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Business Models: A New Perspective on Knowledge-Intensive Services in the Software Industry

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Abstract

Firms' specialization to core competencies as a response to intensive competition in technology and knowledge-intensive industries, such as software industry, emphasize network-intensive business behavior and the importance of utilizing resources beyond company boundaries. In recent years, outsourcing of services, including knowledge-intensive services (KIS), have attracted increasing attention in the research literature. However, KIS have not been sufficiently analyzed in connection with different types of business models. Taking theories of interorganizational exchange, including industrial network approach and the transaction cost theory as our basis, we analyze key knowledge-intensive services in four different types of business models of software companies. In our empirical analysis, we identify that the role and type of KIS vary systematically by business model-types.

1. Introduction

Network-intensive business behavior is an emerging topic in several areas of research, including the discussion of business strategy and business models. This is an interesting perspective to the knowledge and knowledge resources of companies, because, as a result of increasing specialization in core competencies, companies need to acquire knowledge beyond their own area of expertise to create and deliver competitive value propositions to their customers. This phenomenon has led to increased efforts in acquiring essential resources through networks of actors, especially in highly knowledge-intensive fields such as software business.

Along with this development, knowledge-intensive services (KIS) of specialized providers have received increased attention in the literature (Soete and Miozzo 1989; Starbuck 1992; Miles et al. 1995). In the other direction, there is evidence that relationships and collaboration in business networks vary in different types of businesses (Wilkinson and Young 1994; Ford et al. 1998, 70-72; Cannon and Perreault 1999). However, the differences in the use of KIS in different business contexts have not received sufficient attention in the literature.

In this study, we contribute to this research gap by analyzing the use of KIS in connection with different types of business models. Since there is a wide variety of ways to conduct business in the software industry, we have classified software business models into four categories on the basis of prior literature. This classification framework is used to structure the analysis focusing on the following research questions: (1) *"What are the key knowledge-intensive service types in different business model categories?"* (2) *"Who are the key service providers (actors)?"* and (3) *"What is the role of knowledge-intensive services in particular types of business models?"* In order to address these research questions, we conduct a comparative case study based on a qualitative research approach.

After a brief introduction on both the knowledge-intensive services and the business model concept of firms, we establish a framework to distinguish between different types of business models in the software industry. Then, in the chapter three we discuss our research methodology and, in the following chapters, we present our empirical data and discuss the findings contributing to our research questions.

1.1 Knowledge-Intensive Services

The emergence of knowledge-intensive services (KIS) in innovation activity has received increasing attention in the literature during the last decade (e.g. Miles et al. 1995; Windrum and Tomlinson 1999; den Hertog 2000; Gallouj 2002). Based on both literature research and case studies, Miles et al. (1995) characterize KIS as users, carriers and source of innovation. Furthermore, Hauknes (1998) concludes that KIS play a key role in transforming client firms into dynamic learning organizations. Some authors (e.g. Miles et al. 1995; Windrum and Tomlinson 1999; Toivonen 2004) define KIS providers as professional business service organizations that have knowledge or expertise related to a specific technical or functional domain. According to them, KIS actors may be primary sources of information and knowledge (through reports, training, consultancy, etc.) and their services form key intermediate inputs in the products or production processes of other businesses (e.g. communication and computer services). On the other hand, den Hertog (2000) identifies KIS as a category of service activities that is often highly innovative in its own right, as well as facilitating clients' innovation activity.

A substantial part of the literature on knowledge-intensive services emphasizes the function of KIS as an innovation agent to service users' innovation process, and the contribution of services to knowledge transfer and diffusion in innovation systems (Miles et al. 1995; Hertog 2000; Gallouj 2000). Instead, little attention has been paid to the role of KIS in the development of business capabilities in different business contexts, although Miles et al. have recognized the difference between technological and non-technological KIS already in 1995. They identify the latter one as managerial or business-oriented KIS. In this study we attempt to contribute to this gap by analyzing the use of KIS in connection with different business models.

In the literature there are numerous attempts to classify KIS according to the type of service (e.g. Miles, 1995; Starbuck 1992; Soete and Miozzo 1989). Common to all of these attempts are that they identify a wide range of KIS that are heterogeneous by nature. Toivonen (2004) divides KIS providers into private companies that provide services on

profit basis, public organizations that provide services on non-profit basis (e.g. public research and technology organizations, RTOs), and hybrid forms between private-public and profit-nonprofit service actors. Nevertheless, there are services and KIS actors that do not fit into these classifications. For example, Martinelli (1991) has recognized the role of internal actors as suppliers of knowledge-intensive services. Furthermore, Kim and Mauborgne (1999) summarize that the components of services in value innovations, and the long-lasting nature of the client relationship, require that value innovators have a network of collaborative partners that provide complementary assets, capabilities, products and services.

The use of knowledge-intensive services has been studied in accordance with the size of a company (Howells and Green 1988; Martinelli 1991), state of business cycle (Goe 1991; Marshall 1985), growth (Ochel and Wegner 1987), and industry type (Toivonen 2004). Complementary to these studies, our focus is to explore KIS in different business contexts within a specific industry, i.e. software business. On the basis of the literature reviewed above, we focus on the identified key types of KIS and classify them by actors and by the type and role of service as illustrated in Table 1.

Table 1: Classification of KIS by Actor, Type and Role

KIS Actors	Type of Service	Role of Service
<ul style="list-style-type: none"> ○ <i>Internal actors,</i> ○ <i>Private (specialized) providers,</i> ○ <i>Public service providers,</i> ○ <i>Collaborative strategic nets of partners.</i> 	<i>Business consulting services, Legal services, HRM services, IT consulting and support services, Communication services, Research services, Sales and distribution services, etc.</i>	<ul style="list-style-type: none"> ○ <i>Informative,</i> ○ <i>Diagnostic,</i> ○ <i>Advisory,</i> ○ <i>Facilitative,</i> ○ <i>Turnkey,</i> ○ <i>Managerial.</i>

In the classification presented in Table 1 we make a distinction between different KIS actors that include private providers, public providers, collaborative partners and internal actors. We see that any of these can act either on profit or non-profit basis and that the interactive service relationships between KIS providers and users are essentially bi- or multilateral learning processes that are supposed to expand the business capabilities of KIS actors. Furthermore, we identify the types of services used and their roles in different business contexts. We argue that there is difference in the use of KIS in different types of businesses and analyze this phenomenon through cases representing different business models in the software industry. In addition, we argue that the increase of networked business behavior has fed the emergence of new providers and types of knowledge-intensive services. In this study, we identify these service relationships as essential characteristics of KIS activity and analyze their existence in connection with identified types of business models of software firms.

1.2 The Business-Model Concept

The concept of the business model in the literature on information systems, electronic business and other areas of management research refers to the ways of creating value for customers, and to the ways a business turns market opportunities into profit through sets of actors, activities and collaboration. Research on business models rests in many respects on strategy discussion and draws on strategic concepts and issues. Despite the confusion in the terminology related to strategy and business models, prior research has achieved a consensus on the position of business model as a conceptual and theoretical layer between business strategy and business processes (Osterwalder 2004; Morris et al. 2004; Tikkanen

et al. 2004). Several researchers have described and analyzed the conceptual development of the business model of the firm (e.g. Papakiriakopoulos et al. 2001; Gordijn and Akkermans 2001; Pateli and Giaglis 2003). According to most recent studies, the business-model concept includes some elements of business strategy, and aims at describing the business as a manifestation derived from strategy (Osterwalder and Pigneur 2002; Rajala et al. 2003; Morris et al. 2004). It has also been defined as an abstraction of business (Seddon and Lewis 2003), which characterizes revenue sources and specifies where the company is positioned in its value-creating network in a specific business.

The essential elements of different business models are defined in different words by several researchers (e.g., Osterwalder and Pigneur 2002; Bouwman 2003; Rajala et al. 2003; Hedman and Kalling 2003; Morris et al. 2004 and Osterwalder 2004). Many of the studies identify a number of elements that are characteristic of different business models. These elements, expressed in different words by different authors, include: (1) value propositions or offerings, (2) the resources needed to develop and implement a business model, and (3) the revenue logic (including sources of revenue, price-quotation principles and cost structures) that is characteristic of a particular business. In addition, some of the studies (e.g., in Timmers 2003; Osterwalder 2004; Morris et al. 2004) emphasize (4) relationships with other actors. Timmers (2003) points out that, in the context of business models, the focus shifts from creating value through internal activities to creating value through external relations. He identifies these relationships within the value-creating network as an inseparable part of the business model of a firm.

2. Research Framework

To analyze knowledge-intensive services in connection with different types of business models, we draw on the literature on industrial network approach (Håkansson 1982; Powell 1990; Gulati 1998; Achrol and Kotler 1999; Möller and Halinen 1999) and transaction-cost economics (Williamson 1975; 1985). These theoretical approaches provide us with basis for distinguishing between different types of business models.

The transaction cost theory first presented by Coase (1937) and further developed by Williamson (1985), provides us with some attributes for the exploration of exchange through market versus hierarchical mechanisms for analyzing strategic dependencies. These attributes include (1) the *frequency* with which transactions occur, which focuses on the type and degree of interorganizational exchange, (2) the *uncertainty* to which transactions are subject to, and (3) the *asset specificity* involved in supplying products and services. The analytical diversity of TCE is clearly advantageous for our classification of offerings as it provides us with measures to distinguish between different types of offerings.

Despite some criticism due to the fact that transaction cost economics (TCE) deals with polar forms of buyer-seller relationships, it investigates a broad range of exchange-related issues including vertical integration and interorganizational relationships in transactions (Rindfleisch and Heide 1997). From the perspectives of our study, the limitation of the transaction cost approach is its strict focus on the transaction and the view of the extremes between markets and hierarchies. It also focuses on the assets of actors, but does not consider their capabilities developed through collaboration in relationships, which are essential in our study.

Hence, we need a dimension in our classification scheme reflecting interorganizational relationships in terms of the level of involvement in customer relationships. The industrial network approach (for example, Ford et al. 1998 and 2003) considers the buyer-supplier relationships in terms of involvement, where low-involvement relationships are handled

with limited co-ordination, adaptation and interaction. On the contrary, the high-involvement approach includes more co-ordination and adaptation, which create interdependency. Furthermore, the theory of industrial networks and relationships provides us with a dimension to distinguish between different types of businesses in terms of buyer-seller relationships.

In order to understand industrial networks and how value is created within them, we need to consider the fundamentals of relationships. Håkansson and Johansson (1992) identified the underlying fundamental elements of networks as actors, resources and activities. According to them, actors perform and control activities that are based on control over resources, and develop relationships with each other through exchange processes. Service activities occur when actors combine, develop, exchange, or create resources by utilizing other resources in the network. Toivonen (2004) summarizes that KIS, like business services in general, can be examined as actors (firms and organizations) or as activities. In the majority of studies, KIS have been studied focusing on actors. In our study, we use the industrial network approach to combine these perspectives, i.e., to analyze both actors and activities simultaneously.

On the basis of the above-discussed theoretical perspectives, we distinguish between different types of business models as presented in Figure 1. Based on the transaction cost theory, we establish a dimension to analyze the homogeneity of offerings for multiple customers. In the other direction, we draw on the industrial network approach to identify the degree of involvement in customer relationships. The construction of dimensions and the framework is discussed more profoundly in our earlier study (Rajala and Westerlund 2005).

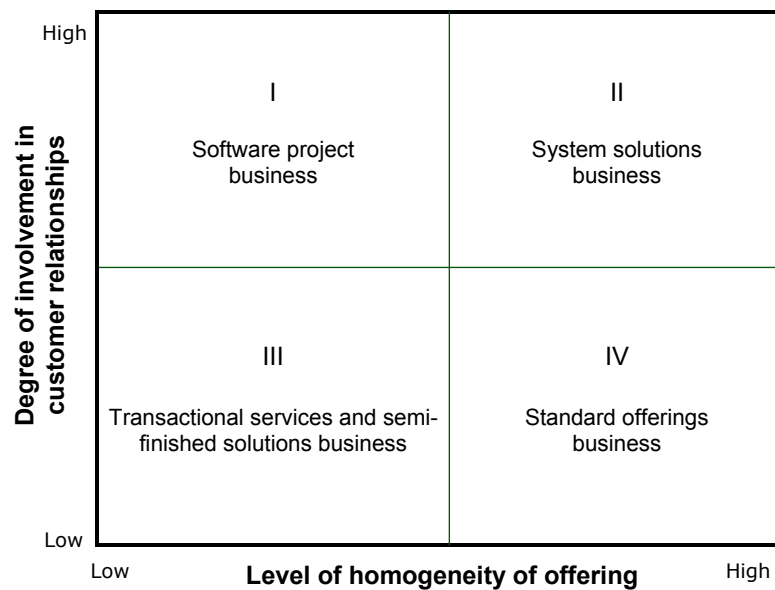


Figure 1: Classification of different types of business models in the software industry

We identify the extremes of both of these dimensions as a low or a high level of homogeneity of offerings and, accordingly, low and high levels of involvement in customer relationships. This polarity in two dimensions produces four distinct categories of business models. We label these categories as: (I) software project business, (II) system solutions business, (III) transactional services and semi-finished solutions business, and (IV) standard offerings business.

3. Methodology

We analyze the use of KIS of selected software companies using the business-model concept as a means of structuring the research. Software business is selected as the focus of this study because of its rich knowledge-intensity, and, because it embodies novel instances of knowledge-intensive services that have not yet received attention in the research literature. We use a qualitative research approach incorporating multiple-case-study methodology comprising structured interviews and observations for the collection of primary data, as suggested by Yin (1994). Our field-study process ran over an 18-month period between April 2002-September 2003, during which time we conducted semi-structured interviews with senior management in the selected case companies. Representatives of the senior management were selected as the key informants due to the sensitivity and nature of the information we were seeking. Given our research questions, they were seen as viable sources of information in the critical evaluation of the representativeness and validity of the data. The interviews with the senior management were recorded and transcribed. In addition to conducting our intensive field study, we collected an extensive set of secondary data on the companies, comprising internal documents, brochures, bulletins and annual reports, presentation material, reviews, and www sites. We also reviewed the relevant literature on theoretical approaches to interorganizational exchange and relationships. This concept-centric focus enabled us to establish a classification scheme for categorizing different types of software business models.

From the perspectives of our research questions, a research design based on multiple-case-study methodology is reasonable. It provides a more comprehensive view of the phenomenon than an approach based solely on quantitative methods. Similarly, a study of only one case would not have allowed comparing services in different types of business models. For our comparative cross-case study we selected six independent software vendors, using company size and identified type of business model as selection criteria. The companies represented each type of business-model category according to our previously constructed classification. We are aware of the possible bias in the empirical data and resulting findings due to the fact that the cases are selected from a relatively small geographical area near the capital of Finland. We have paid special attention to this problem through a triangulation of the analysis by comparing the findings with two separate studies, a survey of 48 Finnish software companies and a case study conducted in Denmark. Comparison of the empirical findings of these studies supports our results.

For reasons of commercial confidentiality, the names of the companies in our empirical data are withheld. The sample included software companies with between five and 500 employees, described as small and medium-sized enterprises on the international scale. The motive for choosing case companies with different types of business models was to provide a solid basis for a cross-case analysis that would reveal whether (and what kinds of) differences existed in the knowledge-intensive services of different software businesses. The number of the empirical observations equals to 243 identified service items in the six case companies representing nine individual business models. Analysis of the data was conducted by coding the service items identified in the interview transcriptions. The observations were further grouped into 20 principal categories, the incidences of which were analyzed according to the four identified business-model types. To ensure the reliability of the findings, the data was analyzed independently by two researchers and verified through comparison of the results.

4. Empirical Data

Our empirical data is collected from six case companies, each of which is described briefly in the following paragraphs. A summary of all of the cases is presented in the Appendix I.

4.1 Case A

The company in Case A is a supplier of model-based software products for building and construction industry, energy sales and distribution organizations, and municipalities. The company develops and markets model-based software products and solutions with related services for infrastructure management. The business is divided into three separate business areas. In all these business areas, the company develops and sells its software and services for the international market. The company has grown steadily from a systems engineering team of few employees into an international software vendor. Currently, the company has subsidiaries in 12 countries that coordinate local distribution partnerships in different market areas.

The value proposition of Case A aims at assisting clients to effectively manage structural information, e.g. on complex building projects. The solutions in Case A are directed to different customer segments, but are based on a common product platform. According to our business model framework, the business model in Case A is identified as a standard offering business.

4.2 Case B

Case B is an international software company that develops, markets and sells commercial off-the-shelf (COTS) enterprise software. The company was founded in the mid 1980s and the ownership was restructured in the early 1990s through a management buy-out. The company was listed on a local stock exchange ten years later.

A profound feature of the offerings of Case B is the interoperability and compatibility with major financial administration and ERP solutions. According to our classification of business model types, the business models of Case B are described as transactional services and semi-finished solutions business, and standard offering business. These two business models are analyzed as separate cases (Cases B₁ and B₂) in our analysis.

4.3 Case C

The company in Case C focuses on software testing and quality assurance tools. The offering in Case C is based on a modifiable system solution (MOTS) and consists of an automated model-based test generator and related consulting, support and training services.

The value proposition in Case C is aimed at helping customers by enhancing their software testing processes by replacing their manually written test scripts with automatically generated test cases. Based on our business model framework, we identify the business model as a system solution business.

4.4 Case D

Case D is a business unit of a multinational company that provides HRM and financial resource management solutions in Scandinavian countries. Case D focuses on offerings

targeted to all branches of the public and private sectors by providing solutions, services and process consulting.

Based on our business model framework, we classify the businesses of Case D into three distinct business model types according to the characteristics of the businesses in different market segments. One of the identified businesses serves large customers through close collaboration in software projects. The business model in the segment of medium-sized customers is identified as system solutions business. The third model, identified as standard offerings business, focuses on software products and application services to SME customers. These three distinct types of business models are analyzed as separate cases (Cases D₁, D₂ and D₃).

4.5 Case E

The company in Case E was founded by major insurance companies in Finland to provide them with information technology services and system solutions in the field of insurance management. The motivation for the founders of this joint venture was an attempt to increase both effectiveness and cost-efficiency through collaborative application development compared to their own in-house application development.

The company operates in close partnerships with its customers by providing them with customized information system solutions based on a common product platform. Thus, we identify this business model as system solution business.

4.6 Case F

The company in Case F is specialized in video streaming applications and content mastering tools. The company was founded in the late 1990s and began the development of web-based business solutions for the film industry. Later, the focus has shifted on interactive TV and digital cinema solutions in the global market. The company develops and sells DTV content authoring and management tools based on a platform to DigiTV producers. On the basis of our classification scheme, we identify the business model of Case F as system solutions business.

5. Findings

In this multiple case study, we analyze different KIS actors in connection with different types of business models from the client perspective, i.e. from the perspective of software firms.

Our key findings indicate that there is a significant difference in the emphasis on the use of KIS between different types of business models: Businesses producing homogeneous offerings for multiple customers use market development services, whereas businesses focusing on heterogeneous offerings to a small number of customers emphasize product and technology development services. Furthermore, services that are strategic in nature, or related to the business strategy of the company, are in many cases acquired from partner network through long-term relationships instead of commercial, specialized KIS providers through transactional relationships. Our business-model specific findings are summarized in Table 2.

In **Software project businesses** (labeled as Type I of the business model categories in our research framework) where there is a high degree of involvement in customer relationships and a low level of homogeneity of offerings, offerings are typically designed to meet customer-specific needs. Customer relationships in these businesses are based on

close collaboration between the software vendor and the clients, and typical value realization includes a high proportion of direct consultation between the vendor and the customer(s). Among our cases, the case D1 represents an example of this category as it develops tailored human resource management solutions in close collaboration with its customers.

The case D₁ makes an example of tailored software providers and IT consulting firms, which emphasize the ability to understand and meet customer-specific needs. In this case the identified KIS include management consulting to develop competences on solution domain and total offering, market sensing and business intelligence monitoring to improve understanding on customer's needs and processes. However, our interviewees emphasize that key knowledge-intensive services in this business are related to development of technological competences.

System solutions businesses (coded as Type II of business models in our framework) embody a high degree of involvement in customer relationships and a high level of homogeneity of offerings. The total offerings in this category are based on a uniform core solution, but are possibly modified for customers through modular components. Our cases C, D₂, E and F represent examples of business models in this category.

Table 2: Identified KIS in different business-model types

Business - model type	I "Software project business"	II "System solutions"	III "Transactional services and semi-finished solutions"	IV "Standard offerings"	
Internal actors	Type of KIS	Market sensing, IT consulting and support services	Systems-development services	Business consulting services	Product-development and technology services, IPR and brand management
	Role of KIS	Managerial and advisory role to provide insight into customers' needs	Advisory role in legal and financial questions, informative role in market intelligence	Managerial role in maintaining capabilities related to operations management	Managerial role in production, technical innovation and marketing
Public providers	Type of KIS	Market research services	HRD services, partner seeking services	Services related to product development and partner seeking	Market research and partner seeking services
	Role of KIS	Informative and diagnostic role in market sensing	Facilitative role in partner network development and research collaboration	Advisory and facilitative role in partner network development and research collaboration	Facilitative role in internationalization and development of distribution networks
Private providers	Type of KIS	Technology consultation services	Legal services, personnel training and consulting services	Communication, HRM development and operating services	Business consulting, localization and legal services, market sensing
	Role of KIS	Facilitative role in technological competencies	Facilitative role in technological development and personnel skills	Facilitative role in marketing communication and business development	Facilitative role in distribution network development and marketing capability

Partner network actors		IT consulting, support and integration services	Operating services, development of technology and market sensing	Development of markets, standards and total business offering	Sales and distribution services
Type of KIS					
Role of KIS	Facilitative role in the development of skills in narrow technology domains	Facilitative role in the development of total offerings	Facilitative role in market development	Facilitative role in collaboration with customer groups and development of distribution networks	

In our empirical data we recognize that the ability to understand and meet customers' needs in narrow segments is essential in these businesses. Several interviewees in our cases explicitly express this view. This emphasizes the capability to produce and deliver modifiable solutions for a number of customers in a relatively narrow customer segment. In our data we recognize that the key knowledge-intensive services are used to improve technological knowledge and application of technology in new solution domains. Specifically, the identified KIS in these cases are related to the development of total business offering, improvement of understanding customer's processes, development of technological competences and research collaboration with technology partners.

Business models embodying **transactional services and semi-finished solutions** are labeled as Type III in our classification scheme. A fairly low degree of involvement in customer relationships and a low level of homogeneity of offering characterize the businesses in this category. Our case B₂ is an example of business models in this category. The business of case B₂ aims at serving the needs of several customers with semi-finished solutions based on a set of components and a product platform. The offering in these cases does not add value to customers as such, but is used as a part of more comprehensive value proposition created through business partners. Our informants in the case B₂ emphasize that success in this business requires the ability to understand and meet technology-specific needs.

In our data, the identified knowledge-intensive services in this business are related to the development of new technological competences through technology partnerships, operating and usability services, development of new business infrastructures, management processes and human resources and outsourcing of support functions. In more generic level, we interpret that KIS in these businesses are used especially to improve internal efficiency of operation.

Businesses focusing on **standard offerings**, i.e. businesses that seek large numbers of customers and economies of scale through a high level of homogeneity of offerings are described as Type IV of business models in our framework. In our empirical study, we identify cases A, B₁ and D₃ to represent business models in this category. A common characteristic of these businesses is that the offering is comprised of a uniform core product, a modular product family or standardized on-line service. Another characteristic of these businesses is that they typically exhibit a low degree of involvement in single customer relationships. The business models in these cases comprise various models of direct and indirect mass-distribution, e.g., online distribution and diverse distribution-partner networks.

The identified KIS in the businesses that belong to this category include legal services related to contracts and agreements, market analysis (surveys, sensing, etc.) related to internationalization processes, establishment and mobilization of distribution networks (partner identification and evaluation, development of delivery networks, management of

customer relationships), localization services, management consulting, product development funding and customer satisfaction analysis.

Our interviewees express that the ability to serve the common benefits of multiple customers is an essential competence in these businesses. Correspondingly, the identified KIS in this type of business are related to marketing and distribution activities. External KIS related to the development of technological competences are used to a lesser extent in the business models of this type.

6. Discussion and Conclusions

In this study, we apply a client perspective to analyzing knowledge-intensive services through exploring the use of KIS in different types of business models. This client perspective is an essential contribution to the existing literature, because prior research on KIS has emphasized the providers' perspective and analyzed the supply of services. In this study, we focus on the demand of services by analyzing what are the key types and roles of KIS used in different types of business models.

In order to distinguish between different types of business models, we established a classification scheme based on two dimensions: the degree of involvement in customer relationships and the level of homogeneity of the offering for multiple customers. Our scheme produced four distinct categories of business models. We suggest that models of the same type share a similar emphasis on key resources. Furthermore, we assume that they differ from other categories in a way that provides a rationale for analyzing the variety of key services in the different types of models.

6.1 Discussion on Findings

As a contribution to our first research question, we identified the types of services emphasized in different business model categories. In publicly provided KIS there are similarity in the type of services used in different business models. Services related to market research and partner seeking are emphasized in all types of business models. However, despite this similarity, publicly provided KIS have heterogeneous roles, i.e. informative, advisory or facilitative roles, in different businesses.

Although KIS obtained from private providers have a facilitative role in all types of businesses, the type of services varies in different types of business models. Private, specialized KIS facilitate technological development in businesses characterized by a high degree of involvement in customer relationships, and market development and marketing capabilities in businesses with low degree of involvement in customer relationships. The KIS obtained from private providers are principally used to facilitate the development of current business.

Partner networks are an emerging source of knowledge-intensive services. Similarly with the services acquired from private commercial providers, KIS obtained from actors in business networks vary significantly by the type of business model. However, the KIS acquired from partner network have a facilitative role in all types of business models. The services obtained through network partnerships are mainly focused on the development of technological capabilities in businesses characterized by a high degree of involvement in customer relationships, and, on marketing capabilities in businesses characterized by a low degree of involvement in customer relationships.

According to our findings, KIS acquired from partners in networks are related to strategic, future-oriented new business development, as opposed to the services acquired from private providers specializing in distinct areas of knowledge. These findings are

consistent with the view of Toivonen (2004) in that KIS obtained from private (specialized) actors and KIS obtained from collaborative business networks are mainly used to facilitate the development of some particular areas of business.

According to our interpretation of the empirical findings, a common characteristic of all business model types is that internal KIS mostly possess similar roles, i.e. advisory and managerial roles in the business. In our data, the focus of internal KIS in businesses embodying heterogeneous offerings is related to market sensing and business development. In businesses focusing on homogeneous offerings, internal KIS are related to technology and product development.

6.2 Limitations of Study and Avenues for Future Research

An identified limitation of the current study was that the sample was collected in a relatively narrow geographical area around the capital of Finland. Hence, we have compared our findings with the data we have collected in other studies, i.e. a survey of the use of KIS in 48 Finnish software companies (Rajala et al. 2004), and a case study of a Danish software company. Triangulation of these studies indicates that our findings are identical in consequential parts. Therefore, it seems that our findings may be valid in other geographical or cultural areas.

Moreover, we focused on small and medium-sized enterprises. Previous studies (e.g. Toivonen 2004) indicate that the use of KIS is correlated with the size of the client company, i.e. smaller-sized enterprises tend to use external KIS to a greater extent than larger ones. The findings of our study indicate that there is also a connection between the emphasis in the use of knowledge-intensive services and the type of the business model. Other studies (e.g., Gulati et al. 2000; Chetty and Wilson 2003; Möller et al. 2004) have shown that the scale of business is linked to network structures and the allocation of resources. Thus, there is need for further research on networks in KIS collaboration in future studies.

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Appendix I

Summary of cases					
Case	Age (yrs)	Personnel	Nature of offering	Customer relationship construct	Business model type
Case A	40	>100	Model-based software products for narrow segments such as building and construction, and energy supply	Distribution through partners in different international market areas. The operations of these partners are facilitated by the company's internal network of country offices	IV
Case B ₁	~20	>200	Commercial-off-the-shelf enterprise software	Multiple customers through a network of distribution partners, including value-added resellers, marketing partners and business consultants	IV
Case B ₂	~4	<30	Semi-finished integration platform for electronic business solutions	Implementation of customer-specific solutions for multiple customers in transactional relationships	III
Case C	5	<50	Software service based on an automated model-based test generator	A multidimensional network structure that incorporates various strategic partners	II
Case D ₁	35	>500	Human- and financial-resource management solutions with related services and process consulting	Customer relations mainly through the company's own sales departments and consultant partners	I
Case D ₂	10	<100	Enterprise resource-management system solutions for SME customers	Distribution through the company's own sales departments and group business units, and marginally through resellers	II
Case D ₃	~3	<50	Third-party solutions, software products and application service provisioning for small enterprise customers	Direct sales, complementary product or service partners and online application service provisioning	IV
Case E	35	>100	Development, delivery and maintenance of information-system solutions for statutory pension insurance companies	Intensive partnerships with customers to provide them with customized information-system services and solutions.	II
Case F	5	<50	Video-streaming and content-mastering software and related services for DigiTV producers.	Primary customers also act as distribution-channel partners and mediators in new markets.	II