0.599</td>
</tr>
<tr>
<td>Instant messaging client</td>
<td>0.527</td>
<td>1 1 1</td>
<td>1.384</td>
</tr>
<tr>
<td>Voice communications client</td>
<td>0.923</td>
<td>1 1 1</td>
<td>1.384</td>
</tr>
<tr>
<td>TV/radio channels</td>
<td>0.0096</td>
<td>9 1 9</td>
<td>0.285</td>
</tr>
<tr>
<td>Customer support</td>
<td>0.0590</td>
<td>9 3</td>
<td>0.220</td>
</tr>
<tr>
<td>Email</td>
<td>0.0665</td>
<td>1 1</td>
<td>0.410</td>
</tr>
<tr>
<td>Content search</td>
<td>0.0951</td>
<td>1 1</td>
<td>0.277</td>
</tr>
<tr>
<td>Voice communications</td>
<td>0.0641</td>
<td>1 1 9</td>
<td>0.410</td>
</tr>
<tr>
<td>Instant messaging</td>
<td>0.071</td>
<td>1 1 9</td>
<td>0.443</td>
</tr>
<tr>
<td>Mobile access network capacity</td>
<td>0.0695</td>
<td>9 9</td>
<td>0.280</td>
</tr>
<tr>
<td>Internet access network capacity</td>
<td>0.0695</td>
<td>9 9</td>
<td>0.280</td>
</tr>
<tr>
<td>&quot;Play app&quot; channel</td>
<td>0.0682</td>
<td>9 3 3 9</td>
<td>0.410</td>
</tr>
<tr>
<td>Video rental</td>
<td>0.0772</td>
<td>9 3 1 9</td>
<td>0.396</td>
</tr>
<tr>
<td>Video on demand</td>
<td>0.0662</td>
<td>9 3 1 9</td>
<td>0.396</td>
</tr>
<tr>
<td>Security service</td>
<td>0.006</td>
<td>3 3</td>
<td>0.062</td>
</tr>
<tr>
<td>Total</td>
<td>0.032</td>
<td>2.22</td>
<td>0.62</td>
</tr>
</tbody>
</table>

| Relative Weight (Pre-Final) | 4.5% | 16% | 3% | 3% | 8% | 6% | 4% | 10% | 7% | 9% | 14% | 4% | 8% |

Figure 7. The relative importance of a multi-play operator’s resources enabling the multi-play offering.

The analysis shows that the most important resource of a multi-play operator is “scalability”, which means that the firm has to be able to handle the increasing number of users. “Server software development” is also quite important, but it is a resource one can buy from the market and therefore not critical. Different content related resources seem to be relevant in a multi-play operator’s business. The analysis reveals that the resource pool of a multi-play operator does not include many resources that correlate with the “Multi-play box” value stream. Actually only the “Retail business capability” correlates with the hardware component of the offering. This can be explained with the fact that the hardware included in the service is
manufactured by a different firm and the operator bundles it with the services. The conclusion is that one of the most valuable service elements for customers is provided with resources that are not controlled by the operator. Also, most of the service elements are produced with the resources of other players in the network. The multi-play operator has capabilities and resources that help its orchestration of the network and managing the bundle, like contracting capabilities. It also has resources that enable the delivery of the service to customers. The multi-play operator is thus dependent on the other players in the network.

7. Conclusion and Discussion

This paper has provided a framework for connecting customer value attributes to the service flows and resources and capabilities. Our attempt has been to explore the transformation of customer requirements into business models, and resources and capabilities with the special characteristics of an integrated offer. The resource-based view and value network have been used as the theoretical foundation. The motivation for the study is derived from the literature review, which addresses a research gap in linking customer requirements with the value streams of actors in a business model, and especially with actor resources and capabilities [2; 7]. The major contribution of this study is in bridging this gap by proposing an integrated approach for transforming customer value into resources. The framework presented in this paper provides a novel approach for transforming customer requirements into a value network of actors.

Connecting the value preferences and the value streams of the business model with an applied QFD process provided us the sensitivities of the customer value attributes and relative importance of value streams in the model. Convenience seems to be an extremely sensitive value attribute in the case of a multi-play service. This is because it has a relatively high weighting in every answer and it correlates with several value streams in the multi-play service. It also seems that the value streams of devices and media are relatively important in executing the customer value preferences. However, the assessment of the correlations between the customer value attributes and the value streams has to be validated. It should be noticed that the selected case study business environment limits the generalizability of the results beyond the communication service business.

The future research directions of this study can be divided into two main categories; improving the customer value model and deepening the resource analysis. The customer value model can be improved by adding more customer profiles into the analysis and by linking supplier strategy attributes into investigation of what resources and capabilities a firm should own, develop and outsource. The resource analysis can be improved by developing the QFD model and going deeper into the resource criticality analysis and the resources of other players in the network. On the whole the value preferences need explicit connection to the value network strategies. This requires systematic analysis of the added value of an integrated bundle and linking the weights back into the value stream model.

References

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268. BUTYLINA, SVETLANA. Effect of physico-chemical conditions and operating parameters on flux and retention of different components in ultrafiltration and nanofiltration fractionation of sweet whey. 2007. Diss.


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271. JUSSILA, IIRO. Omistajuus asiakasomisteissa osuuskunnissa. 2007. Diss.

272. 5th Workshop on Applications of Wireless Communications. Edited by Jouni Ikonen, Matti Juutilainen and Jari Porras. 2007.


275. SOUKKA, RISTO. Applying the principles of life cycle assessment and costing in process modeling to examine profit-making capability. 2007. Diss.


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