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Mobile Internet Services: Integration Models and Structural Determinants

by

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THE ECONOMICS OF TELECOMMUNICATIONS
This report is one of a series of papers and reports on telecommunication economics published by the Institute for Research in Economics and Business Administration (SNF) as part of its telecommunication economics program. The main focus of the research program is to study the deregulation process of the telecommunication industry, and the economic and organizational consequences of changes in markets, technology and regulation. Being started in 1992, the program is now in its fourth period ending in 2005/2006. The program is financed by Telenor AS.

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PREFACE

This report is a part of a project funded by The Research Council of Norway, Telenor, Den Norske Bank, A-Pressen, Ericsson, and EasyPark. The project is called "Mobile and channel integrating electronic commerce – business models and end-user adoption". This work reports on the business strategic sub-project, and focuses on organization of value network activities and business models of the players that in a collaborative effort provide mobile services. The report is a result of a joint effort of a project team consisting of Professor Leif B. Methlie, Associate Professor Inger Stensaker, and Research Scholar Leif Jarle Gressgård. The theoretical part is written by Leif B. Methlie, while the case analysis and discussion sections are mainly written by Inger Stensaker with contributions from Leif B. Methlie and Leif Jarle Gressgård. In addition, some parts of the empirical work concerning SMS Jackpot are based on a business degree report written by Cecilie Seim. Finally, the authors want to thank Professor Per Egil Pedersen at Agder University College for valuable comments.

Bergen, October 2003.

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ABSTRACT

The overall purpose of this report is to contribute in developing theory related to the supply side of mobile and electronic commerce. We explore how mobile services are organized and which factors explain different choices in terms of organization. Based on a theoretical framework called MAPIT, we particularly focus on how structural conditions affect organization of new services. We apply the framework in a multiple case study of five mobile services.

As expected, we found that a number of different actors were involved in supplying mobile services through value creating networks. The value networks we identified showed constellations of both established and new actors, where different elements (organizations, activities, and transactions) were integrated in new ways. Integration and disintegration in the services we studied were aimed at creating value primarily by offering an additional distribution channel and by reaping economies of scale. The values created for customers were not always obvious however. In making decisions about how to organize mobile services, suppliers have to consider carefully how values will be created for consumers.

1 INTRODUCTION

E-commerce and M-commerce: Electronic and Mobile Internet Services

Electronic commerce today is associated with the Internet although transaction exchange on electronic networks has existed for several decades. However, the properties of Internet have changed the economics of information and transformed the economic landscape of transaction exchange. A network economy is created that has profound effects on the demand side and the supply side of markets. The structure of the supply side becomes more complex with new actors contributing in value creation and the buyers on the demand side gain increased customer values through more services, more convenient access, and increased information. The success of the Internet for commercial services attracted the interest from operators of wireless networks. However, the mobile phone as a service access device had not been a great success in many countries. It was successful as a voice and text-based communication service, but voice communication was becoming a mature market in many countries, and the operators were looking for new revenue sources for the mobile phone. In this respect, mobile commerce (m-commerce) could offer new opportunities. But the first attempts of web interface over the GSM wireless networks by WAP protocols were failures. Its adoption by users was slow, and the new UMTS technology and the 3rd generation wireless networks were seen as the solution by the operators.

In 2001 the deployment of this network technology took place in some countries. In Norway, four operators were licensed for deploying the UMTS networks, each one estimated to invest from 10 to 20 billion NOK. For these investments to be profitable the operators will have to increase the ARPU by 100%. In a mature voice market new services must be generated. M-commerce, serving users anywhere and anytime could add new capabilities to the existing e-commerce markets that can only be accessed from fixed locations such as homes or offices. However, the set back of economic development in most countries in the world has slowed down the deployment of the new networks and the applications that could generate the new revenues. It has become a vicious circle where the buyers more carefully evaluate the utility of the services, the device manufacturers are more reluctant to develop the new terminals required, and the operators either back off or delay network deployments. Thus we are left with the GSM technology and some improvements in the transmission capabilities in terms of packet switching and “always on” (GPRS). The most successful commercial services over wireless networks today are SMS based.

By combining services offered on PC based and mobile based terminals (channel integration) in electronic commerce, the best functionality of each channel in servicing the customers can be selected. Channel integration can be used across different phases of the customers purchasing cycle or a service can be delivered through several channels.

Characteristics of E-commerce markets include: removal of geographic and physical constraints; possible reversal of information flows from customers to vendors; novel information bundling and channelling techniques; increasing difficulty to capture benefits for single companies; weaving together of distinct firms' resources and capabilities (Amit & Zott, 2001); increasing use of non-equity forms of collaboration (Narula & Hagedoorn, 1998).

M-commerce, also called Mobile electronic commerce (MEC) and mobile e-business, can be defined as *"e-commerce (e-business) activities relying solely or partially on mobile e-commerce transactions*" (Tsalgatidou and Pitoura, 2001: pp.221). Thus, m-commerce is basically e-commerce by use of wireless devices. In line with this understanding the concept, Kannan, Ai-Mei Chang and Whinston (2001), and Yunos and Gao (2003) propose three unique characteristics of wireless devices over computers and other conventional platforms. First, they argue that wireless devices are accessible, meaning that mobile phones are portable and available for users all the time. Second, mobile phones are personal because they carry the users' identities and by this make personalization easier. And third, it is possible to identify the users' physical location at all time. Hence, in addition to the characteristics of electronic commerce, mobile electronic commerce involves different technological opportunities and challenges. M-commerce has the potential to provide location-specific services, but due to the limitations of the user interface in terms of size, resolution, and surfability, personalization and/or customization becomes increasingly important (Tsalgatidou and Pitoura, 2001: pp.224).

1.1 Background

On the basis of the predicted developments in wireless network technology and the applications of this technology to electronic commerce, a research project was undertaken by SNF on "Mobile and Channel Integrating Electronic Commerce – Business Models and End-User Adoption", in collaboration with five business partners. The following business partners

participate in the project: A-pressen, Den norske Bank, EasyPark, Ericsson and Telenor Mobil.

The objectives of this project are to:

- Increase the level of competence among Norwegian technology and service providers, application developers and operators on business strategic and behavioral requirements for successful implementation of mobile and channel integrating electronic commerce services, including:
    - Developing, testing and disseminating knowledge of relevant business and behavior models.
    - Positioning the team of contributing participants as a leading discussion forum for the development and evaluation of new service-, business and behavior models.
- Increase the level of competence among the cooperating research partners on business strategic and behavioral issues of future electronic commerce, including:
    - Positioning the research consortium among the leading institutions in Europe on business strategic and behavioral research on mobile commerce measured by the number of high quality international publications.
    - Positioning the consortium as member of at least one important international research network in mobile commerce.
- Develop frameworks and models for the evaluation and empirical testing of future electronic commerce services, including:
    - A framework for evaluation of end-users' services adoption.
    - Experimental end-user services in mobile and channel integrating electronic commerce.
    - A test-bed for experimental evaluation of future electronic commerce services and their impacts on customer behavior, satisfaction, loyalty and brand relationships.

The framework to be developed combines the strategic aspects of the supply side with the behavioral aspects of adoption of new services on the demand side. The project is divided into three parts or subprojects. This work reports on the first phase of subproject 1. This subproject is particularly devoted to the supply side and the business models of the actors that in a collaborative effort provide the services. In order to better understand the supply side of mobile services, we conducted a multiple case study, and collected data from our business partners. The MAPIT framework developed by Methlie and Pedersen (2002) (see below) was used for analysis of structural changes in supply networks of e-commerce services. .

1.2 Problem Description

Each firm that exploits the business values of Internet should have a business model – how it plans to create customer values and make money. Services over wireless networks and mobile terminals create new challenges for the network operators who have been the sole provider of mobile services. The service model will be more complex with a number of actors participating in the value creation processes. In this project our goal is to explore how firms cooperate in organizing and supplying mobile services to the market. New business opportunities have evolved based on the technological development of mobile commerce.

Our research questions are: (1) How are mobile services organized? and (2) Which factors determine how mobile services are organized? In order to answer these questions we will: (a) identify the actors that are involved in supplying mobile services; (b) determine how focal actors position themselves relative to existing value networks and value chains; (c) assess the value creation potential for different network actors; and (d) focus on structural conditions included in the MAPIT framework.

The following five mobile services have been studied:

- EasyPark: mobile parking payment services
- SmartPay: mobile phones as payment device
- Djuice: mobile portal
- The Tax Magazine: electronic tax information retrieval

- SMS Jackpot: mobile and electronic lottery

Organization of the report:

This report begins with an introduction of the theoretical foundation for examining different ways of positioning and organizing mobile services. In chapter two we therefore present the value network perspective, and the theoretical underpinnings of our framework which identifies integration models and structural conditions (the MAPIT framework). Research methods are described in chapter three before our five cases are presented in chapter four. Each case description begins with a brief introduction of the mobile service in focus. We then present the value network with the actors involved in supplying the service to the market. The structural conditions for that particular service are determined using the MAPIT framework and they include an assessment of the market, actors, product, influence, and transactions. Based on these structural conditions we predict the integration model for the service in the case study. The actual way the service has been organized is then compared with our theoretical predictions. Once all five cases have been presented and analyzed using this framework, we compare the five cases, and present within-case findings and across-case findings in chapter five. Based on our findings, we suggest how our theoretical framework can be refined and improved in chapter six and in chapter seven we discuss the practical implications of our research.

This report is aimed at two types of audiences. First, the report aims to provide relevant insights for practitioners who operate in the mobile context in terms of presenting different ways in which firms have organized their mobile activities, and a framework by which to compare positioning choices and integration models. These readers will most likely find chapters four and seven, where cases are presented and practical implications discussed, most interesting. The other target audience for the report consists of researchers who focus on the strategies and business models of electronic and mobile commerce. These readers will probably be more interested in the discussion in chapter six, where we attempt to refine our theoretical framework for future application.

2 THEORETICAL FRAMEWORK

In this chapter we present the value network perspective, which creates a basis for our theoretical framework MAPIT. MAPIT can help business strategists to compare their actual integration models with expected models given a set of market conditions under which firms operate. This framework is developed by Methlie and Pedersen in earlier works on electronic markets (see Pedersen and Methlie (2000), Methlie (2001), Methlie and Pedersen (2002)) and has been slightly modified for our purposes. It consists of two parts. The first part of the framework focuses on *assessing* the structural conditions that prevailed prior to introduction of the mobile service, and the second part is a description of various integration model options that helps us *identify* a specific integration model under a set of market conditions. The theoretical framework is built on combining several theoretical perspectives on strategic management such as microeconomics, transaction cost theory, social exchange theory, production cost theory, increasing return theory, as well as evidences from online markets. It allows us to make predictions about the most likely integration model.

2.1 Value Networks

Moving from traditional telecommunication services such as voice and messaging towards telemediated commercial services, the complexity of the product increases both at the supply and demand side. For customers, the buying process becomes more complex and for the supply side a number of complementary resources and capabilities are required. It is therefore anticipated that the typical "walled garden" value chain model of telecom operators must open up bringing together several actors who in a collaborative effort creates the mobile product or service. This corresponds also with the trend in electronic commerce in general where Internet transforms sequential value chains into business-to-business networks, also denoted value networks. Value networks can be defined as "a set of related activities which together contribute in creating the end customer value" (Methlie, 2001). A network perspective on value creation changes the focus from linear, sequential dependent value creating activities to interrelated activities that collectively supply the service. Contrary to the value chain concept, this perspective is not constrained to a specific industry and the relative competitiveness of the actors, but may span several industries, for instance media and telecom, to create the ultimate customer value of a service. Instead of each actor maximizing its profit individually, the revenue generated by the ultimate service to the end consumer

should be shared among the participants of the network. Any actor in the value network has to decide on (1) the firm boundaries, horizontally and vertically, with respect to product varieties and activities in relation to the rest of the network, and (2) how to cooperate with the other actors in the networks. We call this the *integration model*, and it is part of the business model of a firm participating in the value network. This will be elaborated in further below.

2.2 Integration Model

Integration is a term used in economic theory to describe the sharing of internally coordinated value creating activities. Integration is either vertical, where value creating activities are organized as internal value chains, or horizontal, where parallel value chains over a range of products are integrated. A vertically integrated firm is a firm that performs many of the activities in the value creation itself. Disintegration on the other hand, means that value creating activities are divided among separate firms (suppliers, subcontractors, distributors, etc.). Integration is a complex, multidimensional construct of great concern to managers and business analysts in defining their business strategies. We will be concerned with how services mediated by wireless networks and accessed by mobile devices influence organization of value creating activities, and thus the integration model. In most cases this involves changes of existing integration models where services are transferred from existing markets to a mobile commerce market, for instance paying for parking or ordering cinema tickets by the mobile phone.

The integration model is a multidimensional construct consisting of four integration dimensions each one described by a number of elements. In the following we will present each dimension and its descriptive elements.

Initiator

The integration initiator is an actor who takes on the initiative to change the value creating system by introducing new market conditions. In e-commerce markets we have seen how some companies have integrated the distribution channel by eliminating intermediaries, for instance, that air line companies have eliminated the role of traveling agencies by transferring the sales function to their own Internet web site, thus integrating the sales function in-house. Similarly we have seen many firms eliminating agencies or other intermediaries from their

supply channels by transferring their purchasing function to the web. In still other cases, we have seen new entrants that by the web technology change the function of the market, and thereby the economics of intermediation. We call them "neutral" actors. The following elements define the initiator dimension:

- seller
- intermediary
- buyer

Strategy

Integration strategy refers to how the market is targeted or segmented with respect to the products and services offered by a seller. Following roughly the definitions of the two basic generic strategies by Porter (1985) we shall distinguish between two integration strategies: focused and undifferentiated

- In a focused strategy a firm chooses to concentrate on offering a narrow scope of products; a single product (or product line) serving a limited market segment. According to Porter (*op.cit.*) a focused strategy can be based on either cost focus or differentiation focus. Differentiation is achieved by utilizing a differentiation potential to create uniqueness (unique customer values). Uniqueness can be created on any product attribute; the product itself, services or information. Cost advantage may be achieved by utilizing the scale economy.

- In an undifferentiated strategy a firm pursues a broad coverage strategy (Besanko et al., 2000) where a scope of products and services is offered to a broad market. The undifferentiated strategy is driven by scale and scope economies, and the firm sets out to become the low-cost producer. Breadth is important for cost advantage where scale economies of the production resources are utilized.

Integration Form

Integration form defines the kinds of integration and aggregation that can be found on the supply and demand side of a transaction exchange. We have identified six archetypical integration forms each of which is described below.

Horizontal integration

- *Supplier aggregation* is well known from traditional marketplaces in the form of wholesalers and retailers. Aggregation can be done on products, services, or information, or in combinations of these. Online markets will create a new basis for differentiated strategies in supplier aggregation (Methlie and Pedersen, 2002).
- *Product/service integration* is the bundling of complementary products and services that constitutes a more comprehensive solution to the buyer. An example is a travel which may consist of a number of complimentary products such as flight reservations, accommodation, car rental, etc.
- *Information integration* is a form of bundling that has been most widespread in online markets due to the particular advantage of digital information. Electronic newspaper with personalized content is an example of information integration. Information integration is furthermore found in search engines, directories and portals.
- *Customer aggregation* is based on the customers' needs or interests (virtual communities, etc.) and requires some horizontal communication among them.

Vertical integration

- *Vertical functional integration upstream* (suppliers) refers to integration of activities in the supply chain. Enterprise resource planning systems like SAP may support vertical functional integration.
- *Vertical functional integration downstream* (customers) refers to the activities of a purchasing decision performed by a customer. Several models exist to describe downstream functional integration (see for instance the "customer resource life cycle" model described by Learmoth and Ives (1987) which consists of four phases: requirements, acquisition, use, and disposal with a number of processes within each phase).

Governance

Coordination and control of transactions can be executed by different governance mechanisms depending on the attributes of the transactions. Governance of inside-the-firm transactions (hierarchical control) is different from the governance of market exchanges (mediator). Inside-the firm versus market exchange are the extreme mechanisms. Companies may choose government mechanisms that lie between these two extremes, also called hybrid governance structures (Child and Faulkner, 1998) where control is relaxed compared to hierarchies, but not as loose as for market exchange. We shall define two intermediate forms of governance, agent and distributor, based on asset ownership and control (see Grossman and Hart, 1986). By underlining ownership and control we can identify degrees of governance dependent on to what extent one part wants to own and control the assets necessary to establish a transaction exchange.

- Hierarchy is chosen when transactions are recurrent, have highly uncertain outcomes, and require relationship-specific investments. Hierarchy leads to vertical integration - more activities of the value chain are performed inside the firm.

- *Agents* are intermediaries that have established a bilateral contract with another part (seller or buyer) to enter into a transaction agreement in the name of this other part (the principal). They are remunerated with a revenue-sharing commission. Examples are travel agents, insurance agents, stockbrokers, etc.

- *Distributors* are intermediaries who take ownership of the transactions and sell products and services in their own names. They are compensated with a residual surplus of the operation they manage. Brousseau (2002) calls these “commercial intermediaries”. Examples retailers, wholesalers, second-hand dealers, etc.

- *Mediator* is a governance mechanism where the control of the transactions is very loose by the parties involved. A mediator functions as a market maker setting up a centralized market operation. It takes no ownership of the transactions but establishes a contact point between buyers and sellers, and mediates transactions between them.

2.3 MAPIT

MAPIT is a taxonomy developed by Methlie and Pedersen (2002) for understanding the structural conditions under which intermediaries in online markets choose their strategies, roles and functions. Structural conditions are expected to determine the choice of integration model. We are interested in empirically examining how structural conditions affect the choice of integration models for mobile services. In this report, MAPIT is used as a framework for identifying and presenting structural conditions and integration models for the five different mobile and electronic services studied.

The focus in this report is on integration, that is, the governance of transactions exchanged between activities or actors of the value creating system - a value chain or a value network, in order to provide a specific product or service to customers. These transactions can be the macro-transaction that represents the ultimate customer value, for instance parking a car, or a sub-transaction of this, also called a micro-transaction, such as paying for the parking time. Our case studies consist of a mix of macro- and micro-transactions. We do not, however, distinguish between the two types in our studies. Transactions may consist of physical goods, services or information as separate products, or a combination of these. The latter is particularly interesting in digital contexts due to the increasing part of most products that constitutes information and/or service.

The MAPIT framework consists of five dimensions: market, actors, product, influence, and transaction. These dimensions define the structural conditions. The product, influence and transaction dimensions describe different aspects of the individual transaction. The "product" dimension defines the *content* of the transaction. The "influence" and "transaction" dimensions define the *exchange*, where the "influence" dimension describes the social mechanisms and the "transaction" dimension the economical conditions that impact on integration.

Table 1: The MAPIT-dimensions

Structural or relational dimension	Key variables
Markets	Fragmentation Market knowledge requirements • technical • business/customer values domain specific (product or service)
Actors	Revenue and cost models Scale and scope economies
Products/services	Product categories: physical, information and services Product complexity: production and buying Market differentiation potential (online)
Influence	Influence in network relationships - Trust: dominance, dependency - Info asymmetry - Lock-in/Lock-out effects - Previous relations - Personal relations
Transactions	Transaction risk Transaction standardization Transaction frequency

Markets

The two most central market-related conditions that impact on integration are market fragmentation and online market knowledge requirements. The degree of *market fragmentation* is a measure of the number of sellers on the supply side (upstream) and the number of buyers on the demand side (downstream) for a particular product or service. High fragmentation means that there are many sellers and buyers of a specific product in the market. Fragmentation influences both integration direction and integration initiator. In markets with low fragmentation with few dominant sellers or buyers, we expect to see these participants as initiators in vertically integrated value chains, either upstream or downstream.

Even though the general disintermediation hypothesis has been much debated (Clemons et al., 1993), we suggest markets with a few dominant sellers and fragmented intermediary structure will most likely end in disintermediation. This has been observed in the market for air line tickets where travelling agencies have been disintermediated by the large air line companies who want to sell there tickets directly to the customers. In other situation, where we may find dominant players they may form alliances to operate a transaction exchange mechanisms (hub-based intermediaries (Latham, 1999; Kaplan and Sawhney, 2000)). This has been observed in some vertical industries, for instance car manufacturing (Covisint.com) or energy (Traderanger.com). These are most commonly intermediaries executing purchasing transactions. The integration form here tends towards the hierarchy form (Baily, 1998; Giaglis et al., 1999). As the number of either sellers or buyers, or both, increases (high fragmentation), the number of contact points (seller-buyer contacts) increases, rapidly leading to mediating intermediaries. In very fragmented markets new entrants may enter the market due to new intermediary economics, for instance by introducing new technology that increases transaction efficiency and/or information management. These we shall call neutral intermediaries.

- Low market fragmentation – initiation of vertically integrated value chains (upstream or downstream).
- Low market fragmentation - Hub-based intermediaries emerge.
- Low market fragmentation (few dominant buyers/sellers) - the dominant buyers/sellers will initiate integration
- Low market fragmentation + fragmented intermediaries - disintermediate (intermediaries will disappear) and supplier aggregation (banks introduce insurance products) will be reduced
- High fragmentation among intermediaries - vertical and horizontal integration
- If many suppliers and customers, then easier for neutrals to enter market.
- If few dominant suppliers, then more difficult for neutrals to enter the market.

To serve the customers in online markets the supplier needs resources and competencies. We have identified three kinds of competencies, which are related to *market knowledge*: 1) e-commerce *technological* knowledge required to develop and operate an e-commerce application; 2) e-commerce *business* knowledge required to understand how to create customer values in online networks (personalization, aggregation, etc.), and 3) industry or *domain* specific knowledge required to sell a specific product or service in the market. Online market knowledge affects the integrator's choice of integration strategy and integration direction. For instance, value chain integrators normally follow a focused strategy that is vertically oriented. If transactions require high e-commerce technological or business knowledge, then it is likely that new and specialized intermediaries initiate and develop integration (Sarkar et al., 1998).

- If e-commerce (technical and business) knowledge requirement is high, then specialized, new entrants initiate and develop integration.

- If e-commerce knowledge requirement is low and domain specific knowledge is high, then we expect the integrator to be an established player in the domain with a focused strategy.

- If knowledge requirements are high along all three dimensions, then new integrators are likely to enter with focused strategies.

Actors

The actor dimension is a description of specific business conditions related to the market players' revenue and cost models, and whether scale and scope economies are utilized to create competitive advantage. The four major costs associated with integration include production, distribution (logistics), coordination, and transaction costs. The first two cost components determine the technical efficiency while the latter two determine the agency efficiency (Besanko et al., 2000). In markets where agency efficiency relative to technical efficiency is low, we expect to find the seller as the integration initiator. According to Sarkar et al. (1998), customer aggregation is promoted in online markets by the low production costs required to establish customer communities. From this we may deduce that new intermediaries will emerge that perform distribution functions based on customer aggregation. Another argument for customer aggregation is found in lower coordination costs

in online price discovery mechanisms, for instance online auctions (Giaglis et al., 1999). Some researchers have studied the relationship between revenue model and integration. For example Dewan et al. (1999) concluded that in markets where revenue models are traffic based, one finds a few dominating intermediaries employee in undifferentiated strategies (e.g. AOL) and many small ones with more focused strategies.

The third category of actor-related conditions that influences integration is scale and scope economies. Economies of scale and scope exist when a company achieves unit-cost savings. This can be obtained by increasing volume by scale (product concentration), or increasing volume by scope (product varieties on the same infrastructure), or by acting timely. Scale effects due to product concentration stem from online market knowledge, in particular domain knowledge. Timely actions are related to special features of networks, viz. network externalities (Katz and Shapiro, 1985) giving rise to first mover advantages.

- If we look at the impacts of electronic commerce on the governance of transactions, that is, moving from traditional intermediation channels to electronic channels (wireless, etc.), we can summarize our findings:

- If transaction costs are high (agency efficiency low relative to technical efficiency), then seller initiates integration.

- In all other situations, intermediaries will initiate integration. (We will likely see an increase in number of intermediaries).

- If production costs are low, then horizontal integration (bundling) of products, services and information.

- If coordination costs are low (economies of scope high), then supplier aggregation.

- If economies of scale are high, then we expect an intermediary.

- If distribution costs are low, then disintegration (intermediaries disappear).

- If traffic based revenue models are applied, then we expect a development towards a few dominating actors with undifferentiated strategies, and many small actors with focused strategies (Dewan et al., 1999). This is most likely in markets for information integrators (portals, etc.).

- Actors with economies of scope will choose an undifferentiated strategy.
- Actors with concentration-based economies of scale will choose a focused strategy.
- Time based scale effects impacts on the integration form where indirect network effects are present (horizontal integration) (Chircu and Kauffman, 1999).

Products

What are the relevant product-attributes that impact on integration? We have defined three descriptive elements of products and/or services exchanged in the market: product categories, product complexity, and online market differentiation potential. Three product categories are considered: physical goods, information goods, and services. Information goods and services are particularly interesting in our context due to the special properties of electronic exchange and digital technology. Information goods create new opportunities for intermediaries in facilitating direct network effects by creating virtual communities, or in facilitating indirect network effects by bundling complementary goods (Shapiro and Varian, 1999). The impact on integration of this condition depends on the degree of digitalization of the transaction already explored prior to a transfer to a new electronic channel, mobile or others.

- Information content and digitalization potential lead to information integration (complementarities) and supplier aggregation
- Products with low digitalization potential and information content (ex. products which require social interaction upon purchase) will likely not lead to horizontal integration.

Product complexity is also an important condition for integration. Generally, one may find that high product complexity requires more focused integration strategies, and where domain specific knowledge is required, integration takes place along the vertical chain. Low complexity has the opposite effect on integration. We will divide the complexity construct in two parts: 1) “production complexity” which is the number of different inputs (resources and competencies) that is required to process the transaction; and 2) “purchasing complexity”, which is the number of attributes of the product that the customer needs to consider in the purchasing decision.

Production complexity will impact on the integration direction. High production complexity will support vertical integration, but inhibit bundling of products and services, and information integration. However, supplier aggregation can be observed even in transaction exchange with high production complexity due to scale effects (coverage). This can be observed in the credit market where micro transactions may be outsourced to specialized suppliers, for instance credit rating firms. Thus, in cases where the activities can be delimited/isolated from the rest of the value network, and the activities can be outsourced or licensed, production complexity will play a minor role in the integration decisions. With respect to the choice of integration strategy production complexity may encourage the choice of a focused strategy.

- High production complexity – vertical functional integration and possibly a focused integration strategy

- Low production complexity – opportunities for horizontal integration and undifferentiated integration strategies.

Purchasing process complexity will benefit existing/traditional actors. Search becomes important if purchasing process is complex and reduced search costs will reduce the importance of integration for the purpose of reducing search costs, and it may create a need for new intermediaries that manage information (information integrators).

- High purchasing complexity indicates a focused integration strategy.

Increased opportunities for differentiation, personalization, and presentation of products in online markets will influence integration. For example, increased opportunities for differentiation will most likely result in online markets with more focused integrating intermediaries (Dewan et al., 1999).

Attribute diversity of products can be developed and exploited in electronic markets by differentiation and personalization. A firm may differentiate by the means of any of the product attributes such as the product itself, for instance several versions targeted at different customer segments, services, such as logistics, or information such as customer relationships.

- Opportunities for product differentiation lead to more focused integration strategies.

- Increased product differentiation and personalization means that information integration becomes more important

- Presentation characteristics which match the market lead to disintermediation (intermediaries disappear).

Influence

Influence is in itself a multidimensional construct that refers to the social conditions that impact on the transaction exchanges in a network. Social exchange theory suggests that two specific aspects of organizational context may be influential in understanding the relationships between organizations: trust and dependence (Young-Ybarra and Wiersema, 1999). Trust can be defined as an expectation held by one trading partner about another, that the other will behave in a predictable and mutually acceptable manner. Previous relations, good communication channels (personal relationships) and shared values impact positively on trust. Trust building is an important function of the intermediaries and can create opportunities for new intermediaries.

Dependence is related to power and refers to the expectations that the partners will act predictably and consistently in the best of the network interest. Lock-in possibility, importance and alternatives impact on dependency.

- If trust is high, then disintegration and reintegration by new actor

- If dependency is high, then secure transaction by vertical integration

Transactions

Economic conditions for integration are dealt with in transaction cost economics TCE) (Williamson, 1985). This theory provides a framework for assessing alternative governance forms in transaction exchanges. We shall use the term “transactions” to denote the economical conditions based on TCE that impact on integration. “Transactions” refers to three elements: transaction risk, transaction standardization, and transaction frequency.

The risk of entering into an exchange relationship is closely related to the necessary investments (relationship specific investment or asset specificity). This refers to the nature of

the investment and the flexibility in retaining the investment for use in other relationships. If the transaction risk is high, the participants will apply integration forms that reduce risk by increasing transaction control, for instance by vertical integration. Several authors have claimed that transaction risk is higher in online markets (Bailey and Bakos, 1997; Clark and Lee, 1999).

- Transaction risk high – vertical integration. Transaction standardization.
- Transaction risk high - hierarchical integration model
- Transaction risk high - focused integration strategy

Transaction standardization has risk reducing effects by avoiding lock-in. It affects integration in several ways. For example, it is easier for independent intermediaries to integrate a standardized transaction with other transactions. Standardization impacts on several integration dimensions: initiator, governance mechanism, and form. Information integration and functional integration requires a high degree of transaction standardization.

- Transaction standardization high - agent and distributor integration models
- Transaction standardization low - mediator integration model
- Transaction standardization high - intermediary initiate integration
- Transaction standardization high - information integration, value chain integration and functional integration.

Transaction frequency has also been dealt with in transaction cost theory. Williamson (1985) claims that depending on asset specificity, the transaction frequency is important for the choice of governance model. Thus transaction frequency influences both integration form and governance model. Vertical functional integration will primarily be found where frequency is high and the specificity is moderate to high. It is also unlikely that a new intermediary will enter a market where frequency is high, but fragmentation is low. In this market situation will the disintegration take place (Bailey and Bakos, 1997).

Summary

In this chapter we have presented theory on value networks. This is the main perspective underlying our research. In our examination of how mobile services are organized, we have argued that we expect to find that for any service, many actors will collaborate in networks to create values for the networks actors as well as for the customers. In determining our focal actor's integration model, we drew on the MAPIT taxonomy. Integration model was defined as how a particular actor positions himself relative to existing services and value chains, more specifically (a) who will take initiative in establishing the service, (b) what is the strategic rationale behind initiating a new service, (c) what kinds of activities and/or actors will be integrated, and (d) what governance form will be chosen for the new service. The MAPIT taxonomy also created the basis for assessing structural conditions that are expected to affect the choice of integration model. The structural conditions we are interested in include: Markets, Actors, Products/services, Influence, and Transactions (MAPIT).

3 METHODS

The research methodology of the study we conducted is presented and accounted for in this chapter. We describe our choice of research design, how and where we have collected data, and how we have analyzed the data. Since this study represents the first step in establishing a framework for studying how mobile services are organized, we used qualitative methods aimed at providing a basis for a broader follow-up study.

Research Design

The goal of the study was twofold. First we wished to gain insight into how mobile services are organized and secondly we wanted to examine the relationship between structural conditions and integration models in the mobile context. Since mobile services represent new types of services, there is not yet much research on organization of such services. Research from Internet services suggest that new technologies, like the Internet and mobile services, are likely to create new ways of organizing. In order to be able to capture potential new ways of organizing, we chose to conduct an exploratory study. A number of existing theories provide insight in the *relationship* between structural conditions and organization in more traditional business contexts.

While our study was mainly explorative, we wanted to draw on existing knowledge and use it to focus our data collection. Case studies are appropriate for exploratory studies that draw on existing knowledge. We used a multiple case design with five different mobile services as our case units. Multiple case designs allow for comparison across cases, which might add some value in terms of generalization, but more importantly it brings in a comparative dimension that can contribute in generating new and interesting insights. Such novel insights often remain undiscovered in richer single case studies and rarely surface in studies based on a large number of cases, because the purpose is then to conclude on a pre-defined set of variables.

Our five cases were selectively chosen among our research partners' mobile services. A certain screening of the companies and services was involved at an earlier stage in terms of selecting participating organizations for the research project. For this particular study our selection criteria included: (a) services that involved a mobile device; (b) different types of mobile services such as entertainment services, transaction services, and information

services; (c) focal actors with different positions in the value creating network, i.e. some cases where the focal actor was close to the customer and other cases where the focal actor was further away from the customer (e.g. a content provider).

Data Collection

Our main sources of data consisted of qualitative data from interviews with key informants, secondary data, and web information. Four key informants from four different organizations were probed about three of the five services studied. For SmartPay we included one key informant from each main collaborating partner. For SMS Jackpot we based our analysis on a Master's thesis (siviløkonom) conducted at NHH. For Djuice, the analysis was based on a related project on mobile portal strategies. Interviews with the four key informants were structured based on the MAPIT framework and lasted between two and three hours. The interviews were conducted during the fall 2002 after the mobile services had been on the market for some time. MAPIT provided comparable categories for structural conditions and integration models.

In the interviews, we asked key informants to describe the mobile services they offered; to explain how they have organized supply of the services; and to identify whom they cooperated with to deliver the services. In addition we probed how they viewed their customers, which values they aimed to create for customers, and future strategic choices in terms of organization and cooperation. The interview guide is enclosed in appendix A. All interviews were tape-recorded and transcribed verbatim.

Another important source of data consisted of expert knowledge from one of the researchers with in-depth knowledge of the setting and the participating organizations. This knowledge was based on extensive research on electronic markets and other related topics. Expert knowledge was used particularly in determining the structural conditions that presided prior to introduction of the mobile service.

Data Analysis

Data was analyzed in three steps. We first organized our data into the different categories provided by the MAPIT framework. Tables showing structural conditions and integration models are enclosed after each case description. Sorting the data into the predefined

categories involved extensive interpretations because we had allowed our respondents to speak freely about the issues we focused on. Our interviews and secondary data created the basis from which we categorized the integration models. As mentioned, in categorizing structural determinants, we relied heavily on background information from our expert.

Although the MAPIT framework guided our data collection, our first step in the data analysis involved some simplification and modification of the original MAPIT framework. The theoretical part of this report presents our modified MAPIT framework. Once our data had been put into the theoretical framework, we performed within-case analyses where the structural conditions in each case were compared with the integration models. Based on the structural conditions, we were able to predict the most likely integration models. We then compared our expectations with the actual integration models and proposed explanations for any gaps between expectations based on theory and actual choices based on the data.

As a third step in the analysis, we conducted cross-case analyses. The structural conditions for all five cases were compared, as were the integration models. The main point of the cross-case analysis however, was to link structural conditions to integration models. Again, tables were used as visual illustrations and to make comparison easier. We searched for similarities and differences across cases, patterns in integration models, and linkages between structural conditions and integration models. Through the cross-case analysis we attempted to go beyond context-specific description and search for characteristics across the specific services in each case.

An inherent weakness in case studies is the limitations in terms of generalizing from findings from these types of studies. Our primary aim was not to generalize, but to develop a robust framework for a subsequent study aimed at generalizing. The multiple case study allowed us to test how well the framework worked in an empirical setting, but it also showed that although the framework is based on well-established theory, it needs to be adjusted for the mobile setting. More specifically, constructs need to be more precisely defined and accessible to the mobile services we are focusing on, and additional categories may be needed in order to answer our research question of which factors or conditions determine how these new types of services are positioned and organized. Findings from the three analyses we performed are presented in the following chapter.

4 ANALYSIS OF POSITIONING

In this chapter, our five cases are presented. In our analysis of how mobile services have been positioned and organized, we begin by introducing the services, identifying potential values these services can create, and identifying the different actors that are involved in supplying the product (the value network). We next apply our theoretical framework to each case, beginning with assessing the structural conditions under which the service is introduced in a market. Once we know the structural conditions we can predict the integration model the firm is likely to choose. This expected integration model is then compared with the actual integration model each firm has chosen. Finally, we discuss gaps between expected and actual integration models.

4.1 EasyPark

EasyPark's business idea is a wireless solution for payment of parking time. With the EasyPark solution, the customer can activate and de-activate parking by using his/her cell phone. This means that no cash is needed while parking the car and if prepaid time runs out, it is possible to remotely prolong the parking time or alternatively shorten the parking time. Thus, customer values are added in terms of more appropriate payments for the actual parking time, increased security against fines for overdue parking time, and the avoidance of the inconvenience of running to the meter to add money for extending the prepaid parking time.

Alternative parking payment instruments in the Norwegian parking market are cash or payment cards, collected through meters, machines, or personal attended services at the parking lot. These payment collecting instruments are operated by the parking company. EasyPark is the only firm offering *mobile* parking payment services. EasyPark views the card suppliers as the most important competitor in this market. There are a number of different card suppliers, some of them fairly large (as are the parking companies).

Internationally, mobile parking payment is a fairly developed business idea, but perhaps apart from Estland, no one seems yet to have managed to make money off the idea. Siemens are entering the Danish market, where EasyPark operates as well. In Sweden there are two mobile payment service providers for parking. Several competitors have looked at the Norwegian market for mobile parking payment in the past five to six years. The competitive

situation for mobile parking payment service appears to be based on limited competition with only one actor on the national market. However, it is important to keep in mind that this service competes with low cost traditional payment facilities. In order to be competitive, the mobile solution has to offer parking companies and/or customers increased efficiency or differentiated value added services.

EasyPark operates in Oslo, Bergen, Trondheim, Stavanger, Asker, Bærum, Drammen, Tønsberg, Horten and Copenhagen (Denmark). The cities are divided into parking zones based on who owns the property and the parking prices in the various locations. The zones also indicate maximum allowed time for parking.

In order to use EasyPark services, customers need to be registered. When registered as a member, the customer receives a sticker for the front window in the car. This serves as the parking ticket and can be scanned by parking attendants, who are equipped with mobile terminals to control the status of the parking. Once registered, the customer contacts EasyPark when s/he wishes to pay for parking. Contact can be made on an IVR interface either by calling 03456 from a mobile phone or by sending an SMS to EasyPark's SMS gateway (19150) or to MobilHandel (2500). The customer then has to identify who s/he is, and which zone s/he wishes to park in (all parking meters have blue stickers that indicate the EASYPARK zone). A confirmation is immediately sent back to the customer using the same mode of communication.

Table 2: Services description - EasyPark

Description of Services	
i) Classification	Transaction: payment of parking space/time
ii) Characteristics:	
• Content	Wireless parking payment service
• Infrastructure	Wireless network, multiple channels/interfaces (IVR, SMS direct or SMS-MobilHandel)
• Context	Mobile device/phone
• Application	Combines information and services (settlement) of parking payments to parking companies and customers (private and business)
• Safety/security	Customer account is tied to one specific car
• Payment	Payment per order. Fixed rate + flexible rate based on parking zone and/or customer. Several payment methods can be used for settlement of accounts.
• Basis for payment	Customer category, parking zone, parking price
iii) Platform:	
• Terminal	Mobile phone or PDA
• Communication protocol	IVR, SMS
• Application platform	API, IML: XML
• Transmission	GMS, GPRS

Value Network

The goal is to create value by offering alternative and/or additional channels for ordering parking time and for clearing and settlement of payment. Parking companies provide physical parking space and create values in the parking industry by turning property into a parking lot. Payment collection operated by the parking companies is done through machines or parking meters by cash or payment cards. EasyPark aims to create value by disintegrating the payment function from physical parking by offering wireless ordering and payment of

parking time. EasyPark also aggregates the parking payment services for several parking companies and provides the same service whether the customer parks in Bergen, Oslo, at senterpark, autopark or at any of the other parking lots services by EasyPark.

EasyPark enters the parking value chain as an intermediate actor offering a new channel of parking payment. To be competitive with traditional payment facilities they have to offer more values to customers or less transaction costs to the parking companies than the traditional channels.

There are tight margins for creating value in already established value chains, and EasyPark has chosen to profit on the economics of scale and followed a growth strategy in terms of coverage rather than short term revenues. They have therefore made agreements with many geographically dispersed parking companies. The customers are paying more for wireless services than traditional services. In the long run the goal is to alter the business model through renegotiations with the parking companies, and EasyPark aims to collect a greater share of the value creation of parking.

The justification of EasyPark entering into the parking value chain is that the values created by its existence exceeds its operating costs and results in a fair profit. Which values do EasyPark create and for whom? Below, we list some of the cost and revenue components for the main players in the parking value chain affected by a transfer of traditional cash and card payment to EasyPark's wireless payment solution.

1. Values acquired by the parking companies

    1.1. Savings of operating costs of the existing payment system (handling of cash, cash collection, card companies fees, etc.)

    1.2. Savings on account settlements due to less transaction frequency

    1.3. Inter firm electronic communication of settlement, moderate transaction frequency, but increased risk of non-settlement by payment provider (EasyPark) compared to parking companies own collection of payment

    1.4. Improved image by offering a modern payment facility

    1.5. Increased competitive edge to parking companies not using this facility

1.6. Loss of revenues due to less “over time payments”

1.7. Potential revenue increase due to easiness offered to customers for extending parking time

2. Values acquired by customers

2.1. Payment for actual, not anticipated prepaid parking time

2.2. Better control - warning of expired parking time 15 minutes in advance, thus less risk of being fined

2.3. Increased convenience due to remote extension of parking time

2.4. Increased convenience due to no cash required at the parking meter and no rush to reach the parking lot within the prepaid time limit

2.5. The payment service can be used across several parking companies located in different parts of Norway

2.6. Payment can be aggregated and invoiced once per month

2.7. Business customers (firms) can obtain interfirm electronic settlement customized to the firm’s accounting system.

2.8. Negative value due to additional fees for parking

The figure below presents the different actors in the network involved in creating value through the EasyPark business model.

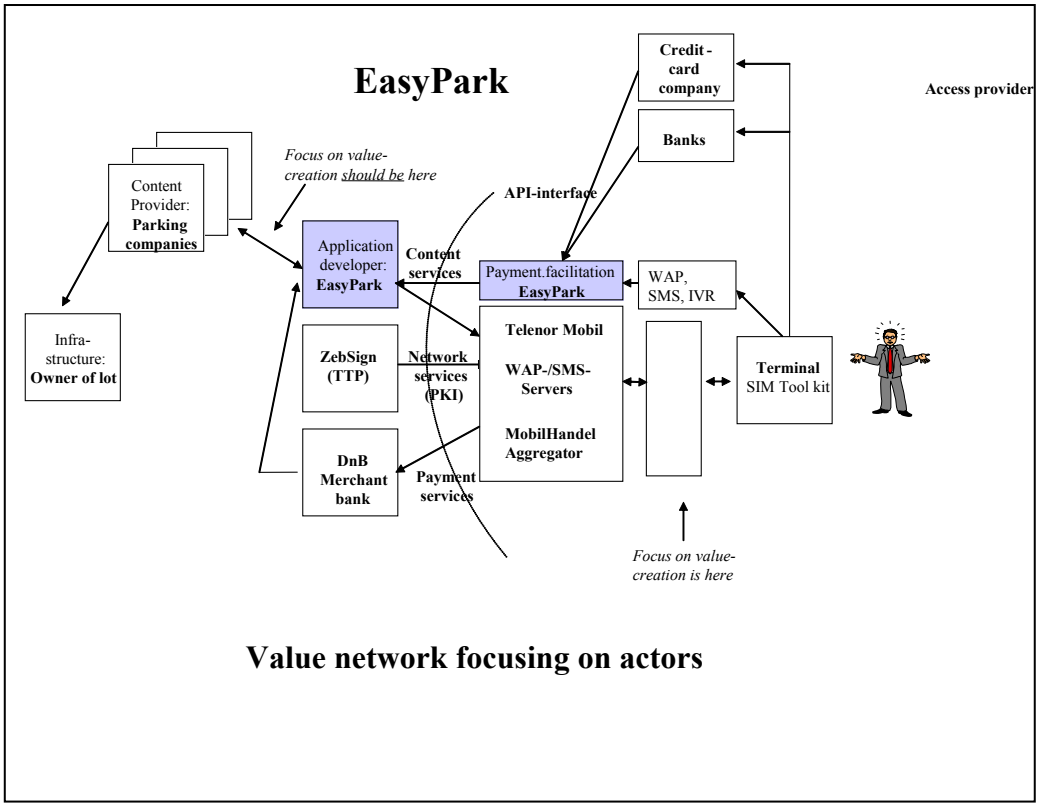

Figure 1: Value network - EasyPark

As can be seen, a number of actors are involved in value creation. The relationship between EasyPark and Telenor MobilHandel however, is special and there exists a collaboration agreement between the two. MobilHandel is a payment provider and at the same time a portal offering a range of products and services to be paid for by SmartPay/Smart-cash. MobilHandel is therefore an alternative entrance point for EasyPark's customers. For EasyPark the primary objective of the collaboration with Telenor is in acquisition of new customers and in attracting investments of financial resources for the application. One of seven new customers is captured by MobilHandel. However, EasyPark believes that new customers can best be captured at the parking event, the moment at which this service is most appreciated. EasyPark wishes that MobilHandel was more active in promoting this particular parking service. They are also willing to give away control if MobilHandel would invest equity in EasyPark. However, EasyPark feels that a parking service like this must be promoted at the parking moment to receive sufficient attention from the car owners.

Positioning

EasyPark takes a position in an existing value chain by functionally disintegrating the payment function from the parking function. EasyPark furthermore positions itself as a new service provider in this value chain by offering a focused application, a wireless parking payment service. This service is offered to the parking companies who deliver the content (the core product), which is a temporary parking space. The parking companies offer their customers this wireless payment service as an additional payment channel to cash and cards. The access gateways, IVR and SMS, have been developed and are maintained for EasyPark by other actors. EasyPark owns the solution and has developed the logic behind the application. Also, EasyPark has developed a special collaboration with Telenor MobilHandel making this content aggregator an SMS gateway to the parking services and SmartPay an available payment instrument. Telenor Mobil is the only network access provider at the time, but this will change with the establishment of Netcom's SMS services.

As described above, disintegrating and digitalizing the payment function of parking enable EasyPark to offer additional services such as extending or interrupting the parking time remotely. These are *vertical complementary services* together with aggregation and billing. Also for business customers, EasyPark aggregates the billing across employees of a firm. With regards to payment, EasyPark offers the customers several payment instruments. It is possible to establish a prepaid account at EasyPark; to use wireless micro payment instruments such as SmartCash, Payex and Contopronto; or to settle the payment through cards or bank accounts.

4.1.1 Structural Conditions for Mobile Parking Payment

In this section we explore the conditions under which EasyPark chose this particular position in the value chain presented in Section 2. What determined the decisions of the boundaries between EasyPark's activities and its co-partners in the value network, and what determined the governance relationships among them? In order to answer these questions we apply the theoretical framework - MAPIT. Hence we will start by an analysis of the structural conditions that impact on the business model in general, and the integration model in particular, of mobile parking payment services in the Norwegian market. This analysis follows the components of MAPIT, that is, we start by describing the conditions related to the five dimensions of the MAPIT structural model: Market conditions, economic properties

of the Actors of the value network, conditions related to the content of the transaction: the Product, the social mechanisms governing the collaboration of actors: the Influence, and finally, the economic conditions related to govern the exchange relationships of individual Transactions.

Market

According to MAPIT, the market (M) conditions impacting on the integration aspects of the business model are related to *fragmentation* and *knowledge requirements*. Fragmentation refers to the number of players on the supply and demand sides of the service in question while knowledge requirements refer to the know-how needed to develop, operate, and market the service as well as to create business values.

The supplier market for parking services is dominated by several large international companies that are present in various local and domestic markets. These are APCOA based in Germany; City Parking based in Belgium; and National Car Park based in England. Most of the parking companies focus on operating, regulating, and surveillance of the parking lots, but some, like National Car Park, also own property. In addition, there are a number of public sector operated parking lots. On the supply side, the market seems therefore to be moderately fragmented. On the demand side, EasyPark interfaces directly with end users - the car owners seeking a temporary parking place. Here the market is highly fragmented.

Mobile parking payment represents an existing transaction service that is offered through a new channel - a wireless network. In order to develop and operate the application with IVR and SMS interfaces to mobile phones, high technical knowledge of wireless data communication and computer application development is required. Furthermore, inter-firm integration between the payment service providers and the parking companies is needed. The second component of knowledge requirements concerns the ability of the intermediary, the service provider, to create business values on this technological solution. It is particularly important to create values for the end users in view of the cheap alternative payment means that are available. In addition, the service provider faces the increased uncertainty by the customers of remote payment via electronic networks. This negative trust has to be overcome. Understanding customers' behavior is part of the m-business know-how. The third component of the knowledge requirements concerns the domain knowledge needed to market the payment solution. Payment is a traditional, well known function. We therefore consider

the domain knowledge of payment to be low. On the knowledge requirements for offering a mobile parking payment service we conclude that the e-technical knowledge requirement is high and e-business knowledge requirement to market this service is moderate-to-high, while the domain knowledge requirement is low.

Actor related conditions

The MAPIT framework looks at three conditions related to the individual actors in the market: cost structure, scale and scope economies, and revenue model. For mobile parking payment services, we assume that the coordination costs of serving several parking companies are low. On the demand side there is little need for coordination among customers. Only for business customers coordination of the number of cars is offered to business customers (firms). Production costs of the service are moderate (higher than for traditional payment); and transaction costs are lower for mobile payment services than for traditional payments due to less collection costs. However, traffic-based costs for connecting to the service (air-time) must also be covered, either by the customer or by the service provider. Development and production of the technical systems for mobile parking payment requires, however, investments in terms of time and money. Also, there is a special cost involved in defining the parking zones of the parking lots. The parking companies will only adopt the new payment service if it adds business values to them. Since this new service is an add-on payment channel for the parking companies, the question arises as to what extent it will release operating costs of the other payment channels. If not, the costs of the mobile payment service will have to be covered by revenues for value-added customer services on the demand side.

For a value chain service provider the revenue model will most probably consist of transaction fees and maybe also a subscription fee. The fee may also be differentiated with respect to customer segments. Traffic-based costs for connecting the service (air-time) must be covered either by the end user or by the service provider.

There are fairly large volume-based economies of scale present due to this digital service. There may also be some indirect network externalities present due to increasing customer value with coverage, that is, the value of the service increases with the number of parking lots served. No direct network externalities (demand side externalities) are identified. The customer value of the service to each user is, in other words, independent of the number of

registered users. Economies of scope are related to sharing of resources across products. An increase in the product variety or market segments by the service provider implies new developments and additional investments. The potential for economies of scope seems limited due to the narrow focus of this parking service.

It is difficult to foresee switching costs or lock-in effects that would discourage other actors from offering mobile parking payment solutions. Current entry barriers consist of agreements with parking place owners, but other companies could get identical agreements.

Products/services

Three product related conditions are included in the MAPIT framework. They are product category, product complexity, and the product's differentiation potential. Product complexity distinguishes between production complexity and product complexity. Differentiation potential has to do with the possibilities to differentiate the product based on price, personalization, and presentation.

Mobile parking payment is a service that allows customers to make parking payments through wireless and mobile channels. It is an information-based service that is separated from the rest of the value chain activities concerning parking a car. The service has already integrated services vertically such as ordering the parking time. In addition it has added the service of interrupting the commanded parking time if wanted by the car owner.

The number of attributes of this service is very small and very standardized implying low usage complexity. The adoption phase by the users is, however, slightly more complex than for traditional payments. It requires registration and trust. The solution must compete with cheap and well known payments facilities. Hence the service must provide added value in other ways than in reduced complexity for suppliers or consumers. The information that has to be displayed for the end users is limited and therefore suitable for a mobile phone. The service is a substitute for other payment instruments, but it does not replace other payment providers. This is what is called cybermediation in the e-business terminology. The production (development) process is of high complexity.

The service can be differentiated with respect to customers (based on identification of customers) and location (based on identification of the zone in which one wishes to park). It

is thereby possible to create different versions of the same service for different customers and to charge different prices based on customer and location (ref. traffic based revenues). The potential for price differentiation and personalization is moderate, as is the potential for differentiation based on presentation. Presentation can for instance be differentiated from other parking payment services since it is possible to warn the customer that parking is about to expire.

Influence

Influence has to do with the each actor's influence in the value network. Influence is related to power and three conditions are included in the MAPIT network: the importance of trust, the potential for lock-in, and information asymmetry.

The power of a new intermediary depends entirely on the values it can add to the players: the suppliers, partners and customers. The power also increases with the complimentary assets and capabilities the intermediary provides. Parking companies have several alternative payment modes they offer their customers of which mobile payment is just one. Thus, the influence of this service provider in the value network is considered low.

There are no incentives for the customer to be loyal to this service since there are alternatives. Furthermore, the intermediary must rely on trust by the customers. An alternative payment channel must be cleared with each parking company. The standard agreement in the Norwegian market is to allow a 2,5% transaction fee to the payment service provider.

Payment services make up an important part of parking. Mobile payment is a real issue in the parking industry, especially at industry conferences and seminars. The parking industry is moving from more or less "back-street" companies to high-tech multinational corporations, and the focus is shifting from pure parking lot rents to developing added values by new customer-centric parking solutions. Technologically advanced payment solutions are thereby increasing the legitimacy of this move in the parking industry, and the relationship between the service provider and the parking companies may therefore shift in favor of service provider in the long run.

Transactions

The MAPIT conditions related to transactions (T) include transaction risk, transaction standardization, and transaction frequency.

One of the transaction conditions related to risk is primarily determined by the relation specific investments needed by the trading parties. The parking companies encounter low risks since they have alternative solutions. The same is the case with customers. In both cases, however, there are some slight uncertainties with respect to clearing and settlement of the payments. The customers may, however, perceive the transaction as risky both in terms of the financial transaction, and in terms of the potential uncertainty tied to whether or not they have actually paid for the parking.

We consider the risk to for the parking companies to be very low in adopting this service. For the end users, there are some risk factors present, but these can most likely be overcome.

Transaction standardization is low because the applications are proprietary. Transaction frequency on the customer side is high. The intermediary encounters the risk of investing in a highly specialized application with low alternative values.

4.1.2 Integration Model

In this section we summarize the *expected* integration model based on the MAPIT framework and the actual integration model. Based on the conditions that were identified using MAPIT in the previous section, we can make theoretical predictions concerning who is likely to *initiate* integration, which integration *strategy* is likely to be applied, which *governance* mechanisms are expected, and how the boundaries of a payment provider are likely to be defined in terms of integration *form*. The theoretical predictions are then compared with the actual integration model that was chosen for each of the mobile services we studied. Gaps between the expected integration model and the actual integration model are discussed.

Expected integration model

1. From the market conditions we know that the fragmentation on the supply side is rather moderate, while at the end user side we have very high fragmentation. This means that we do not expect any initiative on the demand side to set up a new service. On the supply

side, low fragmentation means that there are dominant actors who could either alone or in a consortium set up this service. An alternative is to license the service and operate it in-house. The argument for a parking company to initiate a new payment service is further strengthened by its experience and tradition to do the payment collection itself. Based on the market fragmentation we therefore predict that established actors will initiate the mobile payment services:

Initiator: the established suppliers of parking services

2. We consider the domain knowledge of payment in general to be well known and thus the knowledge requirements to be low. However, to develop and operate a mobile payment application requires high technical m-commerce knowledge. Furthermore, to create business and customer values on this new application require moderate-to-high m-commerce knowledge. We consider parking companies to possess limited technical knowledge and have rather limited m/e-commerce experience. Therefore, we conclude that there is room for an independent player to offer this service if sufficient business values can be created. Based on knowledge requirements to serve the market we predict that a new intermediary will initiate the mobile services:

Initiator: a new independent intermediary

3. A mobile payment application must be developed and operated. We do not see any significant scale and scope economies with traditional payment services. Also, as long as the parking companies must maintain the alternative payment channels there seem to be few incentives to engage in a new payment service. Thus, no comparative advantages exist for the parking companies in offering this service. There are indeed volume based scale economies for an independent intermediary generated by indirect network effects due to low marginal production costs and low coordination costs across multiple parking lots. The scale effect indicates a focused strategy. We have no information on product scope effects, but conclude that limited potential for horizontal integration of complimentary products or services exists. On an overall basis, total operating costs for the application are slightly lower than for cash payment. The revenue basis for this type of service will typically be transaction fee based. However, the real challenge is m-business conduct applying m-business knowledge to create added values for the parking

companies and the customers. The end users must be willing to pay an extra fee for these values (requiring functional extension into the customers' buying processes).

Due to very low coordination costs upstream among various parking companies and the indirect network effects, the intermediary will choose an integration form based on supplier aggregation. For business customers with several cars, horizontal aggregation of car accounts increase efficiency.

From the actor related conditions we conclude that the mobile parking payment service can be offered by an independent intermediary due to considerable volume based scale and indirect network effects. However, the cost structure is such that as long as the service does not substantially replace other means of payment, only increased customer values that manifest in increased revenues can bear this application. However, the service has integration potentials both vertically and horizontally.

Initiator: a new independent intermediary

Strategy: Focused

Form: - *parking company (supplier) aggregation,*

- *functional integration upstream (settlement, etc.) and downstream(parking extension and interruption, etc.),*

- *customer aggregation (company cars)*

4. This product is a digital transaction service and as such lends itself normally to bundling with additional information or other services. However, we are not aware of any present bundling potential in this specific payment service. This could be an object for further analysis. The differentiation potential of all three attributes is considered moderate. Production complexity is high, and the purchasing complexity is low. With high production complexity and moderate differentiation potential we consider a focused strategy to be the most likely choice although low purchasing complexity suggests an undifferentiated strategy. High production complexity also indicates a vertical functional integration upstream, for instance, some kind of system integration between the parking company and the mobile payment provider. The mobile payment service will probably

not be cost effective compared to traditional payment methods (cash, etc.). Therefore additional values must be developed.

Strategy: focused

Integration form: vertical functional integration

5. A new intermediary lacks the needed complimentary assets and the vendors have alternative ways of payment collection. The power lies with the parking companies who will have to benefit from applying this service. The intermediary must enter into a partnership upstream through a contractual agreement. Also to gain access to a customer base necessary market expansion strategies must be employed through the use of mediators (affiliation programs, portal presence, etc.).

   Governance: agent based partnership with parking companies upstream and loose market expansion partnerships/affiliation programs downstream.

6. Transaction standardization is low on this mobile payment application due to proprietary solution, thus requiring some relationship specific investments upstream. Risk is moderate-to-low. Downstream we do not consider the risk on the end user's side to be large enough to employ any particular risk reduction efforts (like Nsafe, ZebSign etc.).

   Governance: agent based partnership

Actual integration model – EasyPark

EasyPark initiated the integration of parking and wireless payment. EasyPark represents a *neutral and independent* intermediary in the value chain of parking services by offering the particular service of payment of parking time from mobile phones. In this case, technology pushed the development of mobile parking payment service. Wireless parking payment emerged as an opportunity, a service that seemed appropriate for a mobile access device due to the mobility of parking and limited information processing requirements. EasyPark's business idea is to create a competitive parking payment service by offering added values to both parking companies and parking customers. EasyPark is currently the only company offering mobile parking payment service in the Norwegian market.

EasyPark has chosen a *focused strategy* where they target a market niche with their narrow service. They serve as a value chain service provider specializing in a specific function of the value chain with the intention of making wireless parking payment competitive to other payment services. EasyPark focuses on the role as application and service provider, but wants others (preferably the network providers) to share the financial risk and develop the market. The company wants to concentrate on its core competence and keep the alternatives open when it comes to payment transfer. According to EasyPark, a customer should be able to pay through any channel. The service allows for segmentation of customers (here defined as a focused strategy), but this was not the purpose of the integration.

Compared with the traditional parking industry and the traditional modes of payment, EasyPark represents a new intermediary who provides a new transaction service (mobile payment) in a traditional context (parking). As such, EasyPark's business idea represents a *vertical functional disintegration upstream*. The new service breaks up a traditional value chain service and substitutes internalized payment collection activities at the parking companies with a mobile payment solution. EasyPark *aggregates suppliers* (parking companies) and offers the customers the same parking payment service across several, independent parking companies. Furthermore, EasyPark offers the parking companies *customer aggregation* in terms of settlement, particularly for companies who have a number of employees that use the service. The service represents a digitalization of the payment service. EasyPark aims to create value both for the parking companies and for the customers by offering wireless parking payment services. Through payment settlements, seamless *functional integration* between EasyPark and the parking companies is obtained.

Different cooperation models exist within the value net. The main relationship between the parking companies and EasyPark is an agent type governance form. EasyPark offers the service and receives a percentage of the revenues (commission based). Contractual agreements also exist between EasyPark and the customers, but these are not directly connected with the governance form. Telenor MobilHandel and EasyPark have a collaboration agreement. At the moment, the objective of this collaboration is to influence market presence, that is, to take advantage of the customer base and traffic on MobilHandel. However, EasyPark is interested in a closer cooperation in order to draw on the resources and capabilities of Telenor as a dominant market player in the mobile telecommunication field.

Comparison of expected and actual integration model

The expected integration model predicted by MAPIT fits well with the actual model employed by EasyPark. Market fragmentation may encourage parking companies to provide this new payment service for parking. Also, the parking companies' strong influence in the value net supports this conclusion. For the parking companies to provide this new service it must either prove cost efficient along with the existing methods or it may generate new customer values that can justify the service. Cost efficiency, however, is associated with volume based scale economics. This encourages a new intermediary to disintegrate the value chain and drive scale by increasing coverage of parking companies. Also, the high demand on m-commerce knowledge, both technical and business, strengthens the argument for a new, specialized intermediary. The high production complexity of this service together with scale economy supports concentration and a focused strategy. This is also the business idea of EasyPark.

In terms of integration forms we found that both actors' conditions and product conditions indicate functional disintegration upstream since it separates the payment function from the rest of the parking activities. However, it also involves functional integration of activities upstream of payment settlement. Also, we found conditions that indicate both supplier and customer horizontal aggregation; supplier aggregation to increase coverage and customer aggregation to bundle cars of one single customer. Supplier aggregation, product bundling, and customer aggregation can be expected based on theory. In terms of governance, agent based cooperation was predicted due to the payments vital role in the value chain of parking, and this was also the governance form chosen by EasyPark. It may be necessary to develop the demand side rapidly due to the highly fragmented market at the end user side, the scale effects, and first mover advantage (time-based effects. EasyPark uses MobilHandel as a mediator to promote this service.

Summary of EasyPark

EasyPark's business idea is a wireless solution for payment of parking time. The wireless solution by EasyPark makes it possible to redesign parking companies' value chains by detaching the payment from the physical parking of the car. This separation of payment from the other activities of the value chain allows the payment transaction to be represented by an information entity transmitted digitally over a wireless network. Thus, it is possible to take

advantage of the economics of digital information, for instance increased economics of scale and scope, and provide a cost efficient m-commerce solution that increases the operational efficiency of parking. When payment is separated from the physical parking lot payment facilities, and instead is represented by digital information, a potential for value-added complimentary services arises.

Table 3:

Easypark - Structural Conditions

MAPIT	Mobile Parking Payment
(M) Fragmentation	Supplier market (The market of the services/content that is paid for) *Moderate* Demand market (end users) *High*
(M) Knowledge requirements	e-technical knowledge requirements *High* e-business knowledge requirements *Moderate-to-high* Domain-specific knowledge *Low* (Payment is a well known task for people)
(A) Costs	Production costs *Moderate*. (The production costs are primarily tied to development and operation of the application. The marginal cost for each electronic transaction is very low. Relative to traditional payment methods we assume the wireless payment method has lower marginal costs, but probably higher investment and operating costs) Coordination costs *Low* Transaction costs *Low* Distribution costs *Low* (The distribution costs use of mobile phone (air time) devolve on the end customers)
(A) Revenue sources	For transaction based services, the revenue sources will mainly be transaction fees and possibly subscription fees.
(A) Scale economies	Large economies of scale based on volume exist due to low marginal production costs. Economies of scale based on time exist to some extent (first mover advantages). This is primarily due to indirect network effects (coverage). No direct network effects are identified. Low potential for economies of scope (which would bring potential for horizonatal integration/aggregation)

(P) Category	Transaction service - digitalization extent is high (high potential for vertically complementary services).
(P) Complexity	Production (process) complexity *High* Product (buying) complexity *Low*.
(P) Differentiation potential	Price differentiation potential *Moderate* Personalization potential *Moderate* Presentation potential *Moderate*
(I) Influence	Parking companies *High* (all complementary assets: location, brand, etc., no lock-in effects due to alternative payment methods) Customers *High* (No lock-in effects due to alternative payment methods) Payment service provider *Low* (may be increasing)
(T) Risk	Parking companies *Low-to-moderate* (Costs of relation-specific investments on the service provider. Slight risks for missing settlement) Customer *Moderate* Service provider *High*
(T) Frequency	Transaction frequency *High*
(T) Standardization	Transaction standardization *Low* (Proprietary payment solution. However, communication based on standards (SMS, WAP, IVR)

Table 4: Easypark - Integration Model

	Expected Integration Model	**Actual Integration Model**
Initiator Buyer Seller Neutral	Established parking companies • Market fragmentation on supply side moderate Neutral, independent intermediary • Requires high technical and m-commerce knowledge • Volume based economies of scale	Neutral, independent intermediary • New actor
Strategy Focused Undifferentiated	Focused strategy • Volume based economies of scale • High production complexity	Focused strategy • Specializes in mobile payment • Competes with alternative modes of payment
Integration Form Horizontal: a) Supplier aggregation b) Product/service integration c) Information integration d) Customer aggregation Vertical: e) Vertical functional integration upstream f) Vertical functional integration downstream	Supplier aggregation (coverage) • Low coordination costs • Indirect network effects • Volume based economies of scale Product bundling (information integration) • Moderate potential for presentation differentiation Vertical functional integration • High production complexity Customer aggregation • Low coordination costs	Supplier aggregation • The same service covers all parking companies and all larger cities) Vertical functional disintegration upstream • The payment activity is separated from the physical act of parking • The payment activity is offered by a different actor than the other parking activities Vertical functional integration upstream • Between Easypark and parking companies for payment settlements Customer aggregation • For companies. All of their employees parking expenses can be aggregated and paid e.g. on a monthly basis.)
Governance (Cooperation model) Hierarchy Agent Distributor Mediator	Agent upstream (contractual agreement) • Parking companies' influence • Low degree of transaction standardization Mediator downstream • Volume based scale effects	Agent • Contractual agreements between Easypark and the parking companies as well as between Easypark and the customers • Collaboration agreements between Easypark and Telenor MobilHandel

4.2 SmartPay

SmartPay is a mobile payment system for exchanging money over mobile devices in return for goods and services. The business idea of a mobile payment system is based on a vision that traditional wallets will be replaced by the mobile phone. This will shift the physical transference of tangible cash to an exchange of information over a digital network. Furthermore, mobile devices offer a secure, convenient, and authorized payment method for commercial transactions such as retail payment, banking and brokerage. Mobile payment is relevant in three different contexts: attended POS (point of sales) where the mobile phone is used as cash or payment card; unattended POS such as vending machines; and Internet based commerce. Mobile payment methods are typically based on either account charging or tokens (micro payments). In the first case the mobile payment is integrated with the general payment infrastructure in terms of clearing and settlement; in the second case the mobile phone replaces cash.

SmartPay is a payment method in the Norwegian market offered by the mobile operator, Telenor Mobil, and the financial institution, Den Norske Bank as a joint venture. SmartPay can be used to transfer money from several terminal devices such as mobile phones, PCs, and digital television. Through SmartPay, customers can use electronic commerce services without providing sensitive information about their credit card or bank accounts. The most popular services today are SMS based and include parking, purchasing of soft drinks, tickets and games.

SmartPay represents a necessary enabling service for purchasing goods and services at the Telenor MobilHandel web site. In this context, MobilHandel functions as a content aggregator. Although the payment system technologically remains open, the service is presently limited to the access provider's (Telenor Mobil) customers. The goal is to generate volume and increase ARPU (Average Revenue Per User) for Telenor Mobil and transaction fees for the bank while at the same time providing added value for the customers.

Telenor's vision is that the mobile phone will become a new wallet where cash, bank and credit card accounts are made available independently of the customer's location in relation to the point of sale. Due to regulations, the balance on the mobile payment account must be less than NOK 1000. Several competing mobile micro payment solutions exist on the Norwegian market, such as Payex, Contopronto, etc. An alternative to wallet and account

charging in mobile payment systems could be to pay for digital services either by prepaid cards or by a debit to the customer's phone bill. However, there are restrictions in terms of what can be charged on the phone bill, and this is an expensive solution in terms of distribution costs.

SmartPay is SMS based (dial-up) and is offered in three versions: micro payments, credit card charge, and bank account charge. The first is called SmartCash and is a wallet for digital cash; the second is credit card charging, and finally, the third, is a conventional settlement through bank accounts. The distinction between these versions is important since the security required for each is different. An order on MobilHandel takes place when a customer sends an SMS, or navigates on WAP or WEB to find a product. The customer confirms the purchase, submits the PIN code and chooses the type of payment to be used. After the order, which takes place on the content provider's sales system, a separate payment dialogue is initiated on the mobile phone. Telenor receives a message concerning the telephone number that is used to purchase the product or service, and the amount the customer needs to pay.

If the SmartCash mode is used for payment, Telenor MobilHandel will charge the customer's SmartCash mobile account and credit the content provider's account. Due to regulation restrictions on balances (less than NOK 1000), Telenor daily transfers the account balances of the content providers to DnB, who executes the settlement.

For the bank account based payment method (SmartPay) the procedure is different due to more rigorous security means. Telenor runs the dialogue with the customer, through a SIM-Toolkit dialogue (neither SMS nor WAP). The SIM card on the customer's mobile phone ensures a secure exchange of information between the mobile phone, the seller, the bank or the credit card company, and Telenor Mobil. A receipt is sent through a separate SMS message. SIM-Toolkit is an ETSI/SMG standard which allows the SIM card to control access to the network. It makes the dialogue possible between network applications and end users. Two key codes need to match in order for a transaction to occur. The customer has one code - a SmartPay PIN code. A third party has the other code. Upon code match the transaction is made. SIM-Toolkit performs the transaction dialogue both when SMS and WAP are used for purchasing. The only information that is sent out on the net is the digital signature, but this is not useful unless you also have the personal PIN code. SmartPay uses Public Key

Infrastructure (PKI) as their security system. Through this, the customer has to identify himself/herself in connection with each transaction. ZebSign distributes keys and certificates.

MobilHandel has entered into an agreement with Visa Norge where Telenor customers who are Visa cardholders can sign up for trading on MobilHandel and use their Visa card as payment card. This payment solution, however, is not part of the SmartPay system.

Table 5: Services description - SmartPay

Description of Services	
i) Classification	Payment system for electronic (digital) markets
ii) Characteristics:	
• Content	Payment transactions
• Infrastructure	Telenor Mobil access network (SMS/WAP)
• Context	MobilHandel
• Application	Several
• Safety/security	Transaction dialogue through separate system; SIM-Toolkit. Two key codes need to match.
• Payment	Differentiated transaction fees, SMS and air time (WAP)
iii) Platform:	
• Terminal	Mobile phone, PDA, TV
• Enabling technology	PIN, PKI
• Communication protocols	SMS, WAP, WEB
• Application platform	API given by MobilHandel

Value Network

SmartPay is offered as a mobile payment solution by DnB and Telenor, each being the dominant player in its industry in Norway, viz. DnB as a financial institution and Telenor as a telco. SmartPay is an enabling service for commerce and must create values for both content providers and customers in order to be accepted. Below is a list of potential added values for the trading parties.

1. Content providers

    1.1 Additional sales channel

    1.2 Increasing market research

    1.3 Transaction costs savings

2 Customers

    2.1 Context independence (location and time/anywhere - anytime)

    2.2 Convenience - ease of use

    2.3 Transaction costs savings (cheaper POS)

    2.4 Trust (security compared to cash PIN and/or PKI)

    2.5 Less privacy?

3 Mobile operator

    3.1 Generate more traffic

4 Financial Institution

    4.1 More comprehensive payment infrastructure

    4.2 Opportunity to differentiate

The network of actors involved in delivering SmartPay's services and creating value are presented below.

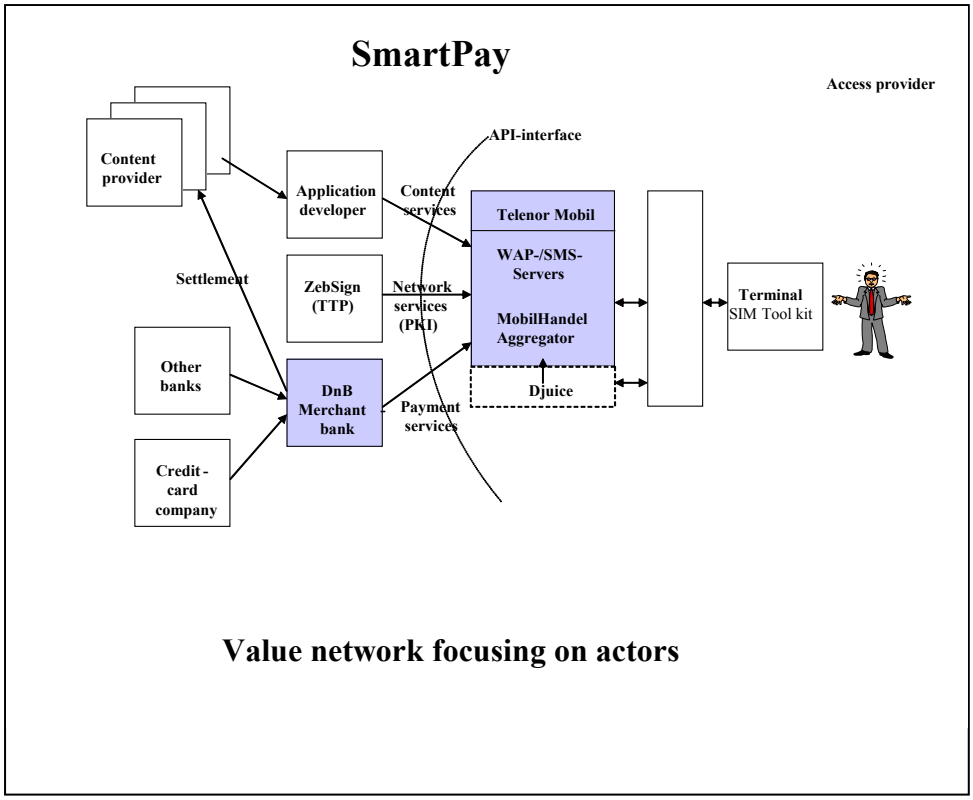

Figure 2: Value network – SmartPay

Positioning

Mobile payment separates payment from physical transaction processes. Prior to mobile payment solutions, the content providers facilitated payments in electronic and digital markets and payment was usually made by credit card. Telenor and DnB have entered into an ownership-based joint venture agreement in order to offer the mobile payment system SmartPay. Telenor and DnB both own the legal rights to SmartPay and they are both dedicated to making SmartPay their major mobile payment solution. Ultimately, both parties also wish to include other operators and banks in order to win the market. The idea is to keep the payment system open and flexible.

Bank customers are exposed to SmartPay information on DnBs web site. DnB's role as transaction facilitator depends on which payment method the customer chooses. When the

customer charges a bank account, DnB checks account balance, charges the account (in any bank) and makes settlements with the store. In this system, DnB is the merchant bank and the merchants have to open an account with DnB. From this account, DnB can transfer the money to the merchant's preferred bank.

The SmartCash solution is operated by Telenor. When a customer pays using SmartCash, Telenor charges the customers SmartCash account and transfers the money to the merchant's account. DnB is involved in transferring money between Telenor and the store, but Telenor is responsible for book-keeping in terms of how much money each customer has on his/her SmartCash account.

4.2.1 Structural Conditions for Mobile Payment System

SmartPay is a payment system for electronic markets. The service is SMS based, and it facilitates money transfer through digital channels such as mobile phones. In other words, SmartPay is a new and digital payment channel where payment information is sent over open, wireless networks. In this section, we explore how a new mobile payment service is likely to be positioned in existing markets and value chains. Before presenting the integration model chosen by the central actors in SmartPay, we look at the structural conditions that influence positioning choices. Based on the structural conditions within the MAPIT framework, we are able to predict the most likely positioning, which then in turn can be compared with the actual positioning.

Markets

According to MAPIT, the market (M) conditions impacting on the integration aspects of the business model are related to *fragmentation* and *knowledge requirements*.

Mobile payment services are being introduced in several countries by banks, payment card issuers, telecommunication companies and new payment service providers. The market is still fairly immature lacking standardized processing cycles including clearing and settlement procedures. Several non-compatible mobile payment services are present in the market today As already mentioned, some mobile payment service providers exist in the Norwegian market such as Payex and Contopronto. However, they provide only micro payment solutions. However, there exist strong substitutes for mobile payment services by traditional payment

instruments such as coins, payment cards, checks, and giro. On an overall basis we characterize the market for payment solutions to be moderately fragmented on the payment provider side.

Mobile payment must be subject to the same level of standardization that governs other payment methods. It must provide general payment services for mobile commerce. In the context of m-commerce both the upstream market of content providers and the downstream market of end consumers are highly fragmented.

In order to produce and deliver mobile payment services, high levels of technical knowledge is required. This technological skill includes security, developing application interfaces for the hand sets as for well as the content providers' applications, and operating the payment servers. Also, due to these interfaces we assess the requirement of domain-specific knowledge of the payment service provider to be high for account-based mobile payments, but low for micro payment systems. However, we consider the requirements for e-business knowledge to be moderate since payment is an enabling service and not the primary value creating transaction.

Actors

The MAPIT framework looks at three conditions related to the individual actors in the market: cost structure, scale and scope economies, and revenue model.

The costs for developing mobile payment services can be categorized as high. The market for mobile payment services remains new and immature, and there are several competitors and alternative modes of payment. This implies that companies that initiate such a project need to have a large capital base. Major investments have to be made before any profit can be expected, and the companies must have a long-range plan for the service. Although the risks and costs of development are high, variable production costs are low. Coordination costs and transaction costs are similar to the costs of Internet banking, and distribution costs are also low.

There is great potential for extensive volume based scale economies in mobile payment services. The product/service is information based, the marginal costs (costs per transaction) are minimal, and the capacity of the network is unlimited. The costs associated with a mobile

payment solution are related to development and maintenance of the technological solution. Once the solution is developed, the more transactions carried out, the better. Economies of scale based on time also exist (first mover advantages). In order to to achieve time-based scale advantages, however, it is important to rapidly capture as many content providers as possible. Herein lies indirect network effects since the value for the customer increases with the number of content providers that accept the mobile system as a method of payment. The same value for the consumers can be achieved by standardization and coordination of transaction processing. This is a feature of the general payment market in Norway.

We do not see any scope effects since this is an enabling service for m-commerce and will be complimentary to any commercial transaction.

Revenues are generated by traffic and connected with the number of transactions, or by a combination of traffic-based revenues and a fixed subscription rate. A less likely source of revenue is by advertising.

Products/services

Three product related conditions are included in the MAPIT framework. They are product category, product complexity, and the product's differentiation potential. Product complexity distinguishes between production complexity and purchasing complexity. Differentiation potential has to do with the possibilities to differentiate the product based on price, personalization, and presentation.

Mobile payment solutions can be used to pay for products and services sold in the mobile market place, the Internet market place (web and/or wap), and traditional market places such as vending machines, parking, airport shuttle (proximity payments). The idea is that cash is available independently of point of sale location for impulse purchases. Digital payment systems are necessary for customers to be able to purchase goods and services on mobile portals (such as Telenor MobilHandel). A mobile digital payment system can also be used in other distribution channels, such as interactive television.

A mobile payment service represents a transaction type of service. Production complexity is high. Purchasing complexity, however, is moderate. Using the mobile phone for online transactions is relatively more complex than traditional payment methods.

This enabling service is difficult to differentiate from competitors. Branding and trust, however, are differentiation features that may add values to the payment provider. Also, compared to traditional payments, payment by the phone has the unique property of being location independent. The service is differentiated with respect to channel of payment. In terms of differentiating the service for particular customer segments or even for each individual end consumer, the potential is moderate. The service can be differentiated on price by letting customers self-segment themselves. Different pricing options based on expected use is a common way to differentiate on price for mobile phone subscriptions. The potential for price differentiation can be categorized as moderate. There is also moderate potential for differentiation of the product by personalization, but a presentation potential exist in terms of location dependent information bundling.

Influence

Influence has to do with the different actor's power in the value network. Three conditions are included in the MAPIT network: the importance of trust, the potential for lock-in, and information asymmetry.

Trust in the payment system is of utmost concern for consumers. Providers that are perceived as trustworthy by consumers will have a competitive advantage and thereby increase their influence in the network.

As mentioned, a mobile payment service is of no value without products and services that can be purchased from content providers. Therefore, the value of a mobile payment service depends on the availability of content providers having adopted this payment system. Today, content providers have to choose among incompatible mobile payment systems, and thus risk being locked-in.

End consumers have several options in terms of payment systems. Brand loyalty or personalized services may provide incentives for customer loyalty to a specific mobile payment provider, but there is nothing inherent in the service itself that could lead the payment provider to exercise any power vis-à-vis the consumers. Another reason why consumers may choose to be loyal to a particular payment system could be that the switching costs are high (e.g. by having to go through a lengthy registration process to choose among alternative mobile payment systems).

Information about the end consumer can create information asymmetry in the network. Currently, the interface with end consumers for electronic commerce is through portals or content aggregators such as MobilHandel.

Transactions

The MAPIT conditions related to transactions (T) include transaction risk, transaction standardization, and transaction frequency.

One of the transaction conditions related to risk is primarily determined by the relation specific investments needed by the trading parties. The mobile payment provider has to make investments that are difficult to use for other purposes, i.e. the investments have high asset specificity and must be viewed as high risk. For the end consumers, however, the transaction risk is low since they have alternative modes of payment. Content providers have moderate risk associated with transactions since they have to make at least some investments in integrating a new payment service with their existing revenue system.

Transaction standardization is considered moderate due to the immature business and several competing mobile payment solutions. So far no solution seems to have acquired a de facto standard. The transaction frequency is high.

4.2.2 Integration Model

In this section we summarize the expected integration model based on the MAPIT framework and then we present the actual integration model for our particular case, SmartPay. Based on the conditions that were identified using MAPIT in the previous section, we can make theoretical predictions concerning who is likely to *initiate* integration, the integration *strategy*, integration *form*, and the *governance*. The theoretical predictions are then compared with the actual integration model and any gaps between the expected integration model and the actual integration model are discussed in an attempt to refine the MAPIT framework.

Expected integration model

1. Due to high fragmentation of content providers and consumers in m-commerce and fairly high knowledge requirements to operate a wireless network payment service in

this environment, the MAPIT framework suggests that this service will be offered by a dedicated provider. High domain knowledge requirements are associated with account-based payments and integration with existing billing and accounting systems. In this case it is likely that a bank or payment card issuer will be the payment enabler. However, on the other hand, the high m-technical knowledge required that includes communication and server skill, indicates a neutral intermediary, such as a specialized ICT firm as a payment provider. A specialized ICT firm may be sufficient as a stand alone provider only for simple payment solutions, such as micropayments where payment is not charged a bank account and therefore is not part of the general payment infrastructure.

Initiator: account-based (macro) payment: existing payment provider acquiring the necessary m-knowledge skill; micro payment: new independent provider

2. There are considerable investments required in developing a mobile payment solution. In addition, an immature market requires a substantial capital base. However, the production and transaction costs are low creating a potential for economies of scale on volume and externalities (coverage). Coverage based scale effects indicate an undifferentiated strategy, where the payment service should be used by as many content providers as possible. Based on this we can expect that the payment provider will pursue content provider (supplier) aggregation, that is, to attract as many users to the payment solution as possible. The revenue sources of this service are transaction and/or subscription based. A new intermediary that enters the value chain to perform a specific activity implies a vertical functional disintegration.

   Strategy: undifferentiated

   Form: content provider (supplier) aggregation

   vertical functional (dis-)integration

3. The product category is a digital transaction service with some potential for complementary services. Complementarities can be related to add-on information services such as lists of available merchants, special bargains, account surveys, etc. There is some potential for information integration due to these complementarities. However, with the displays available on the hand sets today the potential for

information display is rather limited. High production complexity indicates a vertical integration direction. Often this is associated with a focused strategy. However, moderate-to-low purchasing complexity indicates an undifferentiated strategy. High production complexity is normally also associated with vertical integration. The production complexity in this case, is primarily associated with account management and payment transaction processing. Payment transaction processing requires clearing and settlement. Settlement, however, indicates some kind of functional integration vertically. Upstream transfer of money from payment provider to content provider requires functional integration between the two. Furthermore, security elements may be implemented downstream in the terminal device of the customers. Compared to traditional and Internet payment services, a mobile payment service offers added customer values in terms of the convenience of remote payment and security. This supports the focused strategy.

Strategy: focused

Form: information integration, vertical functional integration upstream and downstream

4. A new payment provider lacks complementary assets such as brand, trust, customer base, etc. Its influence in the value chain will depend on the customer values created by the service. The provider must enter into a contractual agreement with content providers. Thus, there is a slight lock-in effect for the content providers although they will have alternative payment channels available. The payment provider receives payment for the good (content) from the customer and transfers the money to the content provider. The good is however, delivered in the name of the content provider.

   Governance: agent-based

5. Content providers face moderate transaction risk in choosing one particular solution in an immature market with moderate standardization. This indicates a medium tight governance form. Frequency, however, is high. For end consumers security is of main concern, in particular, in macro payments. Thus necessary security measures must be implemented which means that the payment provider may be functionally integrated with a trusted party. For a micro payment provider looser security measures may do, such as a PIN code.

Governance: agent based

Actual Integration Model – SmartPay

SmartPay is a joint project between two established actors within their respective industries, Telenor and Den norske Bank (DnB). We have been focusing on the payment market in which DnB represents a major and well-established actor. In order to offer a mobile payment solution however, DnB would need a wireless distribution network and high technical knowledge to develop and operate this service. Telenor has the technical knowledge required. Furthermore, Telenor has the technological infrastructure and distribution network that is needed for mobile payment services. DnB on the other hand, does not have the technological know-how, but in contrast to Telenor, they have very high domain-specific knowledge. DnB also has high e-business knowledge based on experience with Internet banking, while Telenor has moderate e-business experience and competence. Both Telenor and DnB have large customer bases and strong brand names in the Norwegian market. Telenor has a large share of the mobile customer base and DnB has a large share of banking customers in Norway. Complementary competencies thus seem to create the basis for the initiation and cooperation to launch SmartPay. According to both Telenor and DnB, personal relationships played a major role in the choice of cooperation partners.

SmartPay attempts to reach the mass market for mobile payments. Although the payment system currently is limited to Telenor's MobilHandel customers, the goal is to reach the mass market either by finding a killer application or by focusing on simple services first. MobilHandel is a content aggregator where products and services may be purchased using SmartPay. The integration strategy of MobilHandel/SmartPay most closely fits an *undifferentiated* strategy because MobilHandel has a broad coverage aggregator strategy.

DnB believes it is important to find content providers that can supply "killer applications" where technology is exploited fully. This is seen as the key for the service to "take off", and is missing in today's product offering. Negotiations with Norsk Tipping could provide this, but they are also looking into other alternatives. Both Telenor and DnB see the need of becoming more proactive in marketing SmartPay towards content providers.

While waiting for the future Internet m-commerce services, which can only be captured through a large enough customer base, Telenor wants to start off with some simple SMS. The

strategy is therefore to increase the customer base through simple and popular services first, and then target more interesting content. As of today, SMS services are dominant. An important service in the future is viewed as the possibility to transfer money between customers' SmartCash accounts.

Mobile payment services need to be coupled with products and services that are available either on traditional or electronic market places. *Services are integrated* since the payment service represents a necessary complementary service to other services offered by e.g. MobilHandel. The actual payment is separated from the rest of the purchasing process, which means that we have a *vertical functional disintegration upstream*. SmartPay is tightly related to MobilHandel. *Suppliers* (content providers) are *aggregated* through MobilHandel and this aggregation provides network externalities for SmartPay, since the more content providers that are present on MobilHandel, the larger potential customer base will SmartPay have.

The ownership based joint-venture can be categorized as a *hierarchical* governance form. The relationship between Telenor and DnB is to a large extent based on trust and personal relations. Telenor and DnB have been involved in cooperative relations involving innovative and uncertain projects before (e.g. Doorstep), and there where personal relationships established prior to the initiation of SmartPay. The SmartPay cooperation was initiated because of personal relations, but once started, the relationship between the companies became regulated by use of more formal mechanisms. Information asymmetry is minimized by using a steering committee to govern the joint project.

Comparison of Expected and Actual Integration Model

The SmartPay integration model follows to a large extent the predictions of the MAPIT framework. The cooperation between a bank and a mobile operator is not unique. On the contrary, for account based mobile payments this seems to be the preferred model due to the complimentary resources and capabilities each of them possesses.

Economies of scale through broad coverage together with moderate-to-low purchasing complexity suggested an undifferentiated strategy. Moderate differentiation potential, however, allows for some differentiation which indicates a focused strategy. Thus, we have identified conditions that have to be weighed in order to reach the final conclusion on integration strategy. SmartPay follows an undifferentiated strategy. This indicates that the

differentiation potential has played a relatively marginal role in the development of the SmartPay solution so far. Another way of interpreting their choice of undifferentiated strategy could be that the market for mobile payment solutions is immature and a differentiation strategy requires a mature market where end consumers have good knowledge of the products/services and clear preferences.

Based on theory we predicted that suppliers would be aggregated to increase the adoption rate and indirect network effects. In one sense suppliers are aggregated, but the way the service is offered currently, supplier aggregation is taken care of by Telenor MobilHandel and not by SmartPay as such.

There are several functional integration dimensions in the SmartPay solution. Functionally, the payment is disintegrated from the suppliers' value chains and outsourced to an independent actor. This is due to the favorable production costs and some differentiation potential of digital payment compared to more traditional payment instruments. The digital payment service lends itself to other functional integration, such as automatic settlement of merchants' accounts. SmartPay is also integrated horizontally with the general payment infrastructure (interbank system).

The success of SmartPay depends on its adoption and traffic. Therefore, the objective of both companies is to improve the quality and quantity of products and services that can be purchased using SmartPay, and the number of end-consumers that can access these services. In order to do this, it is necessary to include both other mobile network operators (NetCom) and other banks in the payment network.

DnB and Telenor were natural cooperating partners because they were both among the main actors within their respective industries, telecommunication and banking. Telenor has the distribution facility through their wireless access network and is looking for new services to increase traffic on this network. It has the technological skill to develop this application. DnB has, on the other hand, experience in account management and payment transactions, and the bank license required to integrate this payment solution with the general payment infrastructure for clearing and settlement. Furthermore, the two companies have a history of cooperation. The joint venture was initiated based on personal relations, but the current relationship is regulated through more formal mechanisms such as a steering committee. In terms of the SmartPay strategy, both companies are aiming for the mass market (although at

the moment it is restricted to MobilHandel customers), but they have somewhat different views of how to get there. DnB argue that the answer lies in a killer application, while Telenor believes that simple content will lead to market "take-off".

Summary

SmartPay is a mobile payment system launched through an ownership-based joint venture by Den norske Bank and Telenor. The business idea is based on a vision that traditional wallets will be replaced by the mobile phone, which simplifies e.g. paying for electronic service and makes payment independent of location. Mobile payment separates payment from physical transaction processes. In this sense it can be viewed as a disintegration of existing value chains (similar to EasyPark's services). The service integrates the services of mobile communication and payment settlement. It involves transferring payment information over a wireless network from a customer to a merchant, authenticating the customer by PIN-code or digital signature (PKI), and completing the transaction by settling the payment with the merchant.

Table 6:
SmartPay - Structural Conditions

MAPIT	Mobile Payment Service
(M) Fragmentation	Payment market *Moderate* Downstream market (end consumers) *High* Upstream market (content providers) *High*
(M) Knowledge requirements	e-technical knowledge requirements *High* e-business knowledge requirements *Moderate* Domain-specific knowledge *High*
(A) Costs	Production costs *Low* relative to other payment channels Coordination costs *Low* (similar to other payment channels) Transaction costs *Low* (similar to or lower than alternatives) Distribution costs *Low* (The distribution costs use of mobile phone (air time) devolve on the end customers)
(A) Revenue sources	For transaction based services, the revenue sources will mainly be transaction fees and possibly subscription fees.
(A) Scale economies	Large economies of scale based on volume exist due to low marginal production costs. Economies of scale based on time exist to some extent (first mover advantages). This depends on potential direct andd indirect network effects of the content that can be paid by use of the payment solution.

(P) Category	Transaction service - digitalization extent is high (high potential for complementary services).
(P) Complexity	Production (process) complexity *High* Product (buying) complexity *Moderate to low*.
(P) Differentiation potential	Price differentiation potential *Moderate* Personalization potential *Moderate* Presentation potential *Moderate*
(I) Influence	Content providers *Low* Customers *High* Payment service provider *Moderate.* *Can lock content providers in, but are also dependent on content providers to be able to create any value.*
(T) Risk	Payment service provider High (because of asset specific investments costs) Content provider *Moderate* (because of incompatible payment solutions) Customers *Low*
(T) Frequency	Transaction frequency *High*
(T) Standardization	Transaction standardization *Moderate*

Table 7: SmartPay - Integration Model

	Expected Integration Model	**Actual Integration Model**
Initiator Buyer Seller Neutral	For account based payment: existing payment provider • Requires high domain specific knowledge (integration with general payment infrastructure) For micro payments: new independent provider • Requires high m-technical knowledge	A bank, DnB, and a mobile operator, Telenor, join resources to establish a comprehensive mobile payment system. The two firms have complementary capabilities for this application.
Strategy Focused Undifferentiated	Undifferentiated strategy • To gain coverage/potential for scale effects • Moderate to low product complexity	Undifferentiated strategy • Aims for the mass market
Integration Form Horizontal: a) Supplier aggregation b) Product/service integration c) Information integration d) Customer aggregation Vertical: e) Vertical functional integration upstream f) Vertical functional integration downstream	Supplier aggregation (content provider aggregation) • To gain coverage/potential for scale effects Vertical disintegration of payment • Low production costs Vertical functional integration • High production complexity associated with clearing and settlement of payment. Information integration • Moderate degree of information aggregation (limited display capabilities)	Supplier aggregation on MobilHandel Vertical functional disintegration upstream • The payment activity is outsourced to an independent payment provider (SmartPay) Vertical functional integration upstream • SmartPay through DnB settles the merchant accounts

Governance
Hierarchy
Agent
Distributor
Mediator
	Payment provider: agent-based
	• Moderate transaction risk for content providers
	  • Moderate lock-in effects
	  • Moderate risk for failing settlement
	• High transaction frequency
		SmartPay and content providers: agent based
		
		Between DnB and Telenor: hierarchy
		• Joint venture
		• Steering committee

4.3 Djuice[1]

Djuice is an open mobile Internet portal based on the WAP interface protocol for the consumer market initiated by Telenor. The business idea consists of providing an internet portal accessed by the mobile phone. The Djuice WAP portal is a collection of services with search functionality and a set of links to specific themes. Together with their partners, Djuice offers mobile services (entertainment, information and communication) on WAP, SMS, Voice and WEB. (The services are also adapted to PDAs).

In addition to the portal function, Djuice develops and distributes a mobile service platform, which enables local telecom operators, content providers, and media companies to provide mobile Internet services for end users. Telenor has ambitions to establish the Djuice brand name globally. The Djuice family today consists of Djuice.com and five domestic partners around the world under the Djuice-brand name, where Djuice in Norway is the hub for technical and conceptual development, ASP-hosting, brand building and general international marketing. Djuice receives and commissions content from different sources. Presence in multiple markets around the world enables Djuice to collect and distribute global content. The content is distributed by Djuice.com to the Djuice portals as plug in applications or as modules that the local portal adapts to the current event/or other local factors. Hence, Djuice.com possesses technological competence, while the partners possess competence regarding local markets (including customer relationships).

A fundamental component in Djuice.com's business idea is the network concept, where the objective is to achieve *innovation* and *creation* through the sharing of knowledge and exchange of expertise. In addition to the network concept, Djuice has positioned itself as an open solution aiming for the mass market.

Djuice focuses on providing platforms that enable partners to offer services with broad potential. In the short term, there will be a stronger focus on SMS, as WAP is still waiting for its breakthrough. In the medium term, WAP-based services, MMS services (MultiMedia Messaging services) and services that exploit the always-on feature of GPRS combined with push will be emphasized. And in the long term, the focus will be directed at exploiting Java,

[1] The data on djuice is taken from an ongoing project at SNF on wireless portal strategies. Report on this project is in process.

colors and enhanced sound, built-in cameras and Bluetooth, as well as the increased capacity of terminals and the high transmission speeds of UMTS. Distribution is enhanced by pre-configuring hand sets for Djuice to lower the threshold of user adoption. This is done by the dealers of mobile phones, and by the Djuice's customer service who continuously evaluates the user friendliness of the Djuice's WAP and WEB interfaces.

The WAP has mostly been used by business people, while the SMS market has a special appeal to adolescents. Djuice assumes that consumers' interest lies in the actual *experience* of using the services rather than in the technology itself. The services offered by Djuice were previously aimed at business people and adolescents. The latter group is characterized by their focus on entertainment services, quick adoption of new products and services, and extensive discussion (and testing) of the services that are offered. The professional users on the other hand, focus on information services like email, banking, etc., and they have been found more willing to pay for the services than the adolescents. In order to grow however, the company now intends to focus on the mass market. Reaching the mass market requires *simplicity* in terms of using the services (low purchasing complexity).

Table 8: Services description - Djuice

Description of Services	
i) Classification	Mobile Internet portal services
ii) Characteristics:	
• Content	Lifestyle/entertainment, information, travel, communication
• Infrastructure	Multiple channels/interfaces: SMS, WAP, WEB and Voice.
• Context	Mobile devices.
• Application	Collection of mobile data services Location-based services (e.g. Kompis)
• Safety/security	Personal Djuice identity.
• Payment	Users phone bill Djuice Account
• Basis for payment	Subscription Pay-per-use
iii) Platform:	
• Terminal	Java terminals, WAP phones, "traditional" phones, PDAs. (+ PCs for accessing the Djuice websites.)
• Transmission	Current: GSM, GPRS, and fixed Internet. Prospective: UMTS, EDGE and Bluetooth
• Application platform	Nokia mPlatform Solution (network and terminal independent (open) platform). Use of APIs.

Value Network

Djuice aims to create value by: (1) supporting joint-venture partners that address the mass market, (2) helping partners increase distribution and lower the user threshold for end users (3) looking for specific content/event opportunities that can be translated into premium content or community creation, and 4) making it easier and cheaper for suppliers of payable

content to link to Djuice and the partners' APIs, thus speeding up the introduction of new services.

Djuice's business solution adds value for content developers and providers by offering international access to wireless networks, marketing channels, and end-users. The business idea also adds value for end consumers, local Djuice partners, mobile operators, and content/service aggregators. The values created through the mobile internet portal and service platform are listed below:

1. Values acquired by the content providers

    1.1 Access to international wireless networks and thereby access to a larger potential market.

    1.2 Access to technological and m-commerce know-how.

    1.3 Additional revenue by leveraging brand in the mobile VAS marketplace

    1.4 Access to a great volume of diverse mobile VAS

    1.5 Increased brand recognition based on the additional distribution channel.

    1.6 Co-branding benefits

2. Values acquired by customers

    2.1 Personalized aggregation of mobile services for customers

    2.2 Aggregation of SMS content for users through cooperation and integration with the best partners in the marketplace

    2.3 Increased customer satisfaction by customizing content to local needs and behavior

3. Values acquired by local Djuice partners

    3.1 Access to international wireless networks

    3.2 Access to pre-developed and tested technological solutions

4. Values acquired by mobile operators (network access providers)

    4.1 Revenue growth generated by increased data traffic

    4.2 New services - new revenue streams from expanding scope of offerings

    4.3 More compelling market offer to customers and increased customer satisfaction

    4.4 Co-branding benefits

    4.5 Converting capital expenditures to operating costs

    4.6 Acquiring operating experience for further development of mobile services

5. Values acquired by content/service aggregator

    5.1 Competitive technological and business solutions

    5.2 Access to mobile phone users

    5.3 High revenue potential

    5.4 Central position in the value chain

    5.5 Flexible business model

    5.6 Scaleable architecture and potential for business expansion

    5.7 Co-branding benefits

The actors involved in value creation of Djuice services are shown in the value network below.

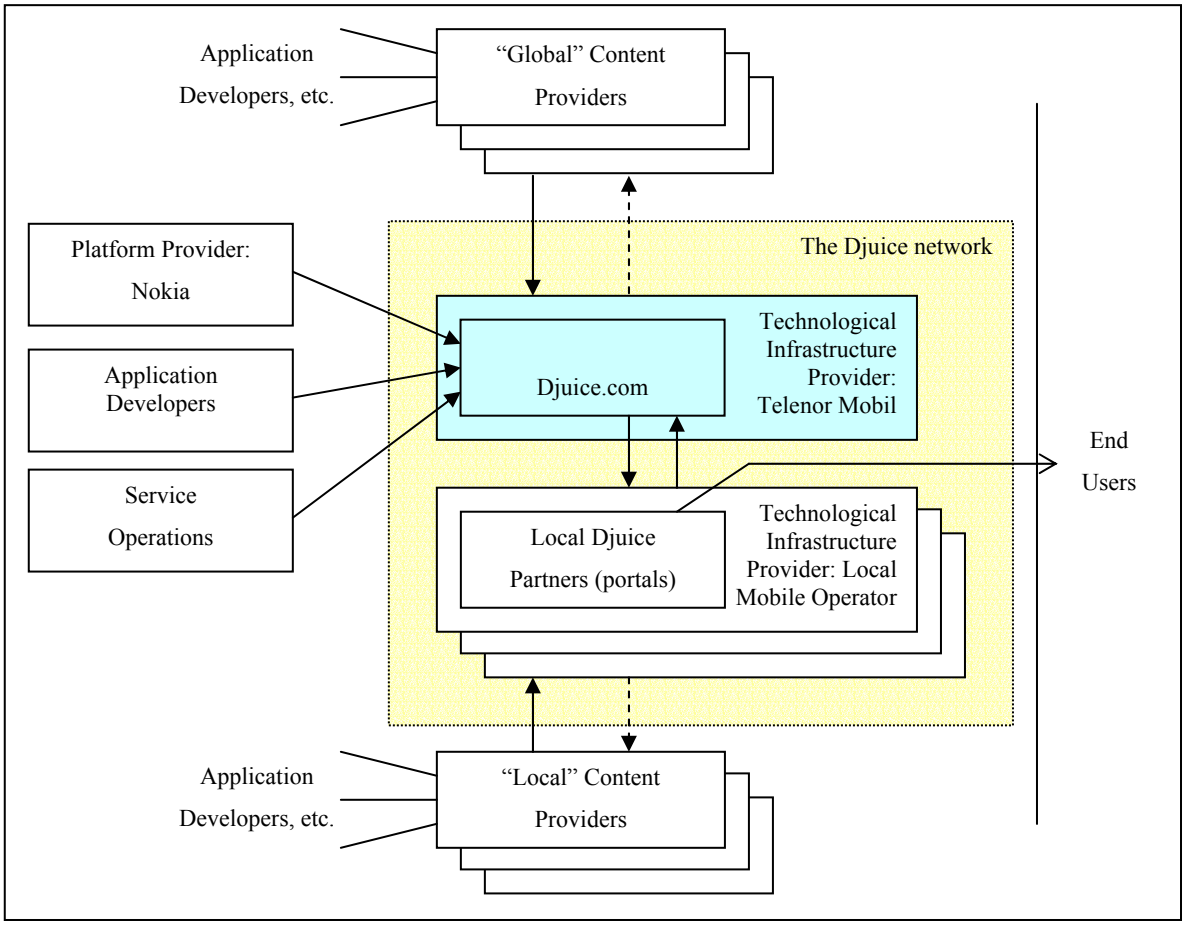

Figure 3: Value network – Djuice

Positioning

Telenor Mobil has taken advantage of the SMS market by positioning Djuice as a content aggregator in the value chain. Djuice.com develops the platform for the local Djuice portals. The local Djuice portals are mainly operated by "local" mobile operators, i.e. national operators in the different countries. Telenor has ownership interests in most of the local portals. Since the services offered by Djuice are channeled through local portals, Djuice.com acts as a mediator between the content providers and the local partners. Djuice.com offers competence and consultancy services facilitating the adaptation of content to the hand sets as well as billing of content. That is, Djuice.com offers transaction engines enabling billing and push services, positioning services and security issues.

Djuice cooperates with several content providers (e.g. Walt Disney Internet Group) in the production of services, and does not focus on developing their own content on the Djuice portals (Telenor controls very few WML pages). Djuice.com negotiates agreements on behalf of the entire Djuice network, and international content services are handled by Djuice.com. Further, Djuice.com has mechanisms and forums for stimulating the exchange of experience, knowledge and innovation for the network members. These are Network meetings and the Djuice Partner Network Extranet – which is an open and continuous communication channel between all partners.

To boost experience in the Djuice partner network and create maximum synergy effects, Djuice has created an international brand and the Djuice partner network. Partners in the network have access to tools, guidelines and strategies for building, strengthening and maintaining the brand. However, the product market, in which the network of companies operates, has just recently been established, so Djuice.com and its partners must build the brand and educate the market at the same time. Djuice's role is to ensure that partners, suppliers and content providers see Djuice as a brand for the network. Djuice.com is also responsible for launching regional and international sponsorship deals together with the local Djuice brands, and for negotiating new agreements on behalf of the network. The local Djuice portal is responsible for developing national sponsorship strategies and for increasing the brand's value locally. The local portals market, manage and distribute Djuice solutions in their own markets, and they are responsible for developing the Djuice brand through local brand strategies and campaigns.

4.3.1 Structural Conditions for Mobile Internet Portal

Djuice offers a mobile internet portal and a service platform. Internet portals already exist, and in this sense, the service represents an existing service offered through a new channel - a mobile channel.

In this section we explore why Telenor has positioned its mobile internet portal, Djuice, as a mediator between global content providers and end customers (sometimes through local portals) in the value net presented in section 2. Drawing on the theoretical framework of MAPIT we analyze the degree to which Djuice's choice of business model could be expected based on structural conditions. The analysis begins with a description of the Market structure,

and then we describe cost and revenue structures for relevant Actors. Further, specifics about the Products/services offered are presented, we discuss the Influence and trust among actors in the network, and finally the risks associated with Transaction exchanges are analyzed.

Markets

The market for content services accessed by mobile devices is broad and to a great extent similar to web based Internet services accessed by PCs. Mobile services offer customer added values in terms of convenience. In addition, new services such as location based services can be added to content services. The content provider market is broad and highly fragmented. The end user market, the consumer market, is equally highly fragmented. There exists a number of mobile portals in the market. They have primarily grown out of the dominant operators in various markets (iMode/NTT DoCoMo, O2-Genie/BT, and others), but also some Internet portals have added a mobile access channel (Yahoo mobile, Excite, and others). Some content providers, typically content aggregators, like large newspaper houses, offer portals in addition to content aggregation in other channels (Schibsted/Inpoc). In domestic markets we find generally few mobile portal providers and very few mobile operators providing network access. These two markets are therefore characterized by low fragmentation.

Another central market condition has to do with knowledge requirements. In order to offer mobile portal services, infrastructure knowledge is needed. Infrastructure knowledge requirements encompass competences within network-/communication (open access networks, bandwidth, security, traffic management); computing and applications (API, Java, web services); and integration of these components into effective systems. These requirements denoted by technological knowledge are evaluated to be high. Mobile internet portals serving the consumer market secure and convenient mobile services require innovative business plans and strategies that package services in new ways to create added values for customers, hence high m-commerce knowledge is required to generate sufficient revenues in an immature and innovative market. Domain knowledge has to do with knowledge required to market a specific core service (a specific content), for instance, knowledge associated with ticket sales for cinemas. The domain knowledge requirements related to most portal products and services are assumed to be low.

Actors

Three conditions related to the individual actors in the market are of interest here: cost structure, revenue sources, and scale and scope economies.

Developing a mobile internet portal requires high investment costs in infrastructure (the portal platform) and content framework. Although the portal infrastructure is based on network standards (GSM, GPRS, etc.) and access standards (SMS, WAP, etc.) the development costs of a portal platform with integration of communication, computing, and applications are high. Also, to create a new brand in the consumer market with services that are attractive to customers requires high investments in marketing. However, to run individual requests on the portal entail low variable production and distribution costs, and low to moderate costs to coordinate suppliers and customers. The transaction costs (upstream) are moderate to high due to the costs connected with acquiring new content providers.

The revenue driver of a mobile internet portal is content based as opposed to the network access provider which is traffic based. The revenue sources for a mobile internet portal can be based on transaction fees, a combination of transaction fees and subscription, or on advertising. Sufficient revenues from advertising require a considerable demand growth.

The business idea of a portal largely rests on values created from economies of scale and scope. The additional costs of processing an increased range of services on the portal are low and hence there is a large potential for economies of scope. More content providers on the portal and more end consumers using the portal means a decrease in total costs for the portal provider and an increase in value for the customers. The value of increased scope of content providers on the portal creates indirect network externalities. Scale and scope effects can also be captured by transferring a branded service platform (infrastructure) across several domestic markets.

For a content provider to gain control of a portal there are moderate scale effects. For network access providers, on the other hand, there exist large scale economies in providing data services over the network. Indeed, data services are regarded as needed to give the operators a traffic growth in a mature voice market.

Products/services

The mobile internet portal provides digital entertainment, information (utilities), and multimedia services. To offer these services in the market, a complex infrastructure is required. The production complexity is, therefore, characterized as high. However, we regard the processing of services on a portal to be well delimited from content production and network operations and therefore easily outsourced or licensed.

Portal services are generally well known products to purchase. The product complexity is therefore considered low. There exists a great potential for personalization (customization) and contextualization of mobile services. Customization can be achieved by letting consumers segment themselves and/or by collecting and saving information about the most frequently used content services by the users. Customization and personalization could be introduced without adding much complexity to the purchasing process. Context specific services, on the other hand, require more from the provider and would most likely increase the production complexity. Examples of contextualization include using the information about the location of the mobile phone (as known by the operator) to supply location based services to the customers. Content delivery based on geographic location can be the main driver for mobile services where relevant content, for instance advertising, is made available to potential customers.

Portal services are generally very simple. However, digital information lends itself to personalization. The additional features of context and location based content give portal services a high personalization potential. With respect to presentation potential we regard this as moderate due to the constraints of the limited displays on mobile phones. New technology may, however, eliminate this constraint over time. Differentiation on price, on the other hand, will be difficult for this type of service.

Influence

Influence has to do with the different actor's power in the value network. Three conditions are included in the MAPIT network: the importance of trust, the potential for lock-in, and information asymmetry.

In the value network, trust is probably most important in terms of the mobile service platform, where Djuice provides services for local portals. Trust is also important in the

cooperation between Djuice and content providers since they develop solutions together. For most mobile services, trust is likely to be an important issue for end customers.

The main power in the value net currently lies with the network access providers due to their complementary assets in terms of brand, customer base, customer information, and technical know-how. Furthermore, they have the incentives to move into the growing data market and they have the technology in place for location determination.

There is no need for portal services without content providers. However, the content demanded on a portal is very broad requiring a number of suppliers. We, therefore, consider the influence of the content providers to be low with very little potential for lock-in/lock-out effects unless they own property rights on very attractive content and want to control the customer contact point themselves. In general, the content providers are likely to choose the mobile portal that offers the greatest chance of reaching their target audience. The power relationship between content providers and portal providers thus seems fairly predictable. Content providers will generally prefer to provide their products/services through multiple channels, where the mobile channel represents one such channel. Mobile portals need content providers to be able to create customer values. As mentioned, portal providers may gain influence if they control customer interface and can push products in the market. Only if the content becomes a "hot item" (a situation of market pull), will the content provider gain influence vis-a-vis portal providers.

Portal providers have low to moderate influence, but may potentially and over time control the customer interface. The infrastructure network with local portals enhances this possibility as local customer needs and preferences are being met. The focus on exchanging experience, knowledge and innovation among the network members can also be viewed as a way to lock content providers in and hence to increase the portal providers' influence in the value net.

Transactions

The MAPIT conditions related to transaction exchange include transaction risk, transaction standardization, and transaction frequency.

The risk for content providers to launch their content and applications on a portal is evaluated to low-to-moderate. Low because content can be distributed through alternative channels, moderate because application will have to be fitted to the portal providers' APIs.

For portal providers the transaction risk is substantially higher due to large investments in infrastructure and know-how, and their dependence on available content based services. The degree of standardization is assessed to be high, and so is transaction frequency.

4.3.2 Integration Model

In this section we summarize the expected integration model based on the MAPIT taxonomy and then we present the actual integration model for Djuice. Based on the conditions that were identified using MAPIT in the previous section, we can make theoretical predictions concerning who is likely to *initiate* integration, the integration *strategy*, integration *form*, and the *governance*. The theoretical predictions are then compared with the actual integration model and any gaps between the expected integration model and the actual integration model are discussed in an attempt to refine the MAPIT framework.

Expected integration model

1. New and specialized intermediaries are more likely to initiate integration when markets are highly fragmented and consist of many suppliers and customers. To develop a broad service mobile portal we do not expect any initiative from either content providers or end customers. Furthermore, the theory predicts that when requirements of high technological knowledge are coupled with high m-business knowledge, then specialized intermediaries may initiate integration. We have observed that the technological knowledge is related to communication and computing know-how. Communication competence is located especially among the network access providers. In most markets, fragmentation of network access providers remains low. Thus, we may expect that a network access provider may take the initiative to create a new intermediary for mobile portal services.

   Initiator: new intermediary

2. The actor conditions are related to build the portal platform and to run the portal services, acquiring customers, and managing customers and content providers. We have identified very high scope effects of the platform, and also fairly high scale effects of services. Furthermore, network traffic and content retrieval are complementarities, thus giving rise to indirect network effects and scale effects at the network access provider. With large scale and scope effects we conclude that the most viable strategy is undifferentiated and that the integration form is likely to be supplier (content provider) aggregation to attain coverage and indirect network effects.

   Strategy: *undifferentiated*

   Form: *supplier (content provider) aggregation*

3. Generally speaking high production complexity leads to a more focused strategy and requires more domain specific knowledge indicating a vertical integration direction. In this case, however, we have identified low purchasing complexity and low domain knowledge requirements. The high production complexity is associated with operating a complex communication and computing infrastructure which is possible to outsource as discussed above. Taken together, these conditions strengthen the actor conditions above that an undifferentiated strategy with supplier aggregation is likely. Due to the communication infrastructure needed to operate a portal, vertical functional integration downstream with a network access provider can be an advantage. In addition we have identified opportunities to bundle content with context and location, another technology component possessed by network access providers. Thus, product/service integration is possible. This may lead to higher production complexity. However, if convenience and simplicity are to be maintained, these context-related services must be simple to acquire and use. Therefore, we maintain that the predicted integration strategy is an undifferentiated strategy.

   Strategy: *undifferentiated*

   Form: *content provider aggregation*

   product/service integration

   vertical integration with network access provider

4. We have identified high scale and scope effects in providing mobile portal services which indicate that the numbers content providers and customers are important. This indicates that the appropriate governance structure is a mediator. This is strengthened by the high degree of transaction standardization and high frequency. It is also supported by the low transaction risks involved by the various stakeholder of the value net.

   Governance: mediator

Actual integration model

The Djuice mobile internet portal and service platform were initiated by the *established* and dominant network access provider in the Norwegian market, Telenor. Djuice's business idea is to bring the mobile internet portal to the mass market. They aim to create value by offering a mobile internet platform and making it easy for end consumers, content providers, and other cooperating partners to *use* the service. The following customer values have been identified by Djuice:

- Personalized aggregation of mobile services for customers
- Aggregation of SMS content for users through cooperation and integration with the best partners in the marketplace
- Increased customer satisfaction by customizing content to local needs and behavior

Djuice has now chosen an *undifferentiated strategy,* where the focus is on reaching the mass market by providing simple services. According to Djuice, their customers value applications and services that possess one or several of four important qualities: 1) services should provide timely information, 2) they should be simple to complete, 3) they should be relevant to location, and 4) they should be personalized. Further, in each part of the value chain, the user experience has to be as good as possible. That is, the services must be easy, intuitive, simple and dynamic. The customer should experience the services as useful and/or entertaining. Based on the customer values Djuice have identified, viz. personal aggregation, aggregation of SMS content, and customizing of local content (as described above), a more focused strategy seems likely. Some of the MAPIT conditions, such as high production complexity and personalization potential through location based services, also supported a focused strategy. However, the range of services offered by Djuice is broad with large scale

and scope effects for the time being. These conditions indicate an undifferentiated strategy. Thus, we have found conditions that could lead to the choice of either a focused or an undifferentiated strategy. This may indicate a likely shift towards a more focused strategy once the market has developed and more people demand mobile portal services.

The whole idea of providing a portal is connected with aggregating content providers, or *supplier aggregation*. *Information integration* also seems unavoidable in a portal concept. Both of these integration forms were predicted by the MAPIT conditions.

Different cooperation models exist within the value network. The mediator governance form describes the portals position in the value chain between the content providers and the customers. In the Djuice case Telenor, as a network access provider, has chosen a *hierarchical* governance position with the portal where they own the Djuice platform one hundred percent. Other relevant cooperation models in the value network consist of the relationship between the Djuice platform and the local portals. Djuice holds ownership in most of the local portals. The partner network ties content providers to Djuice in a mediator governance form.

“Revenue comes from advanced services, not just licenses". This idea of openness is the first pillar of Telenor's WAP strategy. Telenor WAP users can access any and all content in WML, and people holding accounts with other operators can likewise access Telenor's WAP gateway at Djuice.com.

Djuice aims to change from being a complex and relatively sophisticated service provider to being a provider of simple and understandable services for the mass market. The idea is to make it easier for consumers to make choices. Customized and personalized solutions will therefore initially be toned down. As users eventually become accustomed to the technology, Djuice will again increase the opportunities to customize personal solutions. Because Djuice initially focused on innovators and early users, the current focus on the mass market involves a substantial challenge in addressing a less homogenous group of users. Djuice is present in several countries, and the various markets are at different stages of their development. Some locations hardly have a mass market at all. But even in mass markets, the behavior of consumers will not be the same from one country to the next.

Comparison of expected and actual integration model

As expected, the mobile internet portal was initiated by a new intermediary in the distribution channel of content services to end consumers. This new intermediary, the portal, has tight relationships with other parts of the value network, particularly the mobile operator. The close cooperation is primarily due to resources required for producing the portal services on a wireless network. In terms of integration strategy, the theory predicts an undifferentiated strategy and this coincides with the actual strategy pursued at the moment. The choice of strategy is supported by structural conditions such as the high potential for scale and scope effects. However, Djuice has chosen this strategy for a limited time in order to develop the market and to push market development. Once consumers are familiar with the services, more complex services will be offered and Djuice then aims to differentiate its portal services from competitors and to follow a more focused strategy. Brand building is already in focus as a first and long-term attempt at differentiation. In accordance with theory, Djuice aggregates suppliers and integrates information. Information integration, however, is a vehicle for differentiation, and, thus, supports a more focused strategy. The information integration we have identified is the bundling of location and content, which requires a functional integration between the portal and a network operator. Furthermore, an access provider possesses resources (capital and technological knowledge) as well have interests in driving the traffic on the network by entering into new markets. This leads to a tight governance model in this functional integration process. This can explain why Telenor has chosen a hierarchical governance model in its relationship with Djuice.

Summary

Djuice's business idea consists of providing an internet portal that can be accessed by the mobile phone, aimed at the mass market. Djuice has positioned itself between the content providers and the customers on the basis of creating value by aggregating content providers and integrating information. Djuice.com both provides a portal and develops the platform for other, international portals. This dual role allows Djuice to: cooperate with large international content providers (e.g. Walt Disney Internet Group) in the production of services; negotiate agreements on behalf of the entire Djuice network; and initiate and learn from network meetings where experiences, knowledge and innovations are shared and exchanged among network members.

Table 9:
Djuice - Structural Conditions

MAPIT	Mobile Portal Service
(M) Fragmentation	Mobile Portal market *Low* Downstream market *end consumers: High* Upstream market (content providers) *High* (although some large global and domestic providers)
(M) Knowledge requirements	e-technical knowledge requirements *High* e-business knowledge requirements *High* Domain-specific knowledge *Low*
(A) Costs	Production costs *Low* Coordination costs *Low to moderate* Transaction costs *Moderate to high* Distribution costs *Low*
(A) Revenue sources	For portals: traffic-based, transaction fees, subscription, or advertising, or combinations
(A) Scale and scope economies	High potential for scale effects Indirect network effects High potential for scope effects

(P) Category	High degree of digitalization
(P) Complexity	Production (process) complexity *High* (can be outsourced or licensed) Product (buying) complexity *Low*
(P) Differentiation potential	Price differentiation potential *Low* Personalization potential *High* Presentation potential *Moderate*
(I) Influence	Portal providers *Low*, but potential to increase Content providers *Low* (higher for providers that own property rights on very attractive content) Customers *Low* Network access provider *Low*
(T) Risk	Portal provider *High* Netowrk access provider *Low* Content provider *Low* Customers *Low*
(T) Frequency	Transaction frequency *High*
(T) Standardization	Transaction standardization *High*

Table 10: Djuice - Integration Model

	Expected Integration Model	**Actual Integration Model**
Initiator Buyer Seller Neutral/independent	New independent intermediary. • high market fragmentation • high technical knowledge required coupled with high e-business knowledge	Existing actor, Telenor, initiated integration
Strategy Focused Undifferentiated	Undifferentiated strategy • large potential for scope effects • indirect network effects • low domain-specific knowledge required Focused strategy • large potential for scale effects	Undifferentiated strategy • simple services for the mass market • standardization of micro transactions (GSM, etc) Focused strategy • likely change in the future with more mature market
Integration Form Horizontal: a) Supplier aggregation b) Product/service integration c) Information integration d) Customer aggregation Vertical: e) Vertical functional integration upstream f) Vertical functional integration downstream	Supplier agreggation • high degree of digitalization • indirect network effects Product/service integration and information integration • low production costs • personalization potential high degree of transaction standardization Customer aggregation • direct network effects Vertical functional integration • high degree of transaction standardization	Supplier aggregation (content aggregation) Information integration Vertical disintegration • new aggregator
Governance (Cooperation model) Hierarchy Agent Distributor Mediator	Mediator(content providers - customers) • low transaction risks Hierarchical (portal - operator)	Mediator (content providers - customers) Hierarchical (djuice - Telenor) Hierarchical (djuice.com – local djuice portals)

4.4 The Tax Magazine

BA.no (also called BA Interaktiv A.S) is owned by Bergensavisen (BA) - one of the major newspapers in Western Norway. As a content provider, BA.no provides online news and news-related information. The Tax Magazine (Skattemagasinet) is one of several services offered by BA.no. The Tax Magazine presents online tax information services about taxpayers' taxable income and taxation for a fiscal year. It consists of searchable lists about individual taxpayers as well as editorial material coupled to the taxation information. The idea behind the Tax Magazine is to make public information (in this case tax related information) easily accessible. In Norway, tax information is public information provided by the Norwegian Tax Administration, a government agency, and tax lists are annually published on the Internet by several newspapers.

The Tax Magazine currently offers online tax-related information on the web or on wap, and most likely, it will soon be offered on SMS. As of today however, the mobile channel is only involved in making payments for the service. Several competitors offer the service through the mobile SMS channel. While many information-based electronic services are free of charge on the web, the Tax Magazine has charged NOK 10 per access hour in 2001. According to recent price information, a single search in the lists costs NOK 5, and a 15 minutes free search costs NOK 10. Purchases can be charged to the telephone bill (SMS) or to the Payex payment system. Payex is a purse based micro-payment system used by most of the big content providers in Norway.

Table 11: Services description – Tax Magazine

Description of Services	
i) Classification	Information; Tax related information
ii) Characteristics:	
• Content	Editorial information. Searchable taxpayer lists.
• Infrastructure	Channel integrating. SMS + Web or Wap
• Context	Multichannel for online public information
• Application	Traditionally printed information available for online search
• Safety/security	Relevant for payment. Payex requires registration and password.
• Payment	SMS or Payex.
• Basis for payment	Payment for limited time of search or per search in the lists.
iii) Platform:	
• Terminal	PC or mobile phone
• IP net	Internet
• Application platform	

Value network

The business idea behind the Tax Magazine is that online access to information creates value. The scope of the information is narrow however, as it only involves tax-related information. The raw data behind the information is not available on the open market, so the information in and of itself is of some value. However, many newspapers offer the same information for

free in both paper and electronic (Web, WAP, and SMS) versions. According to the editor of BA.no, the Tax Magazine aims to create value for customers by offering a *wider selection and/or higher quality of tax-related and other electronic content services* than their competitors.

Currently the Tax Magazine differentiates its services mainly by charging for the taxation information services. The rationale behind charging money for this service is two-fold. One reason is to generate a cash-flow independently of advertising revenues. The other reason is to educate customers in paying for electronic content. BA.no believes that once customers realize that BA.no is valuable and worth paying for they are likely to become loyal customers and will be willing to pay for other electronic services. This also allows BA.no to test different pricing strategies and to assess willingness to pay for other electronic services.

In the long run, it is believed that value can be created by broadening the scope of the Tax Magazine to include more than editorial material on taxation. BA.no views one plausible development of its taxation services to include more taxation related items from the paper-copy of BA as well as electronic information about public fees, national taxation policy, guidelines for filling out the tax returns as well as other, perhaps even less related, issues.

1. Values acquired by the content providers (BA.no)

    1.1 Revenues from service

    1.2 Information on price elasticity

2. Values acquired by customers

    2.1 Better tax related information? (possible to get for free other places)

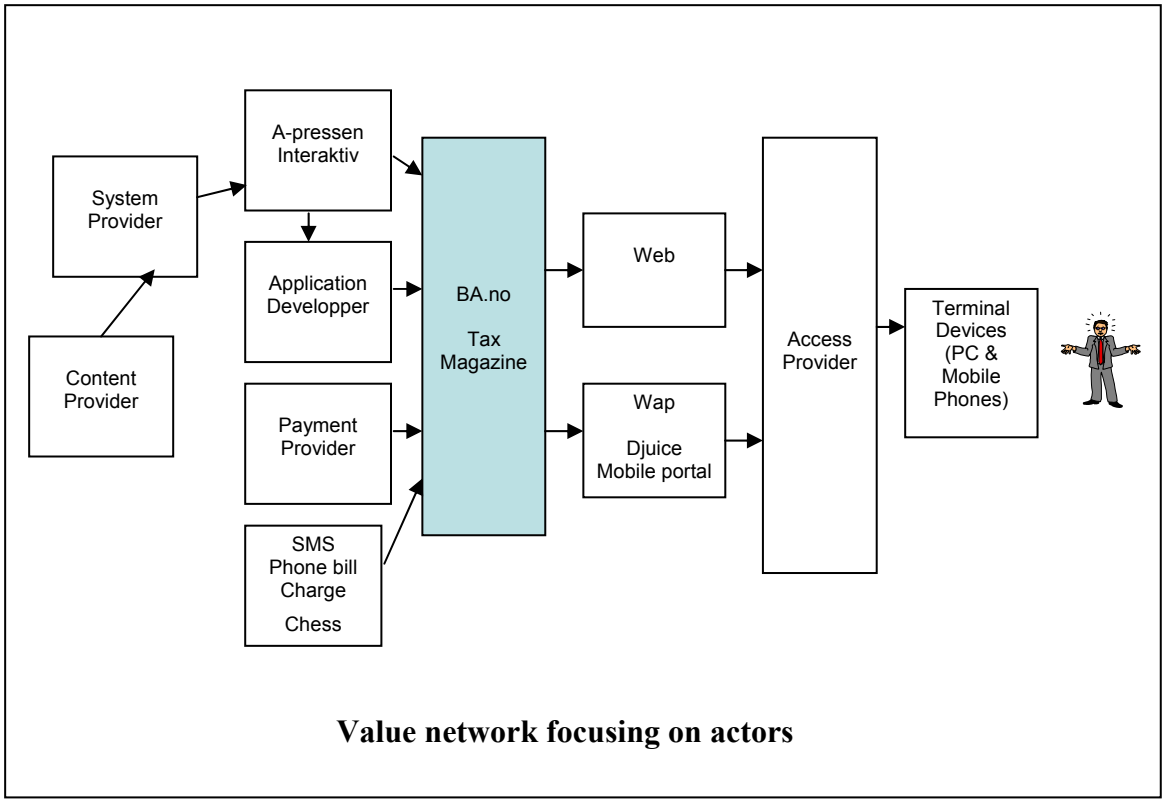

Figure 4: Value network – Tax Magazine

Positioning

The owner of the Tax Magazine, BA.no, aims to offer a broad selection of theme-based content. The Tax Magazine represents one such narrow service where taxation information is integrated with editorial material. The Tax Magazine follows a focused strategy, and this is also the main strategy for BA.no. Instead of looking for one grand killer application for the mass market, BA.no aims to introduce a number of narrow products and services that provide value when they are added up.

There are several different relationships between the actors in the value network. BA.no cooperates with Telenor Mobil through Djuice. Telenor markets the Tax Magazine through the Djuice mobile portal. The cooperation with Telenor Mobil was initially based on offering the service on WAP in addition to Web. Future cooperation with Telenor Mobil, in terms of offering tax-related information on SMS, is likely. An SMS based solution has already been discussed between the two actors several times. The Tax Magazine also has a purely purchasing relationship with Teamco. Teamco obtains tax statistics from the Taxation Authorities and sells it to approved organizations (such as newspapers). BA.no also

cooperates with other newspapers in the A-pressen Group through A-pressen Interaktiv (API). API represents a cooperation effort between forty newspapers, where BA.no is the largest. The members of API cooperate commercially, editorially, and technically.

4.4.1 Structural Conditions for Electronic Tax Information

Market

According to MAPIT, the market conditions that impact on integration aspects are related to fragmentation and knowledge requirements. Fragmentation refers to the number of players while knowledge requirements refer to the know-how needed to develop, operate, and market the service, as well as to create business values.

Many newspapers in Norway offer taxation related information through various channels: hard-copy newspapers, the Internet, WAP, and SMS. The supply side of the market for this type of information is characterized as fragmented. Further upstream, the supply of taxation information is regulated and only available through one specific company which obtains the information directly from the tax authorities. This creates a monopolistic situation with one content provider, the Norwegian Taxation Administration, a non-profit organization. The downstream market consists of a wide variety of individuals and companies searching for different types of taxation related information, including birth dates and addresses. The downstream market must therefore be considered as highly fragmented.

The technological knowledge required for offering electronic tax information through multiple channels is moderate. The service provider has to be able to either develop the technological application or purchase this knowledge. A moderate degree of e-business knowledge is also required in order to create business values. The service provider needs to be clear about what kinds of values an electronic or mobile channel can create. Domain-specific knowledge required to answer simple queries on individual's taxation data is considered low. However, to relate individual taxation data with editorial material may require journalistic research. And the domain knowledge required is, therefore, regarded as high. The overall domain knowledge requirements, thus, depends on to what extent taxation information from the tax lists combined with self generated editorial stuff. After all, the basic pillar of this service is the database of individual's taxation data.

Actors

Three conditions related to the individual actors in the market are of interest here: cost structure, revenue model, and scale and scope economies. All costs connected with production, coordination, transactions and distribution of tax related information can be considered as fairly low. Digitalized information is not very expensive to produce. The costs related to purchasing the information are estimated to about NOK 25.000 per year. Revenue sources for this type of service are usually traffic-based, i.e. based on access time and to some degree based on advertisements. Another, less likely alternative source of revenues is through subscriptions, for example of a package of taxation content services. The potential for scale effects is high as it is with all digital information services. However, scale effects depend on a large market, and the size of the potential market for tax related information may be limited. Scope effects, tied to linking tax related information to other types of information, remain limited.

Products/services

In terms of the product/service, three conditions are of interest here: the product category, product complexity, and the differentiation potential. We have already mentioned that the service is an information service where the extent of digitalization is high. Production complexity and product (buying) complexity are both low. There is limited potential to differentiate the product for various customer segments. Price can most likely not contribute in differentiating the product. The potential for differentiation based on personalization is moderate since editorial material can be specific in relation to individual or groups of taxpayers. In terms of presentation potential, we questioned the extent to which electronic and mobile channels contribute to different or better presentations.

Influence

Influence has to do with the different actor's power in the value network. Three conditions are included in the MAPIT network: the importance of trust, the potential for lock-in, and information asymmetry. In the value network for tax related information, trust is not a central issue. The risk of information asymmetry and lock-in or lock-out effects remains low. There are no obvious dominant actors in the network, but customers have a fairly high degree of influence because of their easy access to alternative suppliers. Newspapers also have some

influence vis-a-vis other types of organizations, since they have access to this type of information. As mentioned, the taxation information from the taxation authorities is not available on the open market. Finally, the Tax Authorities are perhaps the most influential since they own the source of information, and may be able to affect who is allowed to purchase the information.

Transactions

The MAPIT conditions related to transactions (T) include transaction risk, transaction standardization, and transaction frequency. The Tax Authorities have alternative distribution channels for their products and services and the transaction risk for them must be considered low. There are some relation specific investments that are required by newspapers in order to be able to offer content through multiple channels. Newspapers therefore have a moderate risk involved in offering this service. Customers, on the other hand, make no relation-specific investments, and have other alternatives, hence their risk is minimal. The degree of standardization is high, while transaction frequency is low to moderate due to the highly specialized information.

4.4.2 Integration Model

In this section we summarize the expected integration model based on the MAPIT taxonomy and then we present the actual integration model for our particular case, the Tax Magazine. Based on the conditions that were identified using MAPIT in the previous section, we can make theoretical predictions concerning who is likely to *initiate* integration, the integration *strategy*, integration *form*, and the *governance*. The theoretical predictions are then compared with the actual integration model and any gaps between the expected integration model and the actual integration model are discussed.

Expected integration model

1. The provider of tax related information operates in a monopolistic market. Based on the market conditions, we can expect that the Norwegian Tax Administration will initiate integration and thereby offer online taxation related information electronically through several access channels including the mobile phones. Electronic and mobile taxation information requires moderate e-technical knowledge and an understanding for how

value can be created through electronic channels. The Tax Authorities do not possess this type of knowledge, but have high domain-specific knowledge about taxes and the taxation system in terms of their possession of this asset. The requirements for domain-specific knowledge for individual search have been judged as low however. The newspapers have for some time offered taxation information when the annual taxation assessment is made public by the Norwegian Tax Administration. Some newspapers have developed competencies within electronic information technology and e-business. In addition they have the journalistic resources to couple the taxation data with editorial material, and thus possess domain knowledge of this type. Based on knowledge requirements for this type of service, MAPIT leads us to expect that newspapers would initiate integration by offering an improved service (taxation information) through new channels (electronic and mobile).

Initiator: existing content provider

(The Norwegian Tax Administration or the newspapers).

2. The costs associated with offering information and searchable lists online or through mobile channels remain low. Production costs, coordination costs, transactions costs, and distribution costs are all judged as lower than alternative ways of providing this type of information. According to MAPIT, low production and coordination costs are likely to lead to horizontal information integration. Low production costs are also connected with supplier aggregation and information integration. However, we have assessed the potential for scope effects to be low. That is, apart from editorial bundling of taxation data and context information related to these data, the product potential for horizontal integration is low. The high potential for economies of scale and low potential for economies of scope potential indicate concentration and a focused strategy. No segmentation of the market, however, leads us to predict an undifferentiated strategy.

Strategy: undifferentiated or focused

Form: information integration

3. The product category is a digital information service with little potential for complementary services and limited potential for differentiation. This strengthens our

predictions of an undifferentiated strategy. Other conditions, which MAPIT also links to undifferentiated strategies, are the low production and buying complexity.

Strategy: *undifferentiated*

Form: *information integration*

4. Unless the provider of electronic tax information already has access to this type of information, a contractual agreement with the content providers must be established. Actors who already have access to tax information therefore have an advantage and more influence. This strengthens our expectations in terms of who will initiate integration. It is likely that existing actors, either the Tax Authorities or newspapers, will offer this type of service.

   Initiator: *existing content provider (The Tax Authorities or the newspapers).*

5. The newspapers face moderate transaction risk in providing an additional channel for tax information. The risk is tied to relation specific investments need to develop the service. For the Norwegian Tax Administration on the other hand, the risk is low, provided that they can obtain the necessary e-technology and e-business competence. Transaction frequency was considered as low based on the specialized product involved in tax-related information. As with most services involving electronic information, transaction standardization was judged as high. Based on transaction risk, frequency and standardization, we therefore expect that the integration will take the form of an agent or distributor model. The access service to individual taxation data follows an agent model, while the editorial material a distributor model.

   Governance: *agent based and/or distributor based*

Actual integration model

The Tax Magazine is one of a portfolio of information services offered by BA.no, the interactive division of a large Bergen-based newspaper. The newspaper represents one of the *existing actors* we predicted would initiate integration. The newspaper has previously distributed this information (although a less advanced service) through another channel - the hardcopy of the newspaper. The electronic channels allow more complete and advanced

services such as searching tax lists. The idea was also to integrate tax information with editorial information, i.e to *integrate information*, although it is important to point out that this has not really been done. Editorial information has in practice not been bundled with tax information - they rather coexist on BA.no's webpages.

BA.no has chosen a *focused* strategy for the Tax Magazine. They aim to offer a number of narrow, but high quality services, which will create value for the customers. Indeed they expect their information services to become so valuable that customers will pay although similar information is available for free.

The Tax Magazine has been organized as a fully owned integration initiative. BA.no owns the whole business idea, which represents a *hierarchical* governance form between BA.no and the Tax Magazine. However, BA.no annually purchases electronic taxation lists from the system integrator/content provider – the Norwegian Taxation Administration. This purchasing relationship indicates a *distributor* governance form.

Comparison of expected and actual integration model

The actual integration model chosen by BA.no for the Tax Magazine differs from the expected model at a few points. The service was initiated by an established actor, the newspaper, while the prediction based on the structural conditions was either the Norwegian Taxation Administration or newspapers. The initiation by the newspaper is not surprising however, if we take into consideration the special conditions under which the Norwegian Taxation Administration operates. The Norwegian Taxation Administration who generates the taxation data is a non-profit government agency. However, their influence in the value net is strong and they could generate their own distribution channel for publishing taxation data.

So far they have not established this service. Therefore, the alternative initiator is likely to take this position for the mobile channel as well as for the established web channel. BA.no's choice of a focused integration strategy must be based on the differentiation potential of this service. This requires, however, that editorial material differentiates the Tax Magazine from competitors and thereby justifies a higher prize. Unless the mobile channel offers additional customer values to outperform the free web access, and the other newspapers offering mobile access also charge for this, then we have not observed structural conditions that justify a differentiated service, and, thus a focused strategy. As long as other suppliers offer the same

or similar service free of charge, a strategy based on differentiation on price (relative to competitors) must be categorized as contrary to expectations. The choice can be explained by the Tax Magazine's long-term perspective of educating consumers in the value of electronic and mobile information services and their attempt to use experiences from the Tax Magazine to learn about consumer willingness to pay for future electronic and mobile service.

Integration of information was a choice in line with our predictions. Despite their intentions of integrating taxation information with editorial material, however, this integration can not be found in the service they offer today however. Finally, we predicted an agent or distributor governance model because of standardized transactions and low transaction risk. The actual governance model is a distributor model as the Tax Magazine buys the data lists and distributes this with the intention of coupling these data with editorial material. We have assessed the transaction risk to be low. This depends on the Norwegian Tax Administration's willingness to make these data available for the newspapers. There are relationship-specific investments required for this service.

Summary

The business idea behind the Tax Magazine is to offer online access to tax-related information. The established actor, BA.no, owned by the newspaper BA, thereby creates an additional channel by which they offer an existing service, but with the added value of searchable tax lists and complementary and related tax information. Relative to online competitors, the Tax Magazine has chosen to position itself as a better, and therefore more expensive, service. Online information from the Tax Magazine, as opposed to other suppliers, costs money and payments can be made through mobile payment services.

Table 12:

Tax Magazine - Structural Conditions

MAPIT	Electronic Taxation Information Service
(M) Fragmentation	Market for taxation related information *High*, many (most) newspapers offer this information Downstream market *High* Upstream market information providers: *low* because of monopoly
(M) Knowledge requirements	e-technical knowledge requirements *Moderate* e-business knowledge requirements *Moderate* Domain-specific knowledge For individual requests: *Low* For editorial related material: *High*
(A) Costs	Production costs *Low* Coordination costs *Low* Transaction costs *Low* Distribution costs *Low*
(A) Revenue sources	Traffic-based, advertising, or subscription of electronic information in general + traffic-based
(A) Scale economies	High potential for volume-based scale effects Limited (low) potential for scope effects

(P) Category	High degree of digitalization
(P) Complexity	Production (process) complexity *Low* Product (buying) complexity *Low*
(P) Differentiation potential	Price differentiation potential *Low* Personalization potential *Moderate* Presentation potential *Low*
(I) Influence	Content provider (Tax Authority) *High* Content providers (newspapers) *Low* Customers *High* (because many alternatives exist) Access provider *Low*
(T) Risk	Content provider (Tax Authority) *Low* Content provider (newspapers) *Moderate (requires relation specific investments)* Customers *Low*
(T) Frequency	Transaction frequency *Low* (because specialized product)
(T) Standardization	Transaction standardization *High*

Table 13: Tax Magazine - Integration Model

	Expected Integration Model	**Actual Integration Model**
Initiator Buyer Seller Neutral	The content provider (The Tax Authorities or newspaper) • Domain knowledge • Influence in the value net	Content provider (newspaper) • created as an additional distribution channel with additional features (search possibilities)
Strategy Focused Undifferentiated	Undifferentiated strategy • low production complexity Focused strategy • potential for scale economies • moderate differentiation potential (personalization)	Focused strategy if we look at BA.no's strategy for content. Many specialized products. Also charging money for a service that competitors offer for free eliminates an undifferentiated strategy.
Integration Form Horizontal: a) Supplier aggregation b) Product/service integration c) Information integration d) Customer aggregation Vertical: e) Vertical functional integration upstream *f)* Vertical functional integration downstream	Information integration (limited) • Low production costs • Limited potential for scope effects	Information integration Integrates tax statistics from the Tax Authorities with related editorial material
Governance (Cooperation model) Hierarchy Agent Distributor Mediator	Agent and/or distributor • high transaction standardization • low transaction risk	Hierarchy • BA.no has initiated the service as a fully owned business idea. • Distributor of taxation lists

4.5 SMS Jackpot

SMS Jackpot is an electronic lottery offered as an entertainment service by Telenor MobilHandel through a mobile channel (SMS or WAP). MobilHandel customers can access this service in a similar manner as they access a number of other content services provided by MobilHandel. In order to play the mobile lottery, customers need to be registered as MobilHandel customers with SmartPay (A-customers). Running lottery games in Norway requires a license from the authorities. Participants must be at least 18 years old and the licensee must prove its ability to verify this. For a SmartPay A-customer the age is known by the security system. However, at the same time it is also required that the participant remains anonymous to SMS Jackpot. Both age verification and anonymity is taken care of by SMS Jackpot. The service is only available for Telenor Mobil customers. SMS Jackpot is an entertainment service that has no obvious complementarities to other content services delivered by MobilHandel.

SMS Jackpot was launched in the fall of 2001 as an SMS based service. In 2002, the service became available on WAP as well. Each lot costs NOK 20 and the maximum winning price amounts to NOK 100.000. A lot is purchased by sending an SMS message “JP” to 2500. The system immediately checks the availability of lots before returning a lot to the mobile phone having sent the SMS. Drawings in the lottery are centralized and take place in a Black Box, a closed module which is digitally sealed as the lottery begins. The box is isolated from external signals, which could interfere with drawings, prize values and so on. Prices are transferred to the winners’ SmartCash or bank accounts immediately. The system keeps track of the participants, winners, and prices as records for the Lottery Authorities (Lotteritilsynet).

Table 14: Services description – SMS Jackpot

Description of Services	
i) Classification	Entertainment
ii) Characteristics:	
• Content	Electronic information (digital lots)
• Infrastructure	Telenor Mobil SMS gateway
• Context	MobilHandel through several portals
• Application	Lottery
• Safety/security	SmartPay's security system
• Payment	NOK 20 per lot
• Basis for payment	SmartPay
iii) Platform:	
• Terminal	Mobile phones
• Communication	SMS, WAP
• Application platform	CSAM

Value network

A lottery service on a wireless network does not depend on the customers' location. It can be played from anywhere. Pure entertainment services are often used to pass time and the purchasing process is often based on impulse purchases. As such, the flexibility in terms of location can be very beneficial and valuable.

1. Values acquired by the content provider

    1.1 Generates income to humanitarian organizations (50% of net lot price)

2. Values acquired by customers

    2.1 Entertainment and excitement

    2.2 Spontaneity and easy access

    2.3 Symbolic values – something new and cool

    2.4 Winning prizes

3. Values acquired by the lottery operators

    3.1 Infogate and MobilHandel share the revenues (50% on net lot price)

4. Values acquired by MobilHandel

    4.1 Telenor/MobilHandel earns revenues on SMS (NOK 1 pr message)

    4.2 Surfing time on Wap

    4.3 SmartCash transaction fee NOK 1

    4.4 Transaction fee for banking account or credit card: NOK 2.50

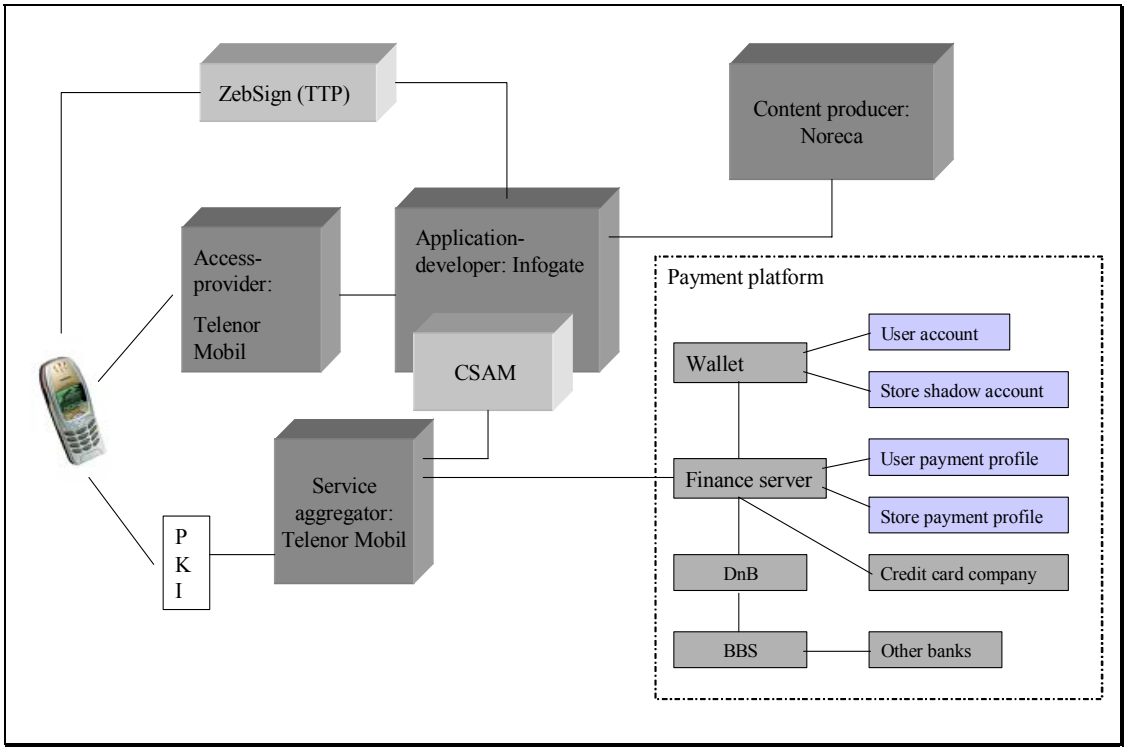

Figure 5: Value network – SMS Jackpot

Positioning

Infogate has positioned itself as the coordinator between Noreca, who holds the lottery license, and MobilHandel, who aggregates this service with other content services, and who provides databases securing the customers minimum age requirements. Telenor Mobil does not claim exclusive cooperation agreements. This means that Noreca can choose other partners and use other distribution channels than MobilHandel. This is not likely however, since Telenor also supplies information about the customers age, and the license to operate a mobile lottery was given based on this cooperation.

The content provider here is defined as the licensee of the lottery, Noreca (Norsk Restaurantcasinodrift AS), who holds the license on behalf of ten humanitarian organizations. Infogate develops the electronic lottery application in cooperation with MobilHandel. Infogate also runs the operation of the lottery. The content aggregator, MobilHandel, defines the customer context, markets and runs the SMS servers, and provides the API interface (CSAM). Part of the SmartPay system is the PKI infrastructure operated by ZebSign. The participants can access the SMS Jackpot through a number of portals: mobilhandel.no, Djuice.no, smsjackpot.no, and infogate.no.

While customers originate from the MobilHandel customer database, the customer interface is held by Infogate. Infogate has the right to interact with customers, but marketing is taken care of by MobilHandel.

4.5.2 Structural Conditions for Mobile and Electronic Lottery

Market

According to MAPIT the market conditions that impact on integration aspects are related to fragmentation and knowledge requirements. Fragmentation refers to the number of players while knowledge requirements refer to the know-how needed to develop, operate, and market the service, as well as to create business values.

The upstream market for electronic lottery consists of content providers and application developers. If we narrow the content providers to lottery suppliers, then there are a few dominant actors, and many small actors. The Norwegian law regulates the supply and suppliers of lottery services. Only a few actors are allowed to offer the service, which requires a license from the Lottery Authorities (Lotteritilsynet). The large profits in the lottery market attract international actors as well. Fragmentation in the lottery market must therefore be characterized as moderate, and likely to be much higher in the absence of regulatory entry barriers. The *electronic* lottery market, on the other hand, is small and cannot be characterized as fragmented. Only a few electronic lottery games exist in the market. One example is eXamen, which is web based and played on the PC. Participation is, however, paid through MobilHandel/SmartPay. Electronic lottery on the *mobile* phone represents a new product-market and SMS Jackpot is at the moment the only electronic lottery played on the mobile phone. The downstream market for electronic lottery, and for m-commerce in general, is rather immature. The downstream market for lotteries in general is highly fragmented.

Electronic and mobile lottery services require high e-technical knowledge because information from different sources and different suppliers needs to be cross-checked and coupled. Due to age limitations for playing a lottery, and the payment system required for the operations, content providers need to interface with a payment facilitator. In terms of e-business knowledge, the requirements seem to be moderate. A supplier needs to know how to create customer values. In terms of domain knowledge requirements, the service is similar to

other electronic lotteries. The main difference lies in the properties of the new, mobile channel. We estimate the domain-specific knowledge requirements to be high. We are not referring to knowledge about the specifics of lottery per se, but knowledge about legal requirements in order to be allowed to offer lottery services in the first place. The license required is also an expression for domain knowledge requirements.

Actors

Three conditions related to the individual actors in the market are of interest here: cost structure, revenue model, and scale and scope economies. As with most electronic services, the costs connected with production, coordination, transactions and distribution of lottery games remain relatively low. Since variable costs are low, there is a high potential for volume-based economies of scale. The main costs are tied to initial development costs, and the more the service is used, the lower the marginal costs will be. The lottery service is based on standard protocols for communication (SMS and WAP). The content aggregator (here MobilHandel) has also developed a standard API for its content providers (Infogate and others). The content aggregator's platform should therefore have scope economies, that is, integration of a lottery service like SMS Jackpot on the platform should lower unit costs. Furthermore, there may be scope economies associates with other services provided by the aggregator such as security system, age verification etc. The potential for scope effects, therefore, is assessed to be high. Revenues are likely to be transaction-based, i.e. cost per lot, and of course, there are also airtime revenues (SMS or WAP surfing) that incur upon ordering, delivery, and use of the service on mobile phones.

Products/services

In terms of the product/service, three conditions are of interest: the product category, product complexity, and the differentiation potential. The product category is entertainment services and a high degree of digitalization is involved in offering this service. While the service requires coupling information, the information potential in lottery services remains limited however. Production complexity is rated as high because of requirements in terms of security and privacy. Buying complexity, on the other hand, is low. There seem to be few opportunities for differentiation when it comes to lottery services. The authorities that

regulate lottery games are not likely to accept price differentiation. The potential for personalization and presentation differentiation also seems low.

Influence

Influence has to do with each actor's power in the value network. Three conditions are included in the MAPIT network: the importance of trust, the potential for lock-in, and information asymmetry. Trust is important because customers need to be confident that they are playing a fair game, and that the possibilities to win are fair. When financial transactions are involved, a certain amount of trust is needed as well. For this type of service, trust is not the main factor related to power in the value network. Since the market is heavily regulated, influence lies with the actor that holds a license. In this respect, the content providers are the dominant players. Application providers have marginal influence, but MobilHandel holds the context position and registers players and checks the age requirement, which is of particular importance here. Based on this position, MobilHandel has a fair amount of influence in the value net as well. Only the content providers have power to lock-in other actors of the value net. Information asymmetry is not a relevant source of influence in lottery services. Customers have some influence, since they can choose not to purchase this service. Other alternatives exist, such as buying lotteries online on the web or at physical outlets. This increases customers' power in terms on customer value demand.

Transactions

The MAPIT conditions related to transactions (T) include transaction risk, transaction standardization, and transaction frequency. For content providers, the transaction risk involved in offering a mobile channel in addition to existing channels of distribution remains low. Application providers, on the other hand, need to make high asset-specific investments to offer mobile lottery services. They also need to have or acquire e-commerce knowledge to create sufficient business values from this additional channel. Content aggregators and network access providers (operators) may use standard services (SMS and WAP) and application interfaces (APIs). To run this service therefore incurs low risk. Customers risk little as well, since they have alternative lottery games. The switching costs are low for customers. However, there is a starting threshold in registering as a SmartPay user at

MobilHandel. Transaction frequency is high and transactions can be categorized as standardized.

4.5.3 Integration Model

In this section we summarize the expected integration model based on the MAPIT taxonomy and then we present the actual integration model for this case, SMS Jackpot. Based on the conditions identified using MAPIT in the previous section, we can make theoretical predictions concerning who is likely to *initiate* integration, the integration *strategy*, integration *form*, and the *governance*. The theoretical predictions are then compared with the actual integration model and any gaps between the expected integration model and the actual integration model are discussed.

Expected integration model

1. Lottery suppliers operate in a moderately fragmented market. Because a mobile lottery service requires a high degree of technical knowledge, and moderate e-business knowledge, we can expect that a new and specialized intermediary will initiate a new high-tech channel. Other market conditions point in opposite directions however. The high domain-specific knowledge requirements may make it difficult for a new intermediary, and when a high degree of knowledge about lottery and rules and regulations is required, theory predicts that an established actor is more likely to initiate the new service.

   Initiator: new intermediary or established actor (existing lottery suppliers)

2. The costs of developing a lottery application for a mobile environment are fairly high, but unit costs of production and distribution are low. The high potential for volume based economies of scale indicates a narrow scope and a focused strategy. However, there may be large scope effects for a content aggregator running the application on a general platform with standardized interfaces upstream (API) and downstream (SMS and WAP). Furthermore, scope effects may exist between the lottery and other applications (security, etc.). We have therefore conditions leading to an undifferentiated strategy taking advantage of economies of scope.

   Strategy: undifferentiated or focused

Integration form: supplier aggregation

3. The product category is a digital entertainment service with limited potential for differentiation. The high degree of digitalization leads us to expect supplier aggregation while the low potential for differentiation strengthens our predictions of an undifferentiated strategy. Production complexity is moderate, based on our overall assessment of the internal process logic as being complex and communication interfaces as being simple due to standardization. The service is based on standard interfaces upstream and downstream. Upstream standardization allows for functional disintegration and communication through a standardized interface between vertically related actors. Downstream standardization makes the buying complexity low. The overall production complexity for the content aggregator, assessed to be moderate, strengthening our prediction above of an undifferentiated strategy.

Strategy: undifferentiated

Integration form: supplier aggregation

vertical functional disintegration

4. One of the actors, here termed the content provider, must have a license to offer a lottery service. The regulations are extremely strict and approval therefore provides a substantial entry barrier. Any actor with a lottery license will be influential in the network. This leads us to expect that an established actor will initiate integration.

Initiator: established actor (content provider)

5. Content providers already offer lottery services in existing markets and thus, a new channel would not incur any substantial risk for them. Network access providers run a low risk in offering mobile lotteries because the technological operations they are involved in are standardized. The application providers, on the other hand, would need to make asset specific investments, which are difficult to use for other types of products or services. Hence, they run a large risk by developing and operating mobile lotteries. The content aggregator (here MobilHandel) aggregates this service together with the other services they offer on the same platform. Additional investments are therefore fair and the risk they encounter when participating in the value net of the lottery is

moderate. If the application provider/context provider offers the service, we can therefore expect an agent- or distributor-based governance model.

Governance: agent based or distributor based

Actual integration model

SMS Jackpot was initiated by a *new intermediary* - the application provider, Infogate. Since Infogate did not have the lottery license, they needed a contractual relationship with a licencee. Based on the Infogate initiative, ten humanitarian and non profit organizations applied for a license under the name of Noreca. However, in order to be allowed to offer lottery services, Noreca had to prove that the minimum age requirement was met while anonymity (privacy) of the participants was retained. MobilHandel could provide customer information that met these requirements. The strategy for MobilHandel is based on providing as many different content services as possible. Since the market for these services in general, and SMS Jackpot in particular, is not segmented with respect to customers, this can be categorized as an *undifferentiated strategy*. Furthermore, we estimate the scope effects for MobilHandel to be high by addition additional services on their platform. SMS Jackpot represents a digitalized entertainment service, which *functionally disintegrates* the existing lottery value chain into a set of interactive actors. Infogate, in cooperation with MobilHandel, offers a new channel through which customers can play lottery games on the mobile phones. The governance model between Infogate and Noreca can be categorized as an *agent* model. There exists a bilateral contractual agreement between MobilHandel and Infogate. MobilHandel offers SMS Jackpot in its own name, which indicates a *distributor* governance model.

Comparison of expected and actual integration model

The comparison between the expected and actual integration model here is done on the focus actor, the content aggregator MobilHandel.

With respect to initiator we have found conditions indicating both a new and an established actor. The latter is primarily related to high domain knowledge; holding a license and operating the lottery according to the license conditions. A new actor was predicted on the high technical knowledge required to develop and operate a lottery on a wireless network.

SMS Jackpot was initiated by a new intermediary, Infogate. However, for this new intermediary to acquire sufficient domain knowledge, an alliance with an actor, Noreca, representing existing humanitarian organization, was established. Infogate also depended upon cooperation with the more established actor Telenor. This indicates that although structural conditions may predict that an established actor will initiate integration, new actors can fulfill these conditions by functional integration. Hence, it becomes more difficult to predict from where an initiative will emerge.

With respect to integration strategy we found conditions indicating both an undifferentiated and a focused strategy. The majority of the conditions for the content aggregator point towards an undifferentiated strategy, which corresponds to the actual strategy chosen by MobilHandel.

The actual integration model matched our expectations for integration form of MobilHandel, namely supplier aggregation and information integration (bundling age information with lottery information). Vertical disintegration is possible due to highly standardized interfaces both upstream and downstream. MobilHandel distributes SMS Jackpot under its brand corresponding to a distributor governance model, which we also predicted.

Summary

SMS Jackpot is an electronic lottery offered as an entertainment service by Telenor MobilHandel through a mobile channel (SMS or WAP). The idea is to create value by providing access to lottery games regardless of location and the service is mainly aimed at customers looking for entertainment or a way to pass time. The service is thereby not entirely new, but the mobile channel provides new opportunities (any-time & anyplace) that may create additional values. The initiator of SMS Jackpot, Infogate, has positioned itself as the coordinator between Noreca, who holds the lottery license, and MobilHandel, who aggregates this service with other content services, and who provides databases securing the customers minimum age requirements.

Table 15:

Jackpot - Structural Conditions

MAPIT	Mobile Lottery
(M) Fragmentation	Mobile Lottery market The market for mobile lottery is immature with one or a few providers. Thus, the fragmentation is estimated to *low* Lottery Market (in general) *Moderately* fragmented Downstream market for lottery services (end consumers): *Highly* fragmented
(M) Knowledge requirements	e-technical knowledge requirements *High* (due to security issues and need to couple information and couple with Smartpay) e-business knowledge requirements *Moderate* Domain-specific knowledge *High* (requires knowledge about lottery laws and regulations)
(A) Costs	Production costs *Low* Coordination costs *Low* Transaction costs *Low* Distribution costs *Low*
(A) Revenue sources	Transaction based + traffic-based (airtime)
(A) Scale and scope economies	High potential for volume-based scale effects High potential for platform based scope effects

(P) Category	High degree of digitalization and limited information potential
(P) Complexity	Production (process) complexity *Moderate*. Complex application logic but standardized interfaces Product (buying) complexity *Low*
(P) Differentiation potential	Price differentiation potential *Low* Personalization potential *Low* Presentation potential *Low*
(I) Influence	Content developer *High* because own "konsensjon" to offer lottery services Application provider Low Customers *Moderate to high* (alternatives exist) Network access provider and network operator (Hva kaller vi MobilHandel) *Moderate* because of interface towards customers in other e-commerce/m-commerce services
(T) Risk	Content developer *Low* Application provider *Moderate to high* because assset-specific investments are required. E-technology, and e-commerce knowledge must be acquired. Network access provider and operator *Low* because standardized technological operations. Customers *Low* (Alternative channels for lottery exist)
(T) Frequency	Transaction frequency *High*
(T) Standardization	Transaction standardization *High* (SMS and API)

Table 16: SMS Jackpot - Integration Model

	Expected Integration Model	**Actual Integration Model**
Initiator Buyer Seller Neutral	Neutral actor. New and specialized intermediary. • moderate market fragmentation • high technical knowledge required coupled with moderate e-business knowledge • high transacton standardization Existing actor (licence holder) • high domain specific knowledge required • high influence (licence)	Infogate represents a new intermediary and they initiated cooperation with Telenor Mobil and Noreca.
Integration Strategy Focused Undifferentiated	Undifferentiated strategy • low buying complexity • low potential for differentiation • low transaction risk (content aggregator) Focused strategy • large potential for scale • moderate production complexity • high transaction risk (application provider)	Undifferentiated strategy • Telenor Mobilhandel open for all content providers (scope economies) and no segmentation of customers are done • broad selection of content to reach mass market.
Integration Form Horizontal: a) Supplier aggregation b) Product/service integration c) Information integration d) Customer aggregation Vertical: e) Vertical functional integration upstream f) Vertical functional integration downstream	Supplier aggregation • high degree of digitalization • scope effects Information integration • high transaction standardization Vertical functional disintegration • high standardization upstream and downstream	Information integration • Scope effects • info about age and customer coupled with purchasing/ordering of lottery services Vertical functional disintegration • new channel, new intermediaries
Governance (Cooperation model) Hierarchy Agent Distributor Mediator	Agent or distributor • high transaction standardization	Distributor • MobilHandel Agent • Infogate

5 CROSS-CASE ANALYSIS

We have analyzed five different types of mobile and electronic services and focused on structural conditions and integration models for each case. Our within-case analysis showed that in most cases, establishing the structural conditions allowed us to make fairly good predictions concerning choice of integration models. The actual integration models, which the firms we studied chose for their mobile products/services, coincided fairly well with our theoretical predictions. In this section we first compare structural conditions across the cases and look for similarities and differences. We then compare integration models across cases and search for patterns in the integration models. Most importantly however, we explore the linkages between the structural conditions and integration models across cases. This third analysis is an additional step in determining the robustness of our theoretical framework.

Until now we have looked at structural conditions and integration models for each particular case in isolation. If we compare the structural conditions in MAPIT across the five cases we have presented however, we find a number of similarities and differences. The similarities are interesting because they provide insight about common structural conditions for the mobile business context. Differences in structural conditions represent the key in understanding various integration models however. If the differences we find in structural conditions can be tied to differences in integration models, then our theory-based framework should be applied to a larger empirical sample for further testing.

5.1 Structural Conditions

Similarities in structural conditions across the five cases are illustrated in table 17 and can be summarized as:

- Four out of five mobile services are initiated in moderately or highly fragmented markets (traditional and electronic markets - not mobile markets). **(M)**
- Four out of five mobile services require high technical knowledge. **(M)**
- All services require moderate or high m-commerce knowledge. **(M)**
- Four out of five services imply low cost structures relative to existing alternatives. **(A)**
- All five services show great potentials for economies of scale. **(A)**

- Purchasing complexity is low in all five cases (moderate to low for SmartPay). **(P)**
- None of the cases show any great potential for product differentiation (differentiation is here aggregated based on potential for customer based price differentiation, personalization, and customer based presentation differentiation). **(P)**
- Content providers are the most frequent influential actors (in three of the cases). **(I)**
- End consumers were rated as highly influential in four cases. **(I)**
- Most of the services have a fairly high risk involved for the initiator of the service. **(T)**
- In four of five cases, transaction frequency is high. **(T)**

Several of the similar factors across cases can be tied to the m-commerce context. These include the low costs involved in offering mobile services, frequent and standardized transactions, high potential for scale economies, and requirements for high technical and e-commerce knowledge. Although another common factor is the risk involved in developing and offering the mobile services, initiators seem willing to take this risk. We believe these conditions above will be more or less similar for all mobile and electronic services. Hence when transactions are standardized, frequent, and cheap, and the potential for economies of scale is large, actors initiate mobile services despite the risks involved in developing and offering new services, or new channels for established services. While these factors can be tied to cost-efficiencies through mobile services, none of the factors point to particular and proprietary characteristics of mobile channels, such as anytime, anyplace, and personalized services.

Other structural conditions that are similar across cases are less context-dependent, and more interesting for understanding differences within the mobile commerce industry. Most mobile services were initiated by actors in fragmented markets. This can be expected as these actors met fierce competition in their existing markets and therefore were likely to search for new product-markets through mobile channels or aimed to offer a traditional product through a new channel based on technological innovation or development (SmartPay, Tax Magazine). For neutral initiators however, such as EasyPark, introduction of a mobile service may just as well have been driven by technological opportunity.

Low purchasing complexity can not be taken for granted for mobile services. On the contrary, products and services that are highly innovative and technologically demanding are often accused of not being user-friendly and consumer oriented. Low purchasing complexity in all five services we studied indicates that the companies understand the importance of customer convenience (Magura, 2003). Based on the potential for location-based services and customized and personalized services, we were surprised to find that the services we studied had little (moderate or low) potential for differentiation. The potential and exclusive values of mobile commerce are closely linked to "any-time, any-where", geographically relevant, and customized products and services (Tsalgatidou and Pitoura, 2001). The services we studied were not organized in a way that brought out the particular advantages of the mobile channel. Any values created by these services will therefore be limited to providing an additional distribution channel.

Another similar condition among the five cases, which is not likely related to the m-commerce context, is the finding that content providers were characterized as the main influential actor in three of the five cases. This was somewhat surprising based on the large and dominant telecommunications company in the Norwegian market, and based on statements from the interviews. If we look at who the content providers are however, we can see that there are several layers of content providers. This may be related to the fact that values were created primarily by adding a new distribution channel. That is, all services studied can be placed under the label "old content, new distribution". As the content distribution is not limited to mobile channels, it is natural that the actors that own the content dominate the relationship. In contrast, if the mobile channel is the only access point, or the channel provides an additional and highly valued service as perceived by the consumers, then the "owner" of the distribution channel will possess a more influential position in the value network. This can explain why our interviewees, such as EasyPark and BA.no, expressed relatively low influence in the value net, while the parking company and the newspaper (BA) held much more influential positions. Finally, end consumers were characterized as highly influential in four of our five cases. This was based on their power to choose not to buy the products or to buy the products through other channels.

Similar structural conditions, particularly the context-dependent ones, provide us with information about the conditions under which mobile services are likely to be introduced. Similar conditions do not inform us about *whom* is likely to offer the service or *how* the new

service will be positioned and organized. In order to answer these questions, we need to look at the structural conditions that *differ* among the five cases.

Differences among the five cases can also be found in table 17 and they include:

- In one case (Djuice) the mobile service is developed in a market characterized by low fragmentation. **(M)**
- Two of the services (SmartPay and SMS Jackpot) require high domain-specific knowledge. **(M)**
- Only two of the cases (Djuice and SMS Jackpot) show a potential for economies of scope. **(M)**

Market fragmentation here refers to the competitive situation in the market prior to launching this particular product/service. While most of the mobile services we studied represented traditional services that already existed through other distribution channels (parking payment, payment in general, tax information and lotteries), Djuice introduced a mobile channel internet portal. The market for internet portals in general is different because, relative to the other services, it remains fairly new. Although several actors exist on the international arena, suppliers have been limited in the domestic market, and competition has been equally limited. We can therefore conclude that in the case of Djuice, the integration model was not linked to a quest for new market opportunities based on fierce competition in existing product-markets, but was more likely opportunity and technology driven. Potential effects on choice of integration model based on market fragmentation will therefore be explored when we link structural conditions to integration model.

Requirements for context specific knowledge were generally fairly low. Mobile payment (SmartPay) and mobile lottery (SMS Jackpot) however, represent services which are highly regulated. They therefore require a high degree of domain-specific knowledge tied to obtaining licenses and integrating regulated information. This differentiates these two services from the other cases in this study and we will need to explore the effect this might have had on choice of integration model.

Only two services showed potential for economies of scope (Djuice and SMS Jackpot). Theory states that digitalized product (generally) have potentials for both scale and scope

economies. However, the (digitalized) products that we have analyzed have low to moderate potentials for scope economies. There are at least two possible reasons for this. First, the limited potential for scope economies we find may be a result of our rather "special" services sample. As described earlier, four out of five services are new access channels, and not new services. Any potential for scope economies for these services must thus be related to using them as access or distribution channels in other situations (for other services). Thus, we can (temporarily) conclude that mobile services that partially substitute functions in an already existing value chain have less potential for economies of scope than new "mobile content services" have. For the same reason, we may also argue that these services are more dependent on economies of scale than content-based services in order to be successful. Another explanation is tied to the high production complexity. Many players must contribute in order to produce the services. These players possess resources that are vital to the total products; the products are composed of non-substitutable segments delivered by distinct players. This is in accordance with our expectations (products in the digital economy are often characterized by this kind of complexity), and result in complex production processes. Coordination is central, as changes in one part of a product may necessitate or result in changes in another part. As many players are involved in the production process, and changes made by one player have to be followed by changes in other participants in the value network, economies of scope may require that all players involved in the network adapt to these changes. Further, the initial costs (in developing the "core product") are generally high, and the players may for this reason be reluctant to make any changes.

5.2 Integration Models

Our four dimensions within the integration model were initiator, integration strategy, integration form, and governance. Below we look for similarities and differences among the cases in these four dimensions, and we explore potential patterns in combinations of the dimensions. Patterns indicate that organizations have made similar choices and could reveal a "preferred" integration model, although this is difficult with only five cases.

The five integration models are illustrated in table 18. Patterns of similarities and differences are difficult to find whether we focus on one dimension at a time, or look at all dimensions simultaneously. We do find that there are some similar *trends* in terms of integration form. Four of the cases showed vertical functional disintegration upstream and four of the cases

integrated information. While three of the services were based on supplier aggregation, only one case (EasyPark) aggregated customers. Two cases were characterized by both vertical functional integration and vertical functional disintegration (EasyPark and SmartPay). This seemingly contradicting finding is due to an integration of certain organizational elements and a simultaneous disintegration of *other* organizational elements. Vertical functional disintegration can for instance mean that a supplier is offering an existing service through a mobile channel. The new channel disintegrates an existing value chain and provides an alternative, sometimes operated by a specialist, while the existing value chain often remains. Vertical functional integration on the other hand, refers to integration of payment services with other services such as parking or purchasing goods electronically. Several of the mobile services were based on integration along several dimensions such as customers, suppliers, and information.

The integration models are internally different but can roughly be divided into two groups. SmartPay, Djuice, and the Tax Magazine are services that have been initiated by established players through a hierarchical governance form. EasyPark and SMS Jackpot, on the other hand, were initiated by neutral actors and they chose different governance forms. The differences along the other integration dimensions are too great to view these rough and imprecise categorizations as any pattern in integration models. The only pattern, which could also be purely coincidental, seems to be that when neutral players initiate integration (EasyPark and SMS Jackpot), they choose governance forms where they rely more on other players in the value network than when established players initiate integration.

While it is clear that integration and disintegration occurs simultaneously and along various dimensions, we have to conclude, based on our assessments of integration models, that no clear patterns of integration models emerge. This complicates our third analysis aimed at exploring the linkages between structural conditions and integration models.

5.3 Linkages between Structural Conditions and Integration Models

In analyzing the linkages between structural conditions and integration models we need to look at table 17 and table 18 in relation to each other and examine the extent to which similar structural conditions provide similar integration models. As mentioned, our within-case analysis indicated that our theoretical framework provided a fairly good prediction of

integration model. There were however, no clear patterns in the choice of integration models. This could be due to our limited sample. In our analysis, we will be focusing on the *differences* we found across cases in terms of structural conditions and integration models since these are most relevant for indicating linkages. If structural conditions determine integration models, then any differences in structural conditions should affect the integration model.

In the previous section we identified two structural conditions that were unusual and might therefore shed light on the linkages between conditions and integration models. The two unusual structural conditions were related to market conditions: low market fragmentation (Djuice) and high domain-specific knowledge requirements (SmartPay and SMS Jackpot).

SmartPay and SMS Jackpot both required high domain-specific knowledge. How did this affect their choice of integration? According to theory, if knowledge requirements are high along all three dimensions, then a neutral actor is likely to initiate the service. In our two cases, knowledge requirements were moderate to high along all three dimensions. While SMS Jackpot was initiated by a neutral actor as expected, SmartPay was initiated by an established actor. If we consider domain-specific knowledge separately from the other knowledge requirements, then this could lead us to expect that established players would be central (such as in SmartPay) because they possess market or production-related knowledge. However, when neutral actors can access critical resources (such as a lottery license) through alliances with established actors, then domain-specific knowledge is no longer a good predictor of whom will initiate the service. Adding the other knowledge requirements complicates the situation further because the different knowledge requirements may weigh differently and outplay each other.

We have argued that in highly fragmented markets it will be easier for neutrals to enter. Among the four cases where market fragmentation was moderate to high, we found two cases where established actors initiated integration and two cases where neutrals initiated integration. In all four cases, a high degree of technical knowledge was required. Established actors often have salient and historical knowledge about that particular type of product/service, hence the rationale behind established actors as initiators might be explained by the need for domain-specific knowledge. Yet our discussion above revealed that the two cases where domain-specific knowledge was required showed diverging initiators. In

SmartPay, an established actor initiated integration in cooperation with a new actor in the payment market (MobilHandel), while in SMS Jackpot, a neutral initiated integration, in cooperation with established actors. We might ask then if a neutral actor could have initiated SmartPay through cooperation with established actors. We believe this is unlikely due to the differences in *types* of services. Payment services require a relationship between supplier and customers over time and involve a high degree of trust. It is therefore more difficult for a new actor to initiate new types of payment services. For lottery services however, the purchase is less likely to require a long-term relationship.

Turning to the integration models, we have two cases of non-hierarchical governance forms (EasyPark and SMS Jackpot). If we tie this back to the structural conditions of mobile parking payment and mobile lottery services, some of the structural conditions, such as high asset specificity coupled with high frequency, would suggest hierarchical governance forms. Why then, did the initiators choose other governance forms than hierarchy in these two cases? One possible reason is that new players need to rely on other actors in the network more than established actors do and therefore they will use governance forms where the network actors are more interdependent. Another possible reason is that the focal actors are not entirely free to choose governance forms. Our interviews show that EasyPark would have preferred a joint venture or a hierarchical relationship with Telenor, but Telenor was not interested. A closer relationship upstream was not an option either because EasyPark's emphasized supplier aggregation (aggregation of parking companies) in order to achieve economies of scale based on coverage. Few parking companies would consider introducing a mobile payment channel that was partly owned by a competitor.

While our within-case analysis showed that our theoretical framework provided fairly good predictions, the cross-case analysis shows more inconclusive findings and few direct linkages between structural conditions and integration models. The analysis nevertheless contributes by providing insight into similarities and differences in terms of structural conditions for the five mobile services we studied. It also indicates that some structural conditions may be more important than others and that sometimes the conditions are intertwined and other times they may outplay each other. In the next chapter we discuss why our cross-case analysis shows inconclusive findings, how to refine and develop the theoretical framework based on our findings, and practical implications and conclusions.

Table 17: Structural conditions - comparing across case

		Easypark	**Smartpay**	**djuice**	**Tax Mag**	**SMS Jackpot**
M	Fragmentation (supplier) Knowledge requirements: a) technical b) m-commerce c) domain-specific	Moderate High Moderate to High Low	Moderate High Moderate High	Low High High Low	High Moderate Moderate varies	Moderate High Moderate High
A	Costs (relative to alternatives) Scale effects Scope effects	Low High Low	Low High Low?	Moderate High High	Low High Low	Low High High
P	Production complexity Product (buying)complexity Differentiation potential	High Low Moderate	High Moderate to low Moderate	High Low Moderate	Low Low Low	Moderate Low Low
I	Who has high influence?	Parking companies End consumers	End consumers Payment service providers (mod)	No particularly influential actors	Content provider End consumers	Content developers, End consumers, Network access provider (mod)
T	Transaction risk (for whom?) Transaction frequency Transaction standardization	Service providers High Low	Payment service providers High Moderate	Portal provider High High	Content provider (moderate) Low High	Application providers High High

Table 18: Choice of organization and positioning

	Easypark	**Smartpay**	**djuice**	**Tax Mag**	**SMS Jackpot**
Initiator	Neutral	Established	Established	Established	Neutral
Int.strategy	Focused	Undifferentiated	Undifferentiated	Focused	Undifferentiated
Int.form	VF. integration V.F. disint. upstream Suppl.aggr. Cust.aggreggation Info. integration	VF integration V.F., disint. upstream Suppl.aggr Info. integration	V.F. disint. Suppl.aggr. Info.integration.	 Info. integration	VF disint. Info.integr.
Governance	Agent	Hierarchy (JV between DnB and Telenor)	Hierarchy (dJuice owned by Telenor and owns local djuice partners)	Hierarchy	Distributor

6 DISCUSSION OF FINDINGS

In this chapter we evaluate the MAPIT framework as a tool for analyzing the supply side of mobile commerce services. MAPIT was originally developed to study integration aspects of intermediaries in electronic markets. In this exploratory case study we wanted to study the applicability of this framework to supply side value networks of mobile services and suggest possible refinements for a broader empirical study. In evaluating the framework we have to bear in mind the limited number of cases used and the variability of key attributes of the cases chosen. In applying our theoretical framework to five mobile services we found that we can make fairly good predictions concerning choice of integration models based on an assessment of the structural conditions for the service. Yet when we conducted a cross-case analysis we found weak, if any, linkages between structural conditions and integration models. In this chapter we discuss why our findings are inconclusive. Although it could be argued that, based on this study, there are no clear linkages between structural conditions and integration models in the m-commerce industry, we believe that structural conditions *do* affect the choice integration model and that our inconclusive findings can be explained based on our experience with applying the framework to the mobile context. In this chapter we first discuss why our study shows inconclusive finding and then we use this insight to simplify, develop and improve our theoretical framework.

6.1 Reasons for Inconclusive Findings

Our cross-case analysis indicated few linkages between structural conditions and integration model. In this section we discuss theoretical and methodological challenges with the framework, as well as limitations based on our research design.

The main theoretical and methodological challenges in the MAPIT framework have to do with defining key constructs in the framework. The theoretical framework involves many different concepts based on the integration of several theoretical perspectives. Integrating theoretical perspectives can strengthen a theoretical framework since it adds to and widens the explanatory power. On the other hand, multiple theories make the framework difficult because different theories often operate at different levels of analysis and with slightly different definitions of well-known concepts. Particularly concepts that are often used and well-known, such as market fragmentation, can be subject to two types of problems unless

they are precisely defined and delimited: the interpretation problem and the measurement problem.

The interpretation problem has to do with how a variable is interpreted and which value is assigned to the specific variable. For instance, if we are to determine the effect of transaction frequency on integration and assign qualitative values to this variable, then we need clear guidelines as to what is meant by transaction frequency in this context, and we need to know the cut-off lines between the defined items of the scale used: low, medium and high. Unless these issues are clearly addressed in the theoretical framework and in the operationalization of the framework, it is likely that different researchers end up with different assessments of transaction frequency, as well as for other structural conditions.

The measurement problem is concerned with measuring the variable that you intend to measure and that there should not exist several values of the same variable. This is the case for the variable "vertical functional integration" which can take two values "integrate" or "disintegrate". In some of the cases, we find that this variable take both values. This can be true, but the problem is that this fact disappears in the operational definition of the variable. On the one hand, we find that a new payment value chain is defined and disintegrated from the existing value chain. On the other hand, activities within the new value chain can be more integrated than before. We end up with two values of the same variable. We have, however, performed the analysis on two different levels: 1) the total value chain, and 2) activities within the new value chain. Although we can argue for both situations (integration and disintegration) to occur, comparing a service where the value chain has been disintegrated with another case where activities are integrated does not provide us with much insight. We should therefore use the concepts in consistent ways and make explicit the level at which disintegration or integration occurs. This would allow us to focus on identifying different (and perhaps new) patterns of integration and disintegration that are occurring in the mobile commerce context.

Our choice of research design might also have affected our findings since our study is based on a limited sample. We have only five cases upon which to base our assessment of the framework and this is hardly enough to test the framework. However, the purpose of this case study was not to test the framework but rather to apply to framework empirically and if necessary refine the framework. If however, the linkages can not be found among our five

cases, then we should not apply the framework as it is to a larger sample. When the actual integration models are known prior to theoretical predictions of integration models, then there is always a risk that knowledge about the actual integration model might affect categorizations of structural conditions and integration models. This can explain why the within-case analysis provides a different and better assessment of the framework then the across-case analysis.

Finally, our current theoretical platform provides some limitations in terms of studying organizational innovations and new types of services. The well-established governance models we are using, such as agent, distributor, mediator, describe the relationship between two parties, whereas we need to be able to describe the relationships in a whole network compared with e.g. another network. Increasing our understanding of the dynamics and interdependencies within a value network requires an expanded understanding of the network which may require other theoretical perspectives. We return to this issue in our suggestions for future research.

The linkages between structural conditions and integration models are likely to be stronger once these theoretical and methodological challenges have been addressed. In the next section we draw on our empirical findings as well as existing research to refine and develop the framework.

6.2 Refining and Developing the Theoretical Framework

In applying the theoretical framework to the mobile services context, we found several ways in which our framework could be improved and developed. The methodological and theoretical challenges discussed above can contribute in developing the framework, but our data also lead us to believe that there were important aspects that were not sufficiently covered in the existing framework, which needed to be either included or emphasized to a greater degree. We do not attempt to define all of the existing categories more precisely here. Instead we critically review our existing categories and consider alternative categories. A natural next step would then be to develop precise definitions and apply the adjusted framework, to these five cases or to another set of data.

Value Networks

Our framework needs added emphasis on how the value network is related to positioning and integration issues. We need to focus more on the potential for value creation and how values are in fact created through the network of actors that offer the mobile services. Drivers for mobile values have been tied to convenience, familiarity with device and cost savings (Anchar & D'Incau, 2002). Mobile value is furthermore tied to entertainment (time killer and time filler), spontaneous needs (internally triggered needs), efficiency, time-critical arrangement (externally triggered), and mobility-related needs (location, situation, mission). While personalization is important for value creation, this is not limited to m-value and personalization is not a characteristic that differentiates the mobile context from other contexts. Mobility-related needs, on the other hand, are especially important for mobile services as it differentiates this type of service from all other services. In creating value, it is the *perceived value by the customer* that is important. Product/service categories need to offer value for the customer through one or more of the above five, and particularly attend to mobility-related needs (Anchar & D'Incau, 2002; Seager, 2003).

In performing the interviews we came to realize that customer values were not adequately covered in the MAPIT framework since this framework is developed with a supply side perspective. It was, however, included in the interview guide that was used to collect the data. This was not an issue that our respondents were particularly concerned with, however. On the contrary, several of our respondents seemed rather uninterested in the potential customer values, while we viewed this as central for offering a new service and creating values.

Value creation is also tied to more technical characteristics of the m-commerce context. Unless the unique features of mobile services are taken into consideration, sufficient value creation is not likely for the customers. M-commerce technical features include communication asymmetry; limited resource capability; bandwidth restrictions and network topology (capacity); variant bandwidth and bursty traffic (technological incompatibilities, lack of standards); mobility in infrastructure; physical risks; frequent disconnections; power limitations; and screen size (Hirsch et al. 2001; Tsalgatidou & Pitoura 2001).

Refining the MAPIT framework for mobile services therefore not only requires a critical look at the current variables and categories, but must also look new variables and categories that

suitably describe the mobile services context, such as new customer values and new features provided by the technology.

MAPIT

We argued in our cross-case analysis that some of the variables in our framework were tied to the mobile commerce context. These variables are interesting as they describe conditions of mobile commerce, but they do not determine different models for how value is created, how mobile services are organized, and who participates in value created networks. The following variables and MAPIT categories are assumed to be similar across mobile services and can therefore be excluded in the framework: costs involved in offering mobile services and potential for scale economies (Actors); frequency and standardization of transactions (Transactions).

The remaining variables and categories in the MAPIT framework (Markets, Products, and Influence) should be thoroughly evaluated and compared with the alternative categories. Below we suggest some alternative and/or adjusted variables, which evolved during data collection and analysis, as potential determinants for predicting how values are created and shared, and how mobile services are organized. We begin with *Market* related variables, and then discuss *Product* related variables, before we end off with *Influence* related variables.

In determining the positioning and integration of mobile services, our theoretical framework emphasized knowledge requirements (Market) and divided this into three different types of knowledge: technical knowledge, m-commerce knowledge and domain-specific knowledge. Included in domain-specific knowledge were licenses. Despite the inconclusive indications based on knowledge requirements, we believe this structural condition is an important determinant for integration models. Our findings suggest that other factors, in addition to or perhaps in combination with knowledge requirements, determine who will initiate mobile services. An alternative way of incorporating knowledge requirements could be based on resource-based theory, where it would be natural to study resource requirements in terms of (1) knowledge/competencies and (2) patents/rights/contracts. This way, licenses would not be considered context-specific knowledge, but it would be a necessary resource along with patents, rights, and other types of contracts. Resource based theory suggests that integration models, particularly predictions about who is likely to cooperate with who, depend on complementary resources. Based on the cost structure of mobile services, with high

investment and development costs, another important resource requirement, which could determine positioning and integration, is the availability of (3) capital asset resources. This variable is also important in determining influence in the network. If, for instance, the adoption rate is low, and the business model is based on economies of scale, then a critical resource will be a substantial capital base.

The mobile products or services (Products) can be described using three different categories: information service, transaction service, and entertainment service. In order to determine the value creating potential, existing literature indicates that the potential for location-based services (mobility-related needs) represents the main driver for m-commerce value. Although the potential to customize (personalize) mobile services also provides value for non-mobile services, we believe this is a main driver for value as well. Another source of value creation lies in potential for complementarities. Complementarities refer to complementary products or services where the values added to one product can be increased by simultaneously offering another product.

A third aspect of how mobile services are organized has to do with who is involved in value creation (Influence). This includes identification of potential actors in the value network, assessing current and future influence and power in the value network, and determining interdependencies between the actors. Our framework already includes these variables, but it could be better suited to the m-commerce context by focusing on different roles the actors have in the network.

Based on our above discussion we propose an adjusted framework which draws on our original categories Markets, Products and Influence and which creates a closer link between the value network perspective and choice of integration models. In our adjusted framework, we have reshuffled the order of the categories and renamed them to better match their content: Service Description comes from our previous category called Products/Services, but here it is expected to determine the value creating potential rather than influencing integration models directly. Resource Requirements (from the category of Markets) and Actors and Influence (from the category of Influence) determine integration and cooperation models (previously called integration model).

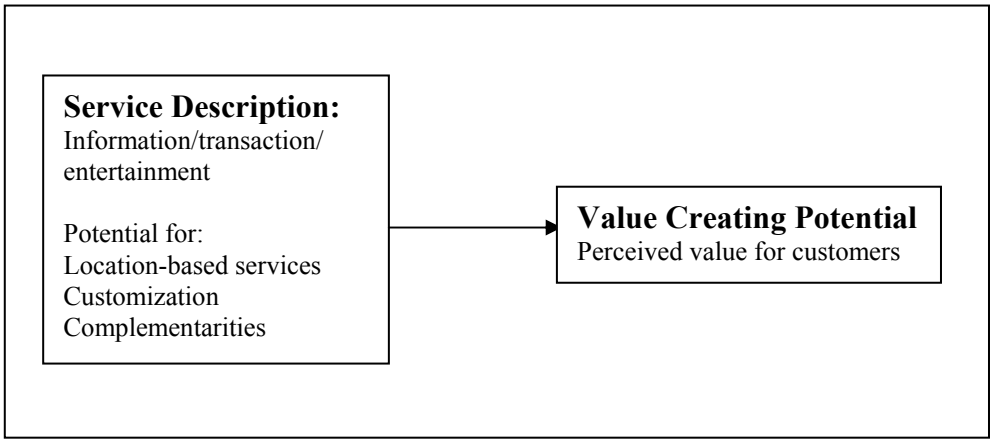

Figure 6: Value Creating Potential

This refined framework emphasizes the value creation potential of a specific service by separating the factors that affect the value creation potential from factors directly related to integration and cooperation choices (figure 1). It also includes the perceived value for the customers in the estimated value creation potential. In figure 2 we show the linkages between the value creating potential and the choice of integration and cooperation. As the figure illustrates, the value creating potential affects which actors will participate in the value creating network and the relationships between the different actors. Taken together, the value creating potential and actors and influence thereby constitute the value network. By splitting value creating factors and positioning factors, the refined framework provides a clearer picture of how the value creating network is connected with positioning issues.

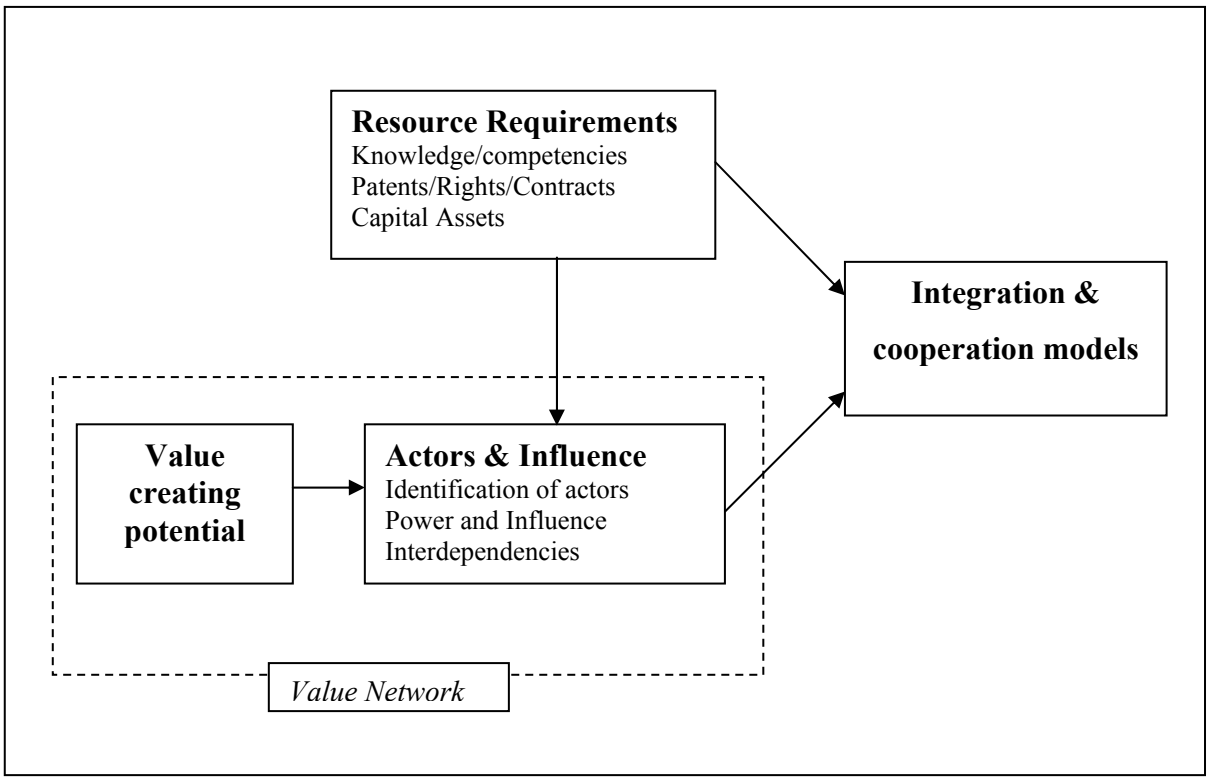

Figure 7: Determinants of Organizational Integration and Cooperation Models

The dependent variable in the framework, integration and cooperation models, has not yet been dealt with. In our cross-case analysis we found few patterns in integration models based on our categorizations. However, we believe some of our more interesting findings were under-communicated through our previous model. The fact that most of the services we studied were organized through simultaneous integration and disintegration activities triggers further questions, and we would like our adjusted framework to capture such nuances. We therefore suggest drawing on other theories and bodies of research than those used for our original framework in order to develop the integration models.

Integration Models

While some researchers have indicated that the purpose of new information technology is either classic disintermediation (cut middlemen), remediation (introduce/strengthen middlemen), or network-based mediation (strategic alliances**)** (Andal-Ancion et al. 2003), our findings indicate that in mobile commerce, all of these can occur at the same time. Some middlemen are eliminated, others are introduced, and many actors cooperate in more or less

interdependent networks. We used a framework based on well-established theories for organization, yet these theories were found inadequate in providing satisfactory explanations of the positioning and organization of mobile services.

We believe that in addition to determining whether or not integration or disintegration took place, it would be interesting and insightful to probe what kinds of activities are disintegrated/integrated. When is information integrated? When is an existing value chain disintegrated? Also, new ways of creating value and new forms of cooperation should not be forced into traditional governance models, such as hierarchy or market. We see the need for introducing other types of cooperation models, which better reflect the complex networks of cooperation and provide us with constructs which allow us to look at the whole network and identify different forms of cooperating networks.

Future research should therefore include alternative theories and categories, which better capture some of the special features in the m-commerce context. We suggest that research on strategic alliances and network theory could be a fruitful point of departure for future research on integration and cooperation models.

Strategic alliance research is relevant because high tech industries are the arenas in which alliance activity has been most intensive in the recent past (Hagedoorn, 1993). The collaboration between a number of firms in order to create and capture value has been a hallmark of e-business (Amit and Zott, 2001). Collaboration is likely to characterize m-business as well. In this study, we have examined the degree to which structural conditions may help us predict how mobile internet services will be positioned and organized. In probing this issue further, we may need to look to additional sources of theory and literature. Research on strategic alliances has indicated that firms react differently to identical market conditions (Park et al., 2002). A number of researchers have studied the reasons why firms enter into alliances and found that alliances are formed to: exploit complementary assets (Burgers et al., 1993; Nohria and Garcia-Port, 1991; Kogut, 1988); defray costs and share risk (Hagedoorn, 1993); reduce capital investment needs (Pucik, 1988); take advantage of increasing speed of technological change (Pucik, 1988); acquire institutional legitimacy (Baum and Oliver, 1991); gain power (Pfeffer and Nowak, 1976); secure customer demand (Kogut, 1988); exit declining markets (Kogut, 1988); seek new opportunities (Kogut, 1988); reduce rivalry (Kogut, 1988); signal social status or recognition (Stuart, 2000); and/or learn

from the strategic partner (Hamel, 1991; Powell et al. 1996; Hagedoorn, 1993; Hagedoorn and Schakenraad, 1994).

From the alliance literature we know about cooperation between two firms. Research on governance forms and transaction cost theory has focused on market, hierarchy, and intermediate governance forms (such as agent, mediator, or distributor). In looking at value creating networks however, we may need to include not only governance forms between dyads in the network, but look at the networks to see if it is possible to identify specific types of networks within m-commerce. If we are drawing on resource based theory to a greater extent then we also need to address what kinds of organizations access external resources through cooperation or alliances? Existing research suggests that resource rich firms are able to gain access to external resources through cooperation, while resource poor firms are less likely to do so (Park et al., 2002).

Network theory might contribute in identifying dimensions in the network that are worth pursuing. Network theory can help us identify different network configurations instead of having to split the network into a number of dyadic relationships. As suggested in the next section, network theory may also provide us with constructs that facilitate an investigation of different configurations or patterns of *nodes* (actors) in a network and different types of *relationships* between nodes. For instance, is a mobile value network likely to consist of a few dominant nodes with many loosely affiliated nodes or many nodes with strong ties and interdependencies? Do mobile value networks with strong ties to the customers create greater values than value networks with weak ties to the customers? In an empirical study, Stuart (1998) found that network actors who are crowded or prestigious are more likely to form alliances rapidly. Other relevant issues include: Who has influence based on their position in network? How can different types of networks be identified and how do networks differ in terms of interdependency? When will we find tight relationships in a mobile service network, and when will we find looser relationship?

Based on our findings, and our brief and selective introduction of some alternative streams of literature, we suggest that in an adjusted framework, the dependent variable “integration models” is replaced with “integration and cooperation models” and that the focus is aimed at describing different forms of integration and cooperation within networks of actors.

7 PRACTICAL IMPLICATIONS AND CONCLUSIONS

Even though the main purpose of this report has been to refine and apply a framework for analyzing integration in electronic markets to analysis of selected mobile service markets, some industry related implications have been identified as well. These implications are partly deduced from applying the MAPIT-model to the cases investigated and partly based upon our own reflections after working with the empirical cases as well as with the informants from each of the service providers. To present these implications, the same structure has been applied as for the individual analyses of case starting with value network and value propositions, presenting implications of relevance to the dimensions of the MAPIT-framework, and finally, discussing the integration forms identified.

Value networks

Most of the cases discussed here include independent providers playing a role as integrators providing new service offerings based upon the infrastructure (either technological, financial, or regulatory) of dominant players. Thus, they do not challenge or bypass the position of existing dominant players typical of many of the successful players in traditional electronic commerce. The integrators prefer specialization and link up with existing actors, which means that power and influence in the network remains largely unaffected. Although mobile solutions can lead to lower costs, it becomes difficult for the integrators to both create new values and to capture some of these values, when the influence in the network remains the same.

EasyPark's revenues, for instance, are limited by the agreements with parking companies who offer alternative payment channels. In order to capture more of the value creation, the integrators would have to offer additional services that are not provided by existing actors. An example would be if EasyPark offered information on the mobile device about available parking spaces and a chance to reserve parking spaces in advance. The Tax Magazine had good intentions of complementary services such as offering tax related editorial information on their electronic and (most likely forthcoming) mobile channel, however, the good intentions were not realized, hence the new channel provides few additional values other than searchable lists.

While many of the services are based on creating large scale cost reductions through digitalization, few other value propositions typical for digital markets have been identified. Examples of such propositions are closer integration with existing service use, complementary service offerings, service novelty and network effects (Amit and Zott, 2001). A main implication may be that service providers' integration models should be based on integrating complementary services utilizing the unique characteristics of mobile services rather than focusing only of price reductions as the only value proposition.

One value creating feature can be lower costs, but low transaction costs and a high potential for economies of scale is not enough to ensure profits. Mobile services are often based on cost structures with relatively high development costs, while production costs are low and this creates the potential for scale economies. Low productions costs do not in and of themselves create scale effects since realization of scale effects naturally requires wide adoption of the service.

Several of the services we studied were not able to take advantage of the potentially lower cost structures due to established and persisting cost structures. EasyPark and SmartPay were not able to offer their new alternative services lower cost than existing alternatives. Hence they would have to create additional values for the content providers and the customers. In the case of EasyPark, there seem to be some added customer values in the buying process of the customers (vertical complementarities), such as differentiating the service from traditional payment means. For SmartPay's services, there are added customer values in location independence and security and business values for the content providers in terms of a new channel and in differentiation potential from traditional payment means.

Positioning

Many of the cases discussed here are based upon taking a role as disintegrator rather than dis-*and* reintegrator or as a novel services integrator. The basis for disintegration as a position is that unbundling creates new values for end customers or that unbundled services may be re-bundled in new and better ways in the value network. Studies conducted in other sub-projects of our research program indicate that both parking and mobile payment services are perceived as specialized payment services lacking the required generality offered by traditional payment services (ubiquity) (Pedersen et al., 2002). This shows that disintegration

of a service without new reintegration creates a service offering that is conflicting with the unique characteristics of mobile services rather than utilizing them.

Market characteristics

All services investigated are found in markets combining a set of knowledge requirements. If focusing on three forms of market knowledge: domain-specific knowledge, e-commerce and technical knowledge, all services are based upon the providers being strong on technology knowledge. The markets are characterized by dominant players controlling much of the infrastructure knowledge, so the providers need to adapt to this infrastructure and rely on the dominant players for their infrastructure knowledge. This could have been balanced by providers for example by combining technology knowledge with market knowledge, such as knowledge of consumer behavior, trends in mobile service use and service preferences. However, none of the providers have focused on the creation of this kind of knowledge and they have not put much effort into combining this kind of knowledge with technology knowledge. This represents an opportunity because the dominant players primarily control infrastructure knowledge and are less focused on market knowledge. The combination of market knowledge and technology knowledge may be used to offer value propositions that are based on service complementarities rather than disintegration of existing value chains as is typical of many of our cases.

Djuice's mobile service platform represents an example where domain knowledge (about corporate customers) has been attempted coupled with technology knowledge through cooperation between Djuice and local companies (partners). The platform allows companies, who do not have mobile channel knowledge, access to the Djuice platform. The local companies (partners) have end consumer knowledge in their particular market, while Djuice has the technical knowledge.

Actor characteristics

Many of the services are based on the idea of significantly reduced costs by large scale digitalization of services. However, this often requires a complete digitalization of the service and service infrastructure. As long as the service is based on maintaining two or more service infrastructures, both physical and digital, the cost advantages and scale effects have been few and the providers have not been able to offer customers the proposed value proposition of

reduced costs. Most mobile services are in fact more expensive than their non-mobile substitutes. Naturally, this makes it difficult to achieve the level of adoption required to take advantage of the potential for scale economies that can be found in most services. This is a severe problem (and a paradox of the business models) as it is hard to find any other customer values that might boost adoption.

Almost all cases involve mobile services in which the proposed revenue model is very simple. Typically, the model is based upon some transaction fee that makes the revenues of the provider dependent on high volumes to exploit the scale effects mentioned above. There seem to be few examples of transaction related revenues being obtained from a variety of transaction sources, such as number of users, number of transactions and number of visitors combined. We have also not been able to identify any changes in revenue models over the adoption cycle or any dynamic elements in the revenue model such as revenue being shared in favor of the provider of a service if it generates traffic, subscribers or revenue for other services. For example, there seem to be no changes in the revenue model of EasyPark if it generates new subscribers to MobilHandel. Thus, the revenue models seem very transaction oriented and static. EasyPark has indicated that they may be able to renegotiate the revenue model and try to capture a greater share of the revenues from the parking companies. However, changes in revenue models will require a shift in the power balance in the network.

Product/service characteristics

The principle applied in the MAPIT-model is that digitalization of services creates new opportunities taking control over complex production and distribution processes or complex buying processes. It is also based upon the idea that digitalization creates new opportunities for service differentiation, but the whole idea is that these potentials must be utilized by service integrators. In our cases, we find only few examples of service providers utilizing the opportunities provided by service digitalization for reducing service complexity, taking control over product or production complexity or for differentiating service offerings.

Mobile services are often characterized by four unique properties, location specificity, ubiquity, time independency and personalization (Rask and Dholakia, 2001; Balasubramanian et al., 2002; Watson et al., 2002). However, few of the services investigated here transform these inherent properties into new product or service characteristics for the end user of relevance to integration.

Even though the services discussed here are somewhat unrelated to location, location information may be used to offer complementary services or to differentiate services. Because of digitalization of services, differentiation and added value provided by location information come at almost no cost to the service provider but may represent added value to end users.

Personalization has not been utilized in the service offerings discussed in this report. However, personalization provides new opportunities for service differentiation. Common to all our cases is that markets are approached by breadth rather than focused segments or differentiation. In some cases it is argued that differentiation and finally, price discrimination is unacceptable, but very little has been done to explore this proposition. New services are often provided as undifferentiated, at least as a first initiative. However, parking services, gaming services, general payment services and content services like the Tax Magazine easily lend themselves to service differentiation if they are provided in complementary bundles as suggested above.

Influence

New forms of lock-in are suggested by Amit and Zott (2001) as something that may be perceived in two different ways. Seen from the service providers' perspective the transformation of services from physical to electronic markets may create new opportunities for locking in customers. When seen from the customer perspective however, this lock-in may not be perceived as something negative restricting choice, but rather as something resulting from the provider offering a superior service. In our cases, little has been done to exercise lock-in as seen from the providers' point of view or by providing superior services creating more loyal customers. In fact, many of the service providers emphasized that their services are offered as disintegrated services unbundled from other offerings. For example, EasyPark focus on how their service may be used with a wide variety of payment alternatives. This illustrates the lack of influence in the value chain found for most of the investigated service providers, which makes it difficult for these providers to add complementary services and transform services into solutions that can create customer loyalty.

In most of the cases, the influence of actors seems to be perceived as a static property. Few of the service providers had any plans for increasing their own power, influencing the resource

dependency among players, or bypassing influential players in the value chain. Even though the current situation may require that the small and independent providers take this position at the moment, it is rather surprising that plans to change this situation were not revealed. Instead future plans focused on keeping alternatives open, and not locking the technical solutions to any one particular supplier (EasyPark using different payment modes, and DnB aiming to be a transaction bank for SmartPay as well as other mobile payment solutions), and sharing the risks and costs involved in developing the services while waiting for the market to take off. These future plans actually contribute in making the focal actors *less* influential in the network.

Transaction characteristics

Most of the investigated cases involve transactions of relatively high frequency, low transaction risk and low transaction standardization. In fact, many of the providers' idea is to adapt to highly proprietary transaction standards rather than transforming proprietary transactions standards into standardized transactions that may change the pattern of influence and the way transactions are made. This is a line of development typically found in knowledge intensive service markets where technology knowledge and proprietary infrastructures are found. However, it seems very difficult to design a profitable business model around this kind of transactions. In many of the cases discussed here, it may be necessary to reinterpret what constitutes the main transaction of the services. For example, EasyPark currently adapts to proprietary transaction standards but they do not open their application interfaces so that other services or parts of their own offerings can be bundled by other providers. As such they offer very few opportunities for other service providers to utilize indirect network effects by connecting to their service infrastructure.

Identified integration forms

The MAPIT framework was originally designed for analyzing intermediaries taking positions as integrators in traditional electronic markets. We have generally seen very few initiatives of this kind in mobile service markets. Instead, service providers have taken rather narrow positions adapting to existing infrastructures. They provide simple forms of integration, mostly by simple vertical functional integration. This is also the case in our report. Thus, one may imply that some of the successful initiatives found in traditional electronic commerce have so far not yet appeared in mobile commerce. The reasons may be many, such as

differences in influence of the value chain, technological and service infrastructures that are still proprietary and lack of transaction standardization. This may also be some of the reasons why existing players are the dominating integration initiators in our study. The general structural conditions of mobile services markets seem much less suited for new initiatives of cybermediators and integrators dis- and reintegrating services in new bundles.

There are also characteristics of mobile services not covered by the MAPIT-model that suggest integration initiatives will most likely be taken by existing players, that services will be offered with high transaction control, that vertical integration initiatives are more likely than horizontal and that focused initiatives still will be rare. These characteristics are, similar to the adoption determinants of services, technological, business strategic and behavioral. In this report, we have primarily addressed the business strategic conditions. Technological conditions include proprietary technology standards, complete operator control over network components, complete handset vendor control over terminal components and physical properties of terminals. Even though service providers may reach their customers designing open services, they have to rely on operator infrastructure to get paid for service use, on handset vendors to get their service integrated into the standard functionality of the terminal and adapt to the physical constraints of terminals handset in their service design. The behavioral characteristics include among other things customer history, functionality requirements and skills and attitudes towards mobile services. For example, customers are used to pay for mobile services, they have a long history of perceiving these services as separate services (voice, text, etc.), and they require that new services fit into this historical pattern. Because mobile terminals are much more widespread than PC's with Internet access, the heterogeneity of user skills and functionality requirements are greater. Also, mobile user contexts require tightly integrated, stable and well functioning services. Thus, customers seem to accept less experimentation and end-user initiated integration than on traditional PC's. Also, attitudes towards mobile services are influenced by current usage patterns of mobile terminals. These terminals are first of all perceived as communication and coordination tools used for social coordination in everyday life. Adapting services to include elements or being related or bundled with services well known in communication contexts may be necessary and these services are controlled by operators and handset providers primarily. Thus, there are a large set of obvious restrictions in the mobile services industry on what kind of integration models we are likely to find.

Implications based upon reflections from the interviews

Since the services we studied tended to disintegrate existing value chains and aimed to provide value primarily through scale effects based on low transaction and operation costs, we were surprised at the lack of focus among subjects on value propositions (particularly customer values), complementarities, and value network positioning. After all, low production costs do not in and of themselves create scale effects since realization of scale effects requires wide adoption of the services. Our interviewees were not overly concerned with convincing us of which customer needs or preferences their services were trying to meet or create. Likewise, the interest in discussing potential complementary services was surprisingly low. We believe that a more customer oriented focus could contribute in more innovative and profitable business models, based on features which distinguish and differentiate the mobile services from other electronic and non-electronic services.

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