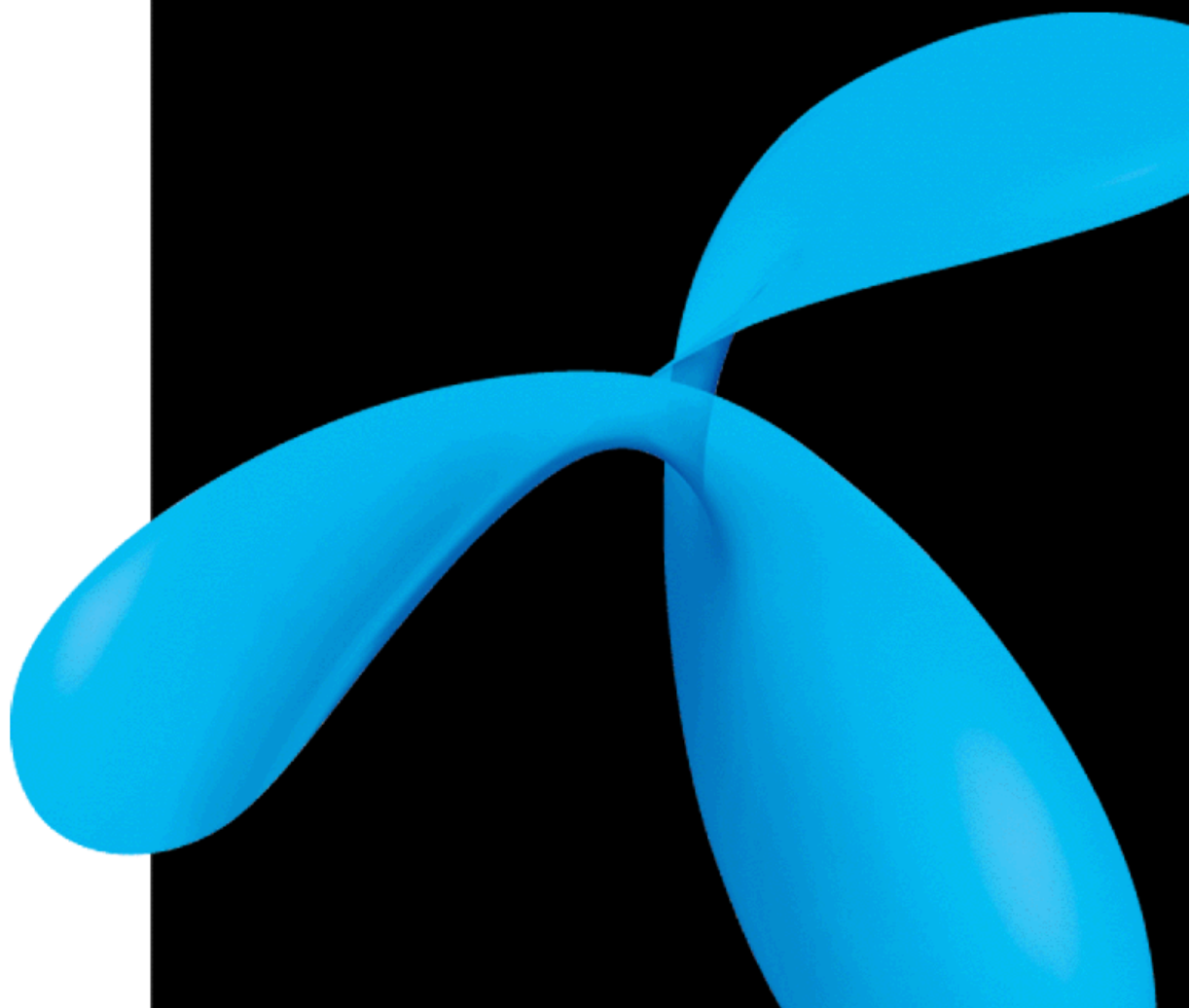


R&D R 9/2006

Per Egil Pedersen, Bjørn Erik Munkvold, Sigmund Akselsen, Pål Ytterstad

The Business Model Concept – Relevance for Mobile Tourism Services Innovation and Provision



R&D Research Report R 9/2006
Title **The Business Model Concept - Relevance
for Mobile Tourism Services Innovation
and Provision**

Author(s) Per Egil Pedersen, Bjørn Erik Munkvold, Sigmund
Akselsen, Pål Ytterstad

ISBN / ISSN 82-423-0600-1 / 0809-1021

Security group OPEN

Date 2006.07.01

Abstract

Business model research, in particular on mobile services, is mainly descriptive and proposes normative implications directly from descriptive models. In this report, we briefly review some of this research but add to the review some of the empirical research on business model dimensions for mobile services. We discuss the categorization of mobile services in general, and mobile tourism services in particular, and suggest a categorization based on the attributes of the service creating customer value. This categorization is used in a conceptual framework for analyzing business model option choices. The framework describes structure-conduct relationships, the relationships between business model option choices and value drivers, and the relationships between business model option choices, resource access and costs. The framework also provides a basis for understanding dynamic elements of business models. This framework is applied in four analytical discussions of business model option choices for mobile tourism services. The report shows how the framework may be used to evaluate and discuss alternative business model designs and suggests managerial implications indicating what may be successful business model designs for different categories of mobile tourism services.

Keywords

Business models, Mobile services, Tourism

© **Telenor ASA 2006.07.01**

All rights reserved. No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, recording, or by any information storage and retrieval system, without permission in writing from the publisher.

Preface

This report is written as a part of the MOVE project. The MOVE project is a BIP (Brukerstyrt innovasjonsprosjekt) project funded by the Research Council of Norway and a number of industry and university partners. The main purpose of the MOVE project is to provide mobile tourism services and infrastructure for such services in the context of the "Nasjonal turistveg" initiative. Lofoten has been chosen as the region of empirical investigation and service development.

The purpose of this report is to present and discuss relevant research on business models as related to mobile services in general, and mobile tourism services in particular. The report is thus intended to provide a foundation for analyzing business model option choices in the MOVE project. However, although some reference is made to MOVE in the analysis, the analysis is kept in a general format and actual considerations for the MOVE project is not addressed in this report.

The report has been written mainly by Per Egil Pedersen. Bjørn Erik Munkvold, Sigmund Akselsen and Pål Ytterstad have mainly contributed to sections 1 and 2.

The project has received funding from The Research Council of Norway, Telenor, Geomatikk, Høgskolen i Agder, Høgskolen i Finnmark, Norut IT, Statens Vegvesen and Unversitetet i Tromsø.

Grimstad, Kristiansand, Harstad and Tromsø, June 26, 2006.

Per Egil Pedersen Bjørn Erik Munkvold Sigmund Akselsen Pål Ytterstad

Contents

1	Introduction.....	1
2	The Business Model Concept	4
2.1	Ontological dimensions of business models.....	4
2.2	Business model types and instances	5
2.3	Business model relationships.....	6
2.4	Empirical studies of business models	8
3	Mobile Tourism Services	11
3.1	Characteristics and categories of mobile services.....	11
3.2	Categories of mobile tourism services.....	15
4	Conceptual Model.....	19
4.1	Analytical value model.....	21
4.2	Analytical resource model	24
5	Analytical Discussion and Conclusions	27
5.1	Analytical discussion	27
5.2	Conclusions	36
5.3	Implications	36
	References.....	38

1 Introduction

The term business model has gained considerable popularity recent years. Osterwalder et al. (2005a) show how the number of publications using the term correlates with NASDAQ fluctuations. This indicates that it has developed as a term used to describe how business is conducted in technology intensive sectors like ICT and telecommunications, and in particular in Internet-based firms of this sector. The term is relevant at three different levels – at the ontological level, at the typology level and at the instance level (Osterwalder et al, 2005a). At the ontological level, the business model concept is defined and its components and dimensions described. These dimensions are not randomly combined to form myriads of business models but are believed to be combined to form specific types of business models. Typologies categorizing these types are developed at the theory level. Finally, typologies are not only theoretically derived but are expected to reflect empirically observable instances of business models. In the popular literature these examples are what are most often associated with the term business model – such as the Amazon model or the eBay model.

Business model components are defined at the ontological level, typologies are created at the theory level and examples of successful and less successful business models may be observed at the empirical level. Surprisingly, little empirical research has been conducted on what determines the design of business models of particular types and what effects business model decisions have. Thus, the business model literature is mainly descriptive in its attempts to typologize business models and is practicing a form of normative “design science” suggesting how business models should be designed without actually having any empirical basis for these normative recommendations. Business model decisions will always have to be left to managers of the firms and value networks developing and introducing technology intensive products and services. Research, however, may provide theoretical and empirically supported knowledge on the relationships between structural conditions and business model options, the relationships between dimensions of individual business model types, and the effects of business model decisions on outcome related measures, such as customer value and innovation intensity. The purpose of this report is to present and summarize some of this research, and to briefly discuss how it may be applied to mobile tourism services.

Tourism services may be categorized according to the simple three phase model of tourist activities - planning or pre-visit phase, touring/visit/on-site phase, and reminiscing or post-visit phase (Brown and Chalmers, 2003; Watson et al. 2004, Werthner and Ricci, 2004). Further, the tourism value chain has been defined as to include the following links: planning/booking, transport, accommodation, and information and support at the destination, with a number of delivery agents for the services at each stage (travel agents, transport providers, hotels, tourist offices, etc.) (Berger et al., 2003). Information technology (IT) based services can support needs related to search, distribution and sharing of information for the different actors in the value chain, and through all three phases of tourism. Mobile tourism services, however, are believed to be most relevant in the touring/visit/on-site phase due to the unique attributes of mobile services – accessibility, personalization and information sharing (Balasubramanian et al., 2002, Nysveen et al., 2005). Examples of such services include mobile gaming services to entertain during transportation, mobile community services and phone blogs to share

experiences during a visit, and finally, the most widely applied mobile tourism service – mobile guides.

The MOVE project aims at establishing a location-based electronic marketplace, offering different mobile tourism services. Four pilot services have been developed, (MOVE, 2006):

- *KartGUIDE* (figure 1.1) is an application providing tourist guide functionality to the mobile handset. The application facilitates map-based navigation in points of interest (POIs) covering selected geographical areas. POIs are classified in different categories and the user may specify which categories to be displayed. Contact information may be used within the application to address the POI in question by phone or WAP. The application runs on JAVA and communicates with a central POI database over the mobile network. A simpler version based on WAP (MoveWAP) is also provided.
- *AktørPortalen* is an interactive, web-based tool that makes it possible for the tourist service provider to enter information about the service offered, locate it on a map and file it in the POI repository.
- *MOSAIKK* offers end-users the possibility to puzzle pictures selected from the geographical area in question. Commercial actors in the tourist industry are providing the pictures and contact information is displayed upon completion of the puzzle. The application is JAVA based.
- *REBUS* is a simple WAP-service challenging the mobile user through riddles, pictures and hints to identify famous places or sights in the selected area.



Figure 1.1 *KartGUIDE*

While these different examples of mobile services all are used during the second phase of the three phase tourism model, their customer value is generated by vastly different service attributes. While mobile gaming and mobile guide services are mainly generating value through their intrinsic attributes, mobile community services like phone blogs generate their value through the attributes of the network of users using the service. This kind of value creation is well known by traditional providers of mobile services because voice services share the same basis for generating its customer value. Thus, traditional providers of mobile services have the resources needed to provide many of the mobile tourism services that generate their value through network attributes. They also have a good understanding of this form of value creation and the business models required to convert resources into customer value. It is not obvious, however, that mobile tourism services that generate their value from intrinsic and complements network attributes are equally well understood.

In this report, we use the review of the business model concept to suggest a framework for analyzing the relationship between structural conditions, business models and customer value of mobile tourism services. The framework may be used to conduct empirical studies and develop theory on these relationships, but in this report it is mainly used as a framework for discussing the applicability of different business models to the innovation, production and

provisioning of different categories of mobile tourism services. While some references to the MOVE project and its services are made, the analysis is general in nature and thus does not discuss explicit implications for business model choices in this project.

The report is organized as follows. In section 2, we present the business model concept, and review some of the literature on business models with particular focus on mobile services. In section 3, we briefly review some of the literature on mobile tourism services. In section 4, we propose a framework for discussing the business model concept with relevance to mobile services and this model is applied to the discussion of business models in mobile tourism services in section 5. In this section, we also make some preliminary conclusions regarding successful business models for different categories of mobile tourism services.

2 The Business Model Concept

Popular uses of the business model concept involves "how you get paid" or "how you make money" (Chesbrough and Rosenbloom, 2002). The idea is that the business model concept is required because the way "business is done" is different from before, and concepts like "strategy" do not sufficiently capture these new forms of business. Thus, more scholarly writers have applied definitions, such as "*how the firm plans to make money long-term using the Internet*" (Afuah and Tucci, 2000), stressing that the "new economy" or "the Internet" is what requires "new forms of doing business". More academic approaches stress the difficulty in defining the business models concept without referring to a number of underlying dimensions (Chesbrough and Rosenbloom, 2002). One of the early attempts at defining the concept was Timmer's (1998) suggestion that a "*business model is defined as the organization (or architecture) of product, service and information flows, and the sources of revenues and benefits for suppliers and customers*" (p. 31). Similarly, Weill and Vitale suggest that a business model is the "*description of the roles and relationships among a firm's consumers, customers, allies and suppliers that identifies the major flows of products, information and money, and the major benefits to participants*" (Weill & Vitale, 2001, p. 34). In a recent review of the business model literature, Osterwalder et al. (2005a, p. 17-18) suggest a business model "*is a conceptual tool that contains a set of elements and their relationships and allows expressing the business logic of a specific firm. It is a definition of the value a company offers to one or several segments of customers and of the architecture of the firm and its network of partners for creating, marketing, and delivering this value and relationship capital, to generate profitable and sustainable revenue streams*". As Osterwalder et al. (2005a) we find the business model concept as a tool or framework most interesting. Thus, instead of suggesting yet another definition, we find the operational components that the business model concept is offering attracting. To arrive at operational components that may be used as a framework for research or for guiding organizational decision making, the components or dimensions of the business model concept as a framework have to be clarified.

2.1 Ontological dimensions of business models

Because the components of the business model as a meta-model are not obvious, terms like "elements" (Osterwalder et al, 2005a), "attributes" (Chesbrough and Rosenbloom, 2002) or "dimensions" (Methlie and Pedersen, 2005a) have been used of these components. While disagreement in the use of component terms is typical, the areas covered by these components are generally agreed upon. From Timmers' (1998) early work, we find the components to be the products/services, the business actors and their roles, the potential benefits and the sources of revenue (Gressgård and Stensaker, 2004). Later, several authors set out to scrutinize the ontological dimensions of the business model concept. Methlie and Pedersen (2002) included three operational dimensions in their business model concept; integration model, collaboration model and revenue model. They focus that individual providers' business model options are restricted by structural determinants and value network considerations because value creation in both traditional and mobile electronic commerce requires a shared understanding of the business model of each network member. In some industries the business model options of each value network member are indirectly determined by the business model of the

dominant members (e.g. operators in some mobile services industries and operating system developers in the software industry). Hedman and Kalling (2003) develop the business model dimensions from several strategy perspectives and include a discussion of causal inter-relations and longitudinal processes by which business models evolve. A business model for electronic tourism markets (ETM) is presented by Joo (2002), defining electronic interaction and coordination among different players (service producers, end consumers, intermediaries, and facilitators such as credit card companies and insurance companies), and the e-commerce infrastructure for this. Based on a case study of the development of the KETM electronic tourism market in Korea, strategies for development of an ETM is discussed from the perspectives of potential travelers and communities, cooperation among players, and technology and development methodology.

Recently, several authors have applied the business model concept to mobile commerce and mobile data services contexts (Campanovo and Pigneur, 2003; Faber et al., 2003, Bouwman, 2003). With some variations in propositions, these authors mainly suggest four dimensions of business models; the product innovation, the customer relationship, the infrastructure and the financial dimensions, covering the product related value proposition, the customer related value proposition, the structural dimension and the revenue dimension, respectively¹ (e.g. Campanovo and Pigneur, 2003). The infrastructure dimension is treated in the strategy and marketing literature under the label of governance. In their review of the business model literature Osterwalder et al. (2005a) show that the 14 most cited papers on conceptual dimensions of business models covers nine business model "building blocks" that relate to four different dimensions of business models. The dimensions are "product/service", "customer interface", "infrastructure management" and "financial aspects". The building blocks are the "value proposition" (13), "target customer" (8), "distribution channel" (6), "customer relationship" (4), "value configuration" (11), "capability" (5), "partnership" (10), "cost structure" (4), and finally, "revenue model" (11) (Osterwalder et al., 2005, p. 18). The figures refer to the number of papers that includes the corresponding "building block" among their conceptual business model dimensions. From these figures we find that the most commonly used dimensions include "value proposition", "value configuration" and "partnership", which are all parts of the term governance in the strategy literature, "revenue model", and "target customer", often termed segmentation in the strategy literature. Thus, the dimensions "revenue model", "governance model", "value propositions" and "market segmentation" seem to be central to most of the published papers on the dimensions of the business model concept.

2.2 Business model types and instances

Early work on business models was less occupied with ontological issues and more occupied with identifying typologies of business models (Timmers, 1998, Weill and Vitale, 2001, Pedersen and Methlie, 2001). Thus, a considerable number of typologies have been developed. These often apply to specific industries (Osterwalder et al, 2005a), such as wireless Internet access (Shubar and Lechner, 2004), mobile brokerage services (Clayton et al., 2004), or mobile data services (Gressgård et al., 2003), but the greatest number of typologies has been developed for electronic commerce on the fixed Internet. Two

¹ Faber et al. (2003) and also Bouwman (2003) suggest technology design, service design, organization design and finance design as the corresponding dimensions.

examples of these typologies are Timmers' (1999) extensive categorization of electronic commerce business models into "e-shops", "e-procurement", "e-malls", "e-auctions", "virtual communities", "collaboration platforms", "third party marketplaces", "value chain integrators", "value chain service providers" and "information brokerage" and Weill and Vitale's (2001) aggregated categorization of "direct to customer", "content provider" and "intermediary" models.

Authors focusing business models for mobile services have been less occupied with providing typologies and more interested in providing managerial frameworks for business model design. Consequently, simple typologies characterizing business models by their degree of openness, such as "closed" or "walled garden" models versus "open" models may be found. In the professional literature on mobile services business models, however, typologies are more common. For example, mapping the approaches of brokerage firms in adopting mobile electronic commerce, Clayton et al. (2004) identified four business models for mobile brokerage services based on combinations of price (standard or stratified) and platform (polymorphic or vertical). Further, the much cited Durlacher reports (e.g. Muller-Versee, 1999) on mobile commerce suggest typologies of business models for mobile commerce based on typological positions in the mobile commerce value chain. The UMTS Forum suggests future business models for 3G services to be categorized as "network operator centric service providers", "content aggregator/m-portal centric service providers" and "content provider centric service providers". Following the same lines of reasoning, Ballon (2005) suggests "service centric business models", "protocol centric business models" and "platform-centric business models" as three archetypical business models in his typology. These models reflect the combination of specific choices of business model dimensions made by providers in the 3G services value chain where service centric models focus their value proposition on the intrinsic value of the mobile service, protocol centric models focus their value proposition on the user network attributes of the mobile service network, and platform centric models focus their value proposition on the complements network attributes of the mobile service platform.

Typologies are often illustrated by examples of providers adopting archetypical business models. In some cases, however, providers' business models transform to more than archetypical business models derived from abstract typologies. In these examples, business model instances represent "role models" of archetypical business models and their instances are used as ideal models for other providers. Examples of such instances are the "eBay model", the "Amazon model", the "Dell model" (Osterwalder et al., 2005a), and most recently, the "Google model". Some descriptions of these models derive from academic case studies (Chesbrough and Rosenbloom, 2002), but most instance based model presentations are non-academic and are found in news media and blogs on business models (e.g. <http://opengardensblog.futuretext.com/>). Consequently, no common frameworks are applied for the instance based business models, most of them are described as unique cases, and their applicability as general frameworks for analyzing and understanding business model decisions is limited.

2.3 Business model relationships

Three types of business model relationships are of relevance. First, business model options are in no way independent. Thus, the relationship between business model dimensions is of interest and the identification of typologies of

business model options should reflect these interdependencies. Second, the choice of particular business model options is likely to affect the outcome or performance of the service provider. Thus, a set of conduct-performance relationships is likely to be found. Finally, business model options may not be freely chosen by providers. Instead, structural conditions, such as regulatory policies, the distribution of power among value chain players, and resource accessibility and uniqueness restrict the business model options available to service providers. This is often termed structure-conduct relationships.

Of these relationships, the first has been given most attention in the business model literature. This is due to the fact that typologies are designed to reflect relevant combinations of business model options and business model instances reflect real world combinations of particularly successful business model option combinations. Using the four dimensional framework for business models outlined above, some examples of interdependencies may be given. For example, revenue models and governance models are highly interdependent. To stimulate collaborative governance models agreements must be made on the distribution of generated revenue. Thus, open governance models require revenue models with easily observable revenue objects and revenue sharing agreements that let partners predict and survey the developments in revenue generation. Another example is the relationship between value proposition and market segmentation. Complex services with deep and specialized value propositions require that end-users understand and feel they control the services to generate customer value. Behavioral control of this kind may require end-user experience and some times even expertise. Thus, deep and specialized value propositions require careful segmentation of end-users. A final example that crosses resource considerations and customer value considerations may be when platform services are introduced. Again, only experienced end-users may be able to generate customer value from platform services with great service variety. In fact, Pedersen et al. (2005) found a negative relationship between service variety and customer value for mobile platform services for customers with low behavioral control, whereas this relationship was positive for customers with high behavioral control.

The examples presented above also illustrate the second type of business model relationships suggested - the relationship between specific options along business model dimensions and the performance effects of choosing specific options under different structural conditions. These relationships have been given less attention in the literature on the business model concept. Instead, performance effects of the choice of options for product-, customer-, financial- and infrastructural business model dimensions are treated separately in individual research areas such as product innovation, industrial organization and strategic marketing research. In the industrial organization field, however, one acknowledges the causal relationships between structural market conditions and business model choices, and between these strategic choices and performance in the so-called "structure-conduct-performance paradigm" (Bain, 1951). In this framework, performance is measured by a firm's business values such as profitability. The mobile data service industry, however, is an emerging market of network services where performance may better be measured by perceived and anticipated customer values. Thus, integration between business model choices and perceived customer values is necessary in the mobile data services industry. It is beyond the scope of this report to integrate and apply the vast literature on the performance effects of business model options to the mobile data services industry. However, it is well documented in this literature that the choice of specific business model options affects the intrinsic and extrinsic attributes of the product or service developed

and produced (Nicholls-Nixon and Woo, 2003; Zahra and Nielsen, 2002; Sengupta, 1998; Stuart, 2000). Some of these relationships will be further discussed in sections 2.4, 4 and 5.

The third kind of relationships found for business model dimensions is between structural conditions and business model options and choices. In some cases structural conditions limit the options available to business model decision makers, while in other situations the options are rather extensive, but final choice is restricted. A general model of these relationships termed the "MAPIT-model" has been proposed by Methlie and Pedersen (2002). It has been applied to the mobile data services industry (Gressgård et al, 2003). The model suggests that five types of structural conditions restrict business model options available to providers of mobile data services. These structural conditions are market-related, actor-related, product/service-related, influence-related and transaction-related. An example of market related structural conditions are the regulatory policies in different mobile service markets used by regulatory authorities to ensure competition. An example of an actor related condition is the economies of scale and scope characterizing the actors providing the service or the infrastructure required for the service. Examples of product/service related conditions are the inherent user behaviors established for a product or service category over time or the contextual attributes of a category of products or services. For mobile services, inherent willingness to pay or perceived accessibility are service related conditions restricting the types of business model options available. An example of an influence related condition is the well established patterns of trust among value network players in the mobile data services industries. Finally, examples of transaction related structural conditions restricting business model options are the transaction risk of a particular transaction or the degree of standardization of a particular transaction. In mobile data services transactions range from highly standardized to highly un-standardized, typically with the un-standardized transactions occurring more frequently when business models are designed for services that are new to the market or new to the firm (radical innovations).

2.4 Empirical studies of business models

Empirical studies of business models typically apply a case oriented method. Often, such case studies include a multitude of explanatory factors and discuss a broad set of success factors. For mobile services, Henten et al. (2004) suggested technology, economy, market development and structure, marketing, socio-cultural, policy intervention and regulation as the relevant explanatory factors. Pedersen (2001) suggested three general requirements for successful adoption of mobile data services; technology-, business strategic-, and end-users' behavioral requirements. These requirement dimensions correspond roughly to the dimensions of Henten et al. (2004), but business strategic requirements refer to more than marketing decisions, and behavioral requirements refer to more than socio-cultural factors.

Maitland et al. (2005) examined possible influences of business models on the characteristics of mobile service networks. Based on five case studies of inter-firm service networks providing mobile information and entertainment services in Netherlands, Germany and Sweden, they studied the influence of revenue models and network membership benefits on network characteristics. Their results show how network operators employed different strategies, creating a variance in business models and governance mechanisms.

Some authors apply a comparative perspective analyzing differences in adoption between Asian and European markets. For example, Bohlin et al. (2003) compared the developments of mobile data services in Japan and Europe and opposed popular assumptions that differences in adoption rates could be explained by differences in technology, regulatory regimes, cultural differences, Internet penetration and differences in consumer segments. Instead, they suggest that the important differences are the coordinated and vertically integrated service concepts and the revenue models offered by Japanese operators. Thus, business model dimensions are found to be among the most important explanations of mobile service success in these case studies. As suggested above, structural conditions may restrict providers' business model options. Yoo et al. (2005) investigated the issue of standardization as part of the regulatory regime of Korea's mobile services market, and how it influenced diffusion of mobile broadband services. They found standardization to provide a form of "cognitive alignment" that helped providers create collaborative actor networks and stimulate openness and innovativeness of services. Thus, standardization was found to be important to the development of collaborative governance models in the Korean mobile services market.

Some case studies also apply conceptual frameworks of business models as multidimensional frameworks for analysis. For example, Osterwalder et al. (2005b) applied their nine-dimensional business model framework for discussing the disruptive potential of Skype in the telecommunication market. They found Skype's value proposition, revenue model and customer relationship dimension to be of importance to their disruptive potential, but the most important dimension was found to be their cost structure – a dimension not traditionally considered as too important in business model frameworks and typologies.

More elaborate studies of business model dimensions, and their effects on mobile data services success, are hard to find. Instead, business model dimensions have been investigated empirically as parts of the strategic marketing, industrial organization and industrial economics literature. For example, Brousseau and Quelin (1996) suggested that a hierarchical governance form will be best suited for obtaining intrinsic quality of services that are not characterized by network effects. In a study of 125 value added service providers in the telecommunications market, they found support for this proposition. The validity of the study is somewhat limited due to increasing disaggregation of the telecommunication value chain after 1996. Another example is a study by Jonasson (2001) on the effects of innovative pricing models as parts of revenue models on customer value. The study was based on 650 customer interviews and analyses of customers' mobile phone bills. Even though customer value was not explicitly measured, the study showed how DoCoMo have been successful in increasing customer value through the use of innovative revenue models.

The relationship between structural conditions and business model dimensions has been investigated under other "headers" than business model relationships. For example, Fjeldstad et al. (2004) found that structural conditions, such as market concentration influenced governance models. For example, market concentration was found to increase the use of collaborative governance models.

Empirical studies of the effects of regulatory policies on pricing and diffusion of mobile services are found (e.g. Gryzbowski, 2005, Schejter, 2006), but these studies are based on a black box perspective to the intermediary variables

providing the explanatory path between regulatory policy and behavioral effects. Thus, they are of less relevance to researchers trying to develop explanatory models and provide managerial advice on how business models should adapt to changes in regulatory policy.

3 Mobile Tourism Services

Mobile tourism services represent the combination of two types of services – mobile services and tourism services. Both types of services have been characterized and categorized by several authors. In the following, we focus on the characteristics of mobile tourism services stemming from their being mobile services. Thus, some characteristics and categories of mobile services are presented in section 3.1. In this part, we focus on characteristics of mobile services believed to represent customer value drivers, not just general characteristics of mobile services. In section 3.2, we use these characteristics to suggest a categorization of mobile tourism services that may be used as a basis for discussing alternative business model option choices for the different categories of mobile services.

3.1 Characteristics and categories of mobile services

Several characteristics have been proposed that are believed to be unique to mobile services. One of the most obvious characteristics of mobile services is the lack of constraints related to time and space (Balasubramanian et al., 2002). According to Balasubramanian et al. (2002), time is a resource that is very limited in a modern person's life, and thus, very costly. Channels giving flexibility in time and space access to information should therefore be valued highly by customers. Watson et al. (2002) discussed what they label the "u-commerce" construct. Three characteristics of u-commerce discussed by the authors are relevant for information accessibility: ubiquitous access (access everywhere), universal access (the possibility to stay connected wherever the customers are), and unison access (the integration of various communication systems that enable a single interface or connection point).

Lot21 (2001) argued that mobile phones are very personal and that only friends, family, and co-workers are allowed access to their cellular phone number. This was supported by Siau et al. (2001), who argued that mobile communication can be personalized to represent information or services appropriate for the individual customer. Furthermore, uniqueness (that the information customers receive is adapted to the time of the day, customer location, and customer roles and preferences) is one of the dimensions of the "u-commerce" construct presented by Watson et al. (2002), which describes the potential for personalization in mobile commerce. Another dimension enabling personal services through mobile channels is the possibility to send relevant and time sensitive information to a loyal card customer, for example (Doyle, 2001; Kannan et al., 2001) argued that wireless devices are ideal for maintaining customer relationships. The reason for this, they contended, is the ability to provide truly personalized content and services by tracking personal identity, by the ability to track consumers across media and over time, by the ability to provide content and service at the point of need, and finally, by the capability to provide highly engaging content.

Through mobile channels, information can be sent to all mobile users within a specific geographic region. In addition, mobile services are typically used to coordinate social networks. Information received by one member of a network is often forwarded to other members of the network (Doyle 2001). Studies within the uses and gratification theory have also focused on the unique gratifications of mobile channels. A study by Leung and Wei (1998) revealed that pagers were viewed as a mark of status and social identity. Pagers were

used to express fashion and status and to integrate with peer social networks. A study by Ling (2001) also showed that mobile phones are used to express fashion and for presentation of self. Results from these studies indicated that gratifications for using mobile devices are related to the expression of characteristics of the individual. Thus, the characteristics of information accessibility, information personalization and information dissemination are believed to be important characteristics of mobile services (Nysveen et al., 2005).

These characteristics may be used to categorize mobile services. For example, Nysveen et al. (2005) used these characteristics to suggest that mobile services could be categorized as goal directed versus experiential focusing on differences in the utilization of the accessibility characteristic and machine versus person interactive of the information accessibility characteristic. Empirical studies revealed systematic differences in the importance of motivational, social and behaviour factors explaining the adoption of these services. The characteristics above, however, all stem from the intrinsic attributes of mobile services. Intrinsic attributes refer to the inherent attributes of the service itself, whereas for network goods such as mobile services, extrinsic attributes emerge from the networks that provide and use the service. This involves an extension of the traditional typology of intrinsic and extrinsic sources of value suggested by Holbrook (1996), and underlines how network services are different from traditional products and services where extrinsic attributes often originate from complementary supplier services and consumer investments (Mathwick et al., 2001). The two types of attributes represent the sources of intrinsic and extrinsic value unique to network effects products as suggested by Lee and O'Connor: "*extrinsic value... is unique to network effects products... is the set of benefits derived from outside the product itself, such as the size of the installed base and the availability of compatible and complementary products...*" (Lee and O'Connor, 2003a, p. 244). These attributes, consequently, represent drivers of customer value.

Intrinsic attributes of mobile services

As discussed above, many unique intrinsic attributes have been mentioned characterizing mobile services, such as accessibility, personalization and information dissemination. A problem with considering accessibility and "being personal" as unique attributes of mobile services is that these attributes are general and may be unrelated to the content of the mobile service. Even though the lack of constraints related to time and space of mobile services has been suggested as the basis for their usefulness (Pedersen and Nysveen, 2003), usefulness is mainly determined by the content of the service – its functionality. Often, the usefulness of mobile services depends on other users using the same service rather than the accessibility or personalization attributes of the service. This is particularly true for communication or person-interactive services, where extrinsic attributes are more important for creating customer value than the intrinsic attributes of the service. Still, for information or machine-interactive services, the usefulness of the service is an important intrinsic attribute (Pedersen and Nysveen, 2003). Another unique intrinsic attribute found important in six studies of mobile service adoption by Nysveen et al. (2005) was enjoyment. Even for services with functionality that was believed to be unrelated to enjoyment, such as mobile payment services, enjoyment was found to be a relevant intrinsic attribute (Pedersen and Nysveen, 2003). This finding corresponds well to studies of mobile services in uses and gratification research suggesting that gratifications of "relaxation" (Leung and Wei, 2000)

and "nutz-spaz" (Höflich and Rössler, 2001) are important to the adoption and use of mobile services.

Intrinsic attributes of a service may also be characterized by its technical specifications, for example related to speed and capacity. It is difficult to determine such attributes for services in general, and mobile services are no exception. Still, attributes such as network bandwidth, dial-up speed, coverage and signal strength have been suggested. For example, in a service quality framework for mobile services, Nordman and Liljander (2003) suggested that dial-up speed and configuration settings were important components of service quality.

Extrinsic attributes of mobile services

Empirical results indicate that mobile devices and services are used to express and confirm the users' identity (Pedersen and Nysveen, 2003) suggesting identity expressiveness is also an important attribute of mobile services (Nysveen et al., 2005). Such symbolic and expressive attributes of mobile services may be considered extrinsic attributes because they result from the service being used in a network context. However, the most often mentioned extrinsic attributes of network services derive from direct and indirect network effects. Direct network effects are the effects related to increasing value of a service as the size of the network increases (Liebowitz and Margolis, 1999). Person-interactive services that are not typically categorized as communication services (e.g. discussion-, contact- and self- support services) have a somewhat more complex set of direct network effects, but these effects are nonetheless related to network size. Thus, network size is an important extrinsic attribute of many mobile data services. For example, social coordination, suggested as one of the most important gratifications of SMS usage, may not be exercised without sufficient network size. Extrinsic attributes believed to be driving customer value through direct network effects are termed user network attributes here. Whereas user network size is the most important user network attribute, authors have also suggested user network strength (Frels et al., 2003, Shankar and Bayus, 2003) and member resource contribution (Asvanund et al., 2004) to be important user network attributes.

While user network attributes are important extrinsic attributes of communication services, network attributes related to indirect network effects are more often believed to drive the value of information, transaction or machine-interactive services. Indirect network effects originate from direct network effects when the networked good or service is a platform for complementary services and products (Gupta et al., 1999). Mobile data services differ with respect to their potential as a platform for complementary services. For example for information and machine-interactive services like premium SMS, MMS content services, mobile Internet access or online game services, value generation opportunities through indirect network effects are great. From the concept of indirect network effects, a set of operational extrinsic service attributes, such as complementary service variety, speed of complementary service development and complementary service quality may be derived. For mobile data services, compatibility with a set of content standards may be a similar intrinsic attribute that increase in importance as the number of providers offering content services (e.g. games, information services) increases. As for direct network effects, considerable attention has been given to the importance of indirect network effects in consumers' assessment of service or product value. For example, researchers in economics, marketing and information systems have concluded that the availability of complementary goods affects

the prices that can be obtained for networked goods (Gandal et al., 2000; Basu et al., 2003; Brynjolfsson and Kemerer, 1996). Extrinsic attributes believed to be driving customer value through indirect network effects are termed complements network attributes here.

Recently, end-users' perception of network attributes has been given considerable attention. Studies of innovation adoption take sensitivity to network effects into consideration and argue that network size is more important when the network is small than when it is large. This suggests that adoption likelihood is sensitive to critical mass and anticipation of future network size (Sarker and Wells, 2003; Shapiro and Varian, 1999). For example, the use of pre-announcement and commitment announcements are examples of strategies used to convince end-users that future network size is expected to be large and that it will increase quickly (Lee and O'Connor, 2003; Montaguti et al., 2002). Perceptions and anticipation of user network attributes have also recently achieved considerable attention in information systems, strategy and marketing literature (Gallaughar and Wang, 2002; Schilling, 2003; Frels et al., 2003). Most of these studies have been conducted in professional end-user markets suggesting that direct network effects are taken into consideration in professional end-users' value assessment process though their interpretation of user network attributes. Few similar studies are found for traditional consumer markets. However, economic theory on network effects assumes that consumers are somehow able to make such assessments and includes network size elements in consumers' utility functions (e.g. Katz and Shapiro, 1992).

A recent study by Asvanund et al. (2004) revealed that consumers combine increasing and diminishing return considerations. The findings showed that consumers consider network strength and quality of the file sharing network, not only network size, when assessing the value of participating in a network. For complements network attributes, end-users' appreciation of complementary service variety and innovativeness may vary across user segments. In professional business markets, such as business software or server operating systems markets, it is likely that complementary service variety is assessed and appreciated (Frels et al., 2003). For simple consumer network goods where the complementary goods are content goods delivered on a content distribution platform such as a video game platform, this is also very likely (Schilling, 2003). However, for complex or radically new network goods and services, like mobile data services, the assessment and valuation of complements network attributes are much more difficult. In this case, consumers will often also have to assess the value of future indirect network effects resulting from adopting the network goods platform. This is an even more difficult task requiring considerable experience and cognitive capacity. Not surprising, a study by Pedersen et al. (2005) showed that less experienced consumers had difficulties assessing the value of user network and complements network attributes. Experienced consumers, however, made such value assessments with much less difficulty.

Most mobile services include all three types of value drivers, but services are to a varying degree characterized by the importance of each of the three types of value drivers. Thus, the importance of intrinsic attributes, user network attributes and complements network attributes as value drivers may be used to categorize mobile services. Table 3.1 provides an overview of the intrinsic and extrinsic attributes of mobile services discussed in this section.

Customer value driver	Characteristics of mobile services
Intrinsic attributes	<ul style="list-style-type: none"> • Information accessibility • Information personalization • Information dissemination • Enjoyment • Technical specifications (network bandwidth, dial-up speed, configuration settings, coverage, signal strength, etc.)
Extrinsic attributes	<ul style="list-style-type: none"> • User network attributes <ul style="list-style-type: none"> ○ Network size ○ Network strength ○ User resource contribution ○ Quality of file sharing network • Complements network attributes <ul style="list-style-type: none"> ○ Complementary service variety ○ Speed of complementary service development ○ Complementary service quality ○ Compatibility with content standards

Table 3.1 Value driving attributes of mobile services

In the next section, these three types of value drivers are used as a basis for categorizing mobile tourism services.

3.2 Categories of mobile tourism services

Tourism services are a subcategory of travel services. As for travel services, such services may be categorized by the provider offering them. For example, Methlie et al. (2002) categorized them according to the position of the provider in the value chain. This categorization, however, does not use the characteristics of the service as its basis. Watson et al. (2004) suggested categorizing tourism services by the phase of the tourist experience. Consequently, tourism services may be categorized as supporting the planning, touring and reminiscing phases of the tourist experience. Many tourism services are information services. Such services may be categorized according to the information source being physical or virtual. Another way to categorize tourism information services is by the information source being commercial or noncommercial and by the type of information being personal or impersonal (Fodness and Murray, 1997). However, many tourism services are not information services, but provide the tourist and/or travel experience in itself. Categories of such services are like those found in industry classification systems and include services as transportation, hotels and lodging services, amusement and recreational services, and dining services found in the NAICS² classification, or hotels, restaurants, transport and travel agencies services

² North American Industry Classification System

found in the NACE³ classification. Some of these services may only be offered in physical contexts, whereas others, such as travel agency services or parts of the service offering of physical service providers may be offered in virtual contexts. In their analysis of tourism services offered in virtual contexts, Methlie and Nysveen (2000) focused on online tourism services and categorized these services as distribution services and value added services. An example of distribution services is online ordering and reservation systems. Value added services may be further categorized according to the types of value they contribute to (Evans and Wurster, 1997). An example of this type of service is community services. The values of these services, include, but are not limited to customer values.

While Methlie and Nysveen (2000) focused on value added services of travel agencies, destination and attraction sites may also offer similar services. Thus, categorization systems may be designed applying Watson et al.'s (2004) phase classification as one dimension and Methlie and Nysveen's (2000) value based classification as the other. In table 3.2, examples of services using such a classification scheme are shown:

Value type	Planning	Touring	Reminiscing
Content value	Travel bundling service	Coupon service	Destination community service
Infrastructure value	Fare price comparison service	Mobile map guide	Online "property lost" service
Context value	Multimedia destination presentation	Media rich mobile guide	Video sharing service

Table 3.2 Examples of value added tourism services

A similar typology as that of table 3.2 has been suggested by Nysveen and Lexhagen (2001), but with a more empirically derived value dimension. In table 3.2, examples are found of traditional online services as well as mobile services. By restricting services to online services, typologies of tourism services may be identified. For example, Pan and Fesenmaier (2000) suggested using information flows as a basis for the classification of services because most online tourism services at that time were found to be information services. While the typology reflects the status of online tourism services at the time of the study, it identifies the user as a relevant dimension of the typology. For example, online tourism services may be offered by professional users to other tourism service providers, they may be offered by providers for tourists or they may be offered by tourists for other tourists. In the first and third type of services, user network attributes are important to user value. Thus, user and provider relationships are of different importance to different categories of tourism services.

Turning to mobile tourism services, the categorizations and typologies of services appear to be more ad hoc or based on empirical observations. For example, Eriksson (2002) suggested car navigation systems, on trip

³ NACE - Classification of Economic Activities in the European Community

information systems, parking information systems, public transport management systems, pedestrian support systems, security and emergency services, tracking services and mobile e-commerce as relevant service categories. Based on their ethnographic study of city tourists, Brown and Chalmers (2003) suggested visit sharing services, guidebook services, map-based services, pre-and post-visiting services, and leisure and pleasure services. This categorization is based on observations of tourist behavior and studies of the artifacts used by tourists during their stay. Thus, transforming existing artifacts used by tourists from physical to digital form could prove a valuable basis for identifying interesting mobile tourist services. Berger et al. (2003) focus location based services and use the phase model of tourism to suggest mobile services for planning/booking, transport, accommodation, and destination support. O'Brien and Burmeister (2003) used the idea of the virtual service space to suggest information space (e.g. destination information), transaction space (e.g. reservation services), distribution space (e.g. map-based services), and communication space services (e.g. customer feedback and tourist messaging services).

In the MOVE project, the concept of a mobile marketplace was used to suggest categories of mobile services supporting the experiences of a visitor of a physical marketplace. To provide services using this metaphor, the combination of two service infrastructure categories is required. The service infrastructure categories suggested are experiential services, communication services, community services, map-based services, goal-directed information services, and entertainment services for the tourist (Finnset et al, 2004). Furthermore, the categories point of interest registration services, multimedia-registration services, communication management services, pricing services, consumer information management services, and product information management services are suggested for tourism service providers. From the combination of these service infrastructure categories, the following service categories are suggested: Basic services (e.g. existing telecommunications services like SMS and MMS), map-based services, point of interest based services, context services, user profile services and data management services.

The categorization of mobile tourism services in visitor and provider services by Finnset et al. (2004) also illustrates the two-sidedness of most mobile tourism services. Mobile tourist services where user network attributes are important to customer value will not create customer value until a sufficient number of users or a sufficiently strong user network has been established. For example, a service for exchanging tourist opinions on attractions will not create value to other tourists until a sufficiently strong group of tourists has adopted and actively used the service. Mobile tourism services where complements network attributes are important to customer value will not create customer value until a sufficient number of complementary services are offered through the services and it will not create business value until a sufficient number of users use it. For example, a mobile guide service will not create customer value until a considerable or selected number of providers post their point of interest (POI) information through it, and it will not create business value to these providers until sufficient number of users uses it. Some mobile tourism services, however, may create customer value mainly based on its intrinsic attributes. For example, a map in itself or a downloaded, destination related game service may not rely on extrinsic attributes to create customer value. Thus, two-sidedness is not equally present in all mobile tourism services, and an important basis for understanding variation in the business models applied to different mobile tourism services may be an understanding of this variation in the importance of two-sidedness across categories of mobile tourism services.

From this brief review, we conclude that service categorizations are designed for a particular purpose and no general service categorization or typology may easily be identified. The purpose of the service classification, whether it is used to suggest scenarios for service development or to provide managerial advice, must be used as the basis for the classification. Here, we suggest a service categorization with the main purpose of providing guidance to business model design.

Using the value driving attributes of mobile services presented in section 3.1 for mobile tourism services, an alternative categorization of mobile tourism services is suggested. The main purpose of this categorization is to provide an analytical basis for discussing how business model option choices may be optimized for different categories of services. As suggested in section 3.1, value may be driven by the intrinsic attributes of a service or from the extrinsic attributes reflecting their network effects. In table 3.3, some examples of mobile tourism services in each category are suggested.

Customer value drivers	Example mobile tourism services
Intrinsic attributes	Entertainment service used during travel (mobile game), Mobile guide service used at the destination (mobile museum guide)
User network attributes	Communication service used during travel, community service used to share opinions and experiences (tourist community service)
Complements network attributes	Information service (mobile map-based guide), reservation service spanning several attractions or destinations (mobile reservation service), discount or coupon service (mobile coupon service)

Table 3.3 Examples of mobile tourism services categorized by value driving attributes

In section 4, we suggest a conceptual framework for discussing how these categories of mobile tourism services may require different business model options to give access to necessary resources and provide the value that makes end-users adopt the services. In section 5, we discuss business model option choices for the different categories of mobile tourism services and suggest implications for tourism service providers, infrastructure and data providers, and tourism support service providers.

4 Conceptual Model

Our proposed conceptual model follows the structure-conduct-performance (SCP) framework often applied in empirical industrial organization (Kadiyali et al., 2001). The SCP model may be further split into operational models to be used as research models, analytical frameworks and empirically testable models. The conceptual SCP model is illustrated in figure 4.1.

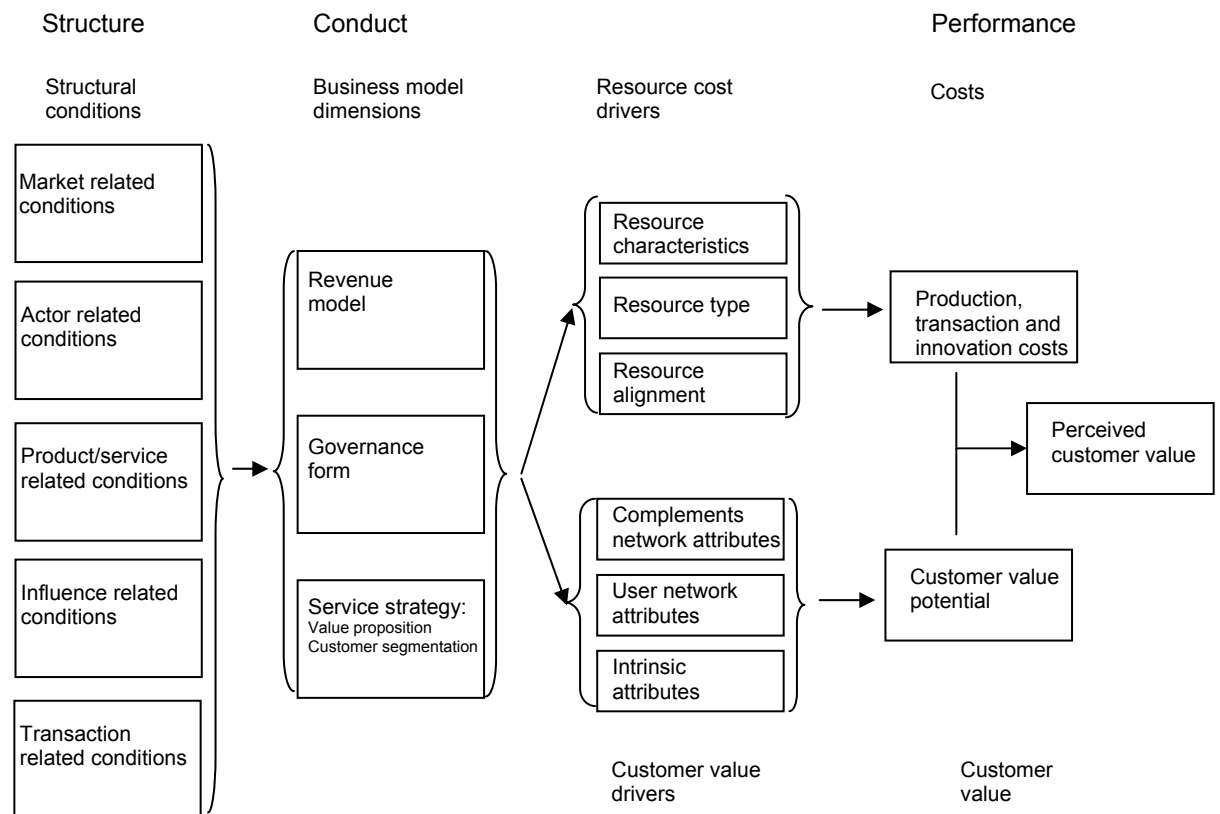


Figure 4.1 General SCP model

The general SCP model has three main components. First, structural conditions include market related, actor related, product/service related, influence related and transaction related structural conditions. These structural conditions are assumed to restrict business model options. Business model options are illustrated in figure 4.1 by four business model dimensions. The revenue model options cover the financial dimension of the business model. The governance form options cover the infrastructural dimension of the business model. Finally, the service strategy options cover the value proposition and customer relationship dimensions of the business model. The choices of particular business model dimension options represent the "conduct" component of the SCP-paradigm. Business model choices are believed to have performance effects. In the SCP model of figure 4.1, we focus cost efficiency and customer value as the relevant performance components. To model the causal relationship between business model decisions and performance, two types of theories have been applied. The causal relationship between business model

decisions and customer value is modelled combining theory of the economics of network goods and consumer behavior theory. The main drivers of value are believed to be of either intrinsic or extrinsic kind. Intrinsic value drivers stem from the inherent attributes of the mobile data service itself whereas extrinsic value drivers stem from attributes of the network of users and complementary services offered. As shown above, network based value drivers represented by user network and complements network attributes, are of great importance for mobile services.

Resource based theory (e.g. Barney, 1991) suggests one of the main sources of sustainable competitive advantage is the resources available to the firm or value network. In particular, control of resources that are difficult to imitate, immobile, non substitutable and rare are important to competitive advantage. Furthermore, resource types may be knowledge or property based (Das and Teng, 2000). Finally, resource alignments may be more or less supplementary or complementary (Das and Teng, 2000). In the model of figure 4.1, these characteristics of resources are considered as resource cost drivers so that transaction and innovation costs are believed to increase if the firm or value network is to gain control over such resources. For example, access to highly immobile, property based and complementary resources are believed to increase transaction costs, whereas access to non imitable, non substitutable, knowledge-based resources are believed to increase innovation costs, particularly if governance form is not designed to minimize such costs.

In a SCP-framework, structure may affect conduct of different kinds and conduct may affect performance of different kinds. Examples of performance types are financial results and customer value. Each SCP-model defines its particular performance dimensions. Furthermore, each SCP-model includes one or more causal relationships between structure and conduct, and between conduct and performance. Structure – conduct relationships may be based on theories such as diffusion of innovations theory, path dependency theory or resource dependency theory, just to mention a few relevant theories. Conduct – performance model relationships may be based on theories such as transaction cost theory, resource based theory or strategic marketing theory, or a combination of several theories. Thus, SCP models represent a conceptual framework for applying more specific operational models to particular markets.

The SCP model of figure 4.1 may be split into theoretical, analytical and empirically testable models. Previously, a model of the relationships between structural conditions and business model option choices have been developed by Methlie and Pedersen (2002) and investigated by Gressgård et al. (2003) for mobile data services. A conduct – performance part of the model has been developed and investigated empirically for six mobile data services markets by Pedersen et al. (2005). In figure 4.2, this part of the SCP model is illustrated. As seen from figure 4.2, the resource based relationships of figure 4.1 has been excluded in this part of the model. In the following, this model is presented in greater detail because it will be used as a basis for discussion in section 5. A proposed analytical model of the resource based relationships of the SCP model is presented in section 4.2. For the discussion of structure – conduct relationships in section 5, the general SCP model of figure 4.1 and the more operational versions of it as presented in Gressgård et al. (2003), is applied.

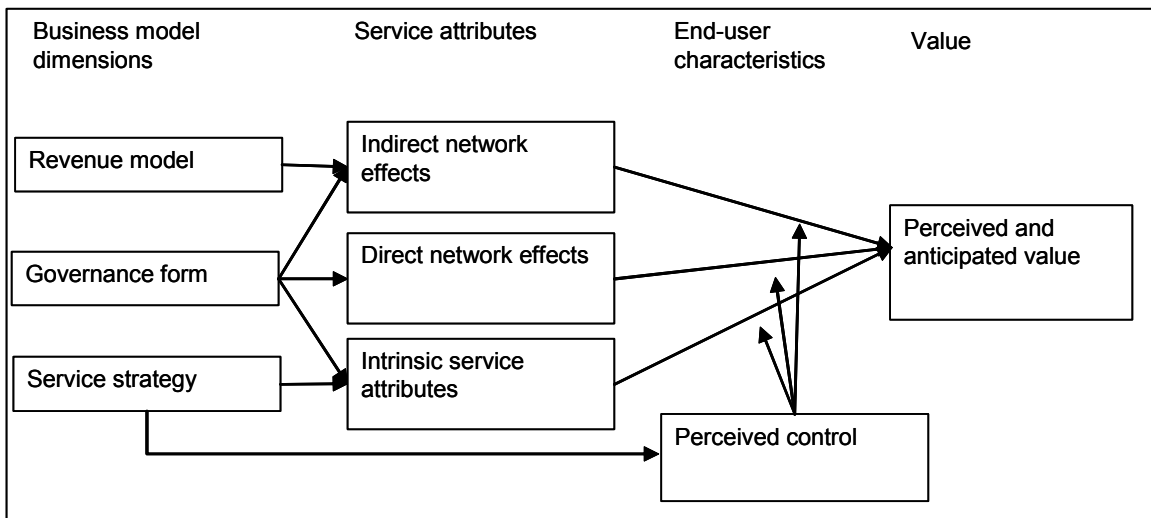


Figure 4.2 Conduct – performance model of Pedersen et al. (2005)

4.1 Analytical value model

In the conceptual model illustrated in figure 4.2, we propose that specific business model dimension options affect the intrinsic and extrinsic service attributes as well as end-user characteristics. Furthermore, we propose that the relationship between service attributes and perceived and anticipated value is moderated by end-user characteristics. While the literature cited in section 2 was general with respect to business model dimensions, service attributes and end-user value perceptions, both research and analytical models have to be more operational for these concepts to be useful in hypothesis development.

The business model concept has been operationalized along three dimensions. For the financial arrangement dimension found in the business model ontology literature we focus on the *revenue model* including revenue valuation and sharing. Content based valuation means that end-users pay per unit of the service content delivered, whereas transport based valuation means that end-users pay for the amount of time online, packet charge or similar volume units. Valuation may also be based on other units, such as when the revenue is indirectly generated through advertising or commissioning. The revenue share element may have a complex option structure, but we simplify this to revenue shares favoring content rather than transport (Strand Consult, 2001). A content oriented revenue share involves a relatively larger proportion of revenue is redistributed to content providers, whereas a transport oriented revenue share involves a relatively larger proportion of revenue is redistributed or retained by network or transport providers. In almost all practical settings, the objects of revenue valuation and sharing are equivalent, but for indirect valuations like advertising or commissioning, revenues may be redistributed favouring either content providers or transport providers. Thus, indirect valuation may also result in either content favouring or transport favouring sharing of revenues.

For the infrastructural arrangement dimension, we focus on *governance form* corresponding to governance form or mode as treated in new institutional economics and organization theory. Providers' options further correspond to the traditional categorization of governance forms as market, relational and hierarchy modes or forms (e.g. Ghosh and John, 1999). However, governance

form is a complex element, and it may include several options. We have previously suggested that the relational form of governance includes so many options that it may be treated as a separate element in the infrastructure dimension of a providers business model (Pedersen, 2001). For example both network forms and alliance forms are relational forms, but there is little doubt that these forms may have quite distinct and different effects on service attributes and thus, performance.

The product innovation and customer relationship dimensions may be treated under the common term *service strategy* with two elements including service value proposition⁴ and market focus elements corresponding to Porter's (1985) generic strategy elements. The options for the service value proposition element are service dependent and for mobile data services related to the specific gratifications sought by these services. We have discussed some of these gratifications above but here we focus two important option issues. The first is to what degree the value proposition focuses the unique attributes of mobile services. Examples are accessibility that only may be obtained through the mobile device or personalization that is unique due to identification of the end-user. The second option issue is that of breadth in service attribute offerings. Examples are services that cover a large set of mobile service gratifications versus service offerings that cover a focused set of gratification as part of their value proposition. Thus, we suggest the two options of mobile specificity (uniqueness) and proposition breadth (scope). For the market focus element we apply the focused versus undifferentiated options of Porter (1985).

In principle, all these options may be treated as continuous. For example, the choice of governance form is not a discrete choice between market, relational and hierarchy forms. Instead, the options vary with respect to the degree of hierarchical, relational and market oriented governance mechanisms are utilized. Thus, closed business models include governance mechanisms mainly of the hierarchical form whereas open models include governance mechanisms mainly of the relational and market forms. Similarly, revenue share options involve a choice of the revenue share redistributed to content providers rather than an absolute value above or below 50% indicating a content versus transport oriented model.

Mobile data services value drivers are categorized as intrinsic reflecting the primary value driven by the inherent attributes of the service itself, or extrinsic reflecting primary value derived through direct and indirect network effects and termed user network attributes and complements network attributes, respectively. Among the *complements network attributes representing indirect network effect value drivers* we include complementary service variety and quality as relevant complements network attributes. Among the *user network attributes representing direct network effect value drivers* we suggest the value driving attributes are mainly related to end-user network size. We suggest the following intrinsic attributes to be mobile specific: Ease of use, usefulness, enjoyment, expressiveness, compatibility⁵, service quality and innovativeness. Intrinsic attributes may also be specific to the service category being investigated, and thus, other intrinsic service attributes may be focused for example for goal-oriented versus experiential service categories. For the moderating factor termed end-user characteristics in figure 4.2, we focus

⁴ The terms "positioning" and "positioning option" are often used in marketing strategy literature (e.g. Ghosh and John, 1999)

⁵ Ease of use and compatibility may be included in the service quality concept if applying a framework similar to SERVQUAL for mobile services (Nordman and Liljander, 2003). Compatibility is a special intrinsic attributes with particular importance also to services where complements network attributes are their primary value driver.

perceived behavioral control. The term is often used in information systems adoption literature (e.g. Taylor and Todd, 1995) to reflect the combination of end-users' perceptions of their own resources (e.g. skills, experience, financial) and facilitation of the service provider. For a more extensive discussion of the intrinsic and extrinsic attributes believed to drive customer value, see Pedersen et al. (2005).

The conceptual model is based on rationalistic assumptions suggesting that end-users adopt mobile data services because of high *perceived and anticipated value*. Value perceptions reflect the value assessments that are made from current intrinsic and extrinsic service attributes whereas anticipated value reflects expectations of further development of these attributes. In figure 4.2, intrinsic and extrinsic attributes are illustrated as unrelated, but for many mobile services these attributes are indeed related. For example, the usefulness of most communication services is strongly influenced by the size of the end-user network. However, not all communication services share this interrelationship. For example, the usefulness of mobile email in Japan may be strongly influenced by network size, but in Europe mobile email simply represents a new access point for an existing service. Thus, network size influences the usefulness of traditional email, but not necessarily the usefulness of a service giving mobile access to email. Also, because these relationships are service specific, the conceptual model in figure 4.2 assumes that intrinsic service attributes are unrelated. This assumption, however, may, and should, be relaxed for service specific versions of the model.

From this discussion of the elements of each of the concepts in the general model illustrated in figure 4.2, a more operational analytical model is suggested. The analytical model is shown in figure 4.3.

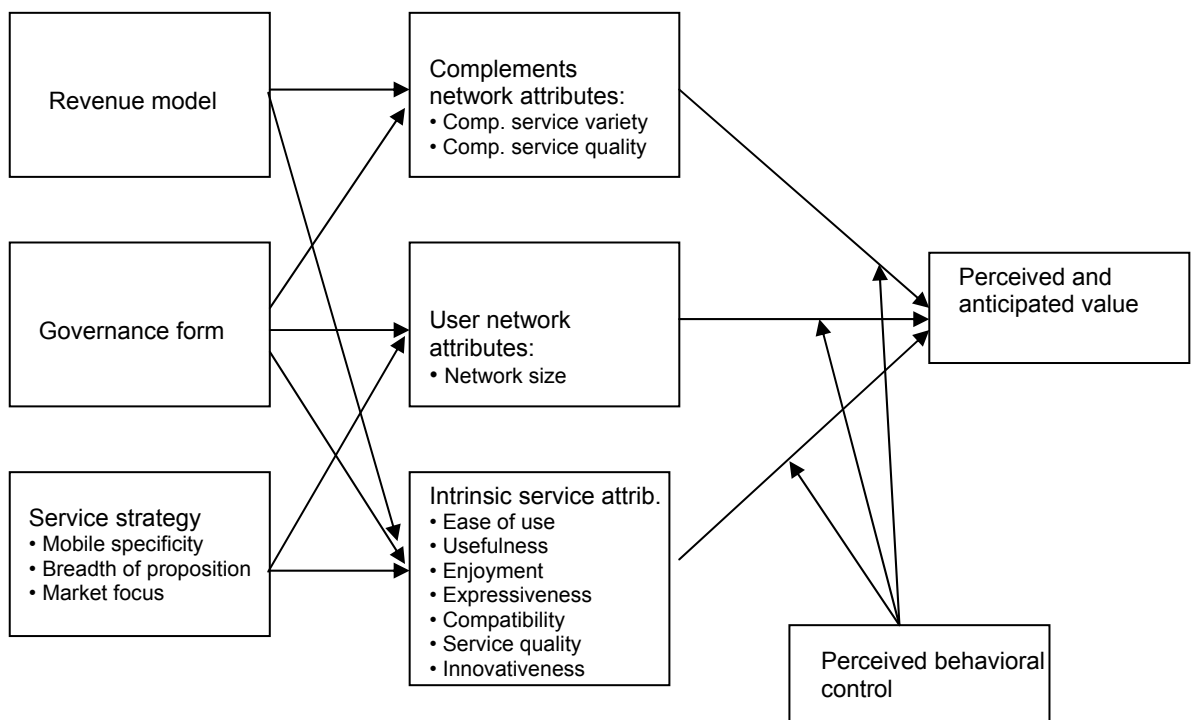


Figure 4.3. Analytical value model

The relationships in the analytical model illustrate the main influences from the choice of business model options on service attributes and the main and moderated influences from these attributes on perceived and anticipated value. We suggest that the choice of revenue model primarily influences the complementary service attributes of mobile data services, in particular if the mobile data services offered represent service platforms such as SMS, MMS or WAP services. Revenue model may, however, also influence intrinsic attributes such as usefulness, ease of use or service quality. For example, revenue valuation through advertisements and commissioning may affect the content of the service reducing usefulness or perceived service quality. Governance form is expected to influence both extrinsic and intrinsic attributes. For example, hierarchical governance forms are likely to give service developers full control of the intrinsic attributes of a service and the attributes of its complementary services. Furthermore, if the firm applying this form is large, it may utilize its current user network to obtain speed of diffusion in new service domains. The choice of a particular service value proposition is the most influential factor determining the intrinsic attributes of a service, whereas the choice between a focused or an undifferentiated market strategy is likely to affect whether end-users have the necessary experience or skills to feel they have behavioral control of the mobile service being used.

The relationship between value driving service attributes and end-user value includes two sets of influences. The first set is the main effects of service attributes on perceived and anticipated value. In the second set, we assume that these relationships are moderated by the perceived behavioral control of end-users. For example, one may propose that complementary service variety leads to high perceived value for all users, but one may also propose that this is only true for experienced end-users being able to utilize and choose among the variety of complementary services. Less experienced end-users may on the other hand be confused by a great variety of complementary service offerings.

4.2 Analytical resource model

The SCP model of figure 4.1 may also be used to develop an analytical model of the resource related relationships between conduct and performance. In this case, we suggest the components of the analytical model to be the same for the business model dimensions, but suggest including a set of resource related cost drivers and a typology of costs being influenced by these cost drivers. The analytical model is shown in figure 4.4.

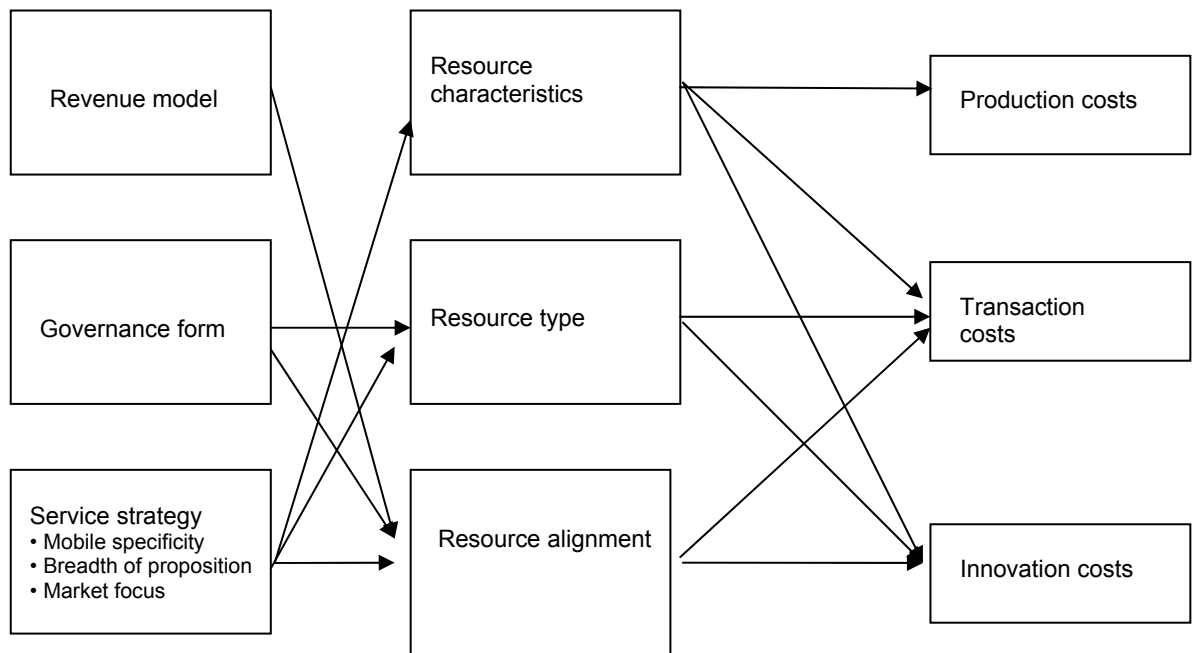


Figure 4.4. Analytical resource model

The causal relationships in figure 4.4 between business model dimensions and resource cost drivers should be understood as follows. Business model option choices affect both the need for and availability of, resources with different characteristics to create sustainable competitive advantage. The resource bases of this advantage are believed to be of three kinds – non-imitable, non-substitutable and rare resources. Non-imitable resources are unique resources, often of intangible kinds. A classic example is tacit knowledge (Polanyi, 1966). For mobile services, the knowledge of complex user behavior or advanced technology platforms may represent knowledge of this kind. Non substitutability refers to the uniqueness of resources. For mobile services, infrastructural network resources represent this kind of non-substitutable resources. Only the network infrastructure owned by carriers may be used to offer mobile services with an anytime/anywhere availability. Resource immobility also refers to uniqueness of resources, but the uniqueness dimensions may be based on other attributes than knowledge. For example, for mobile services, rare resources may be immobile or specialized resources such as the local resources necessary to provide location based services or mobile tourism information services. Das and Teng (2000) also consider the type of resources controlled by partners to be important. Two types are suggested – property based and knowledge based resource types. Access to knowledge based resources may primarily increase innovation costs, whereas access to property based resources mainly increases production and transaction costs. Finally, the combined resources required to obtain competitive advantage may be aligned in different ways. For some categories of services resources are complementary in creating value, whereas for other categories they are supplementary. If they are independent, they may be considered wasteful (Das and Teng, 2000). When resources are highly complementary in creating value, transaction costs are increased, particularly if governance form and revenue model have not been designed to minimize such costs.

Thus, resources may drive different kinds of costs. Production costs are the costs occurring after a service has been developed and the transactional arrangements are established to control its exchange. For most digitized services like mobile data services, marginal production costs are believed to be close to zero. Thus, production costs are believed to be marginal when compared to the other two types of costs. Transaction costs are the costs occurring to safeguard transactions against opportunistic behavior of partners with limited information capacity or asymmetric information. For example, providing some mobile services may require investments in service specific technology, such as payment terminals or ID-readers. These investments will represent resources with high specificity due to lack of alternative use, rarity or immobility. In such situations, transaction costs are believed to be high, but business model decisions may be used to minimize transaction costs. Similar lines of reasoning may be used for innovation costs. Transaction cost researchers may propose that innovation costs are included as a part of the transaction cost concept. Innovativeness, however, is so important to mobile services and the availability of specialized resources required for service innovation so unique, that specific business models may be developed to ensure continued innovativeness of offered services. For example, the Norwegian CPA model involved unconventional business model decisions of the Norwegian carriers Telenor and Netcom that were believed to ensure continued innovation in the SMS and MMS service markets by small, independent developers. The considerations made by these carriers to ensure continued innovation with minimal innovation costs are not easily explained by transaction cost theory.

The analytical model of figure 4.4 has not been proposed as a testable research model like the analytical value model illustrated in figure 4.3. Thus, it should be considered as a draft analytical model to be used here as a framework for discussing the resource requirements of mobile tourism services and how providers' business model decisions may be influenced by the need to access and control such resources. Consequently, its status is highly exploratory and it is in need of considerable refinement. Still, it may easily be integrated into a SCP framework and may offer a more systematic approach to discussing resource related arguments for business model option choices.

5 Analytical Discussion and Conclusions

In section 2, we briefly reviewed some of the literature on business models. We showed that business model research has been descriptive and normative, and primarily analyzed ontological dimensions of business models. The main idea is that business model option choices may be analyzed and described, and then modelled from a normative perspective with the identification of analytically optimal business model decisions. This represents an engineering approach to business models very similar to that used in regular business modelling or business process modelling. Some of the research has been more empirical but mainly focused on identifying typologies of business models and their corresponding empirical instances. Empirical research of relevance to business models is mainly found in strategic marketing, industrial organization, and industrial economics literature, but most of this literature focuses individual business model dimensions such as governance form or market segmentation. In section 4 we suggested using a framework integrating some of this empirical research as a basis for analyzing and discussing business model decisions. The framework is represented by a general SCP model. Parts of the framework have been operationalized as research models found to be empirically supported for mobile services business model decisions. Mobile tourism services are discussed in section 3 as a subset of mobile services. By categorizing mobile tourism services according to their main value driver, the framework of section 4 may be used to discuss business model dimensions of most importance to each category, relevant options and option choices. This section includes an analytical discussion following the guidelines outlined above. It concludes and briefly discusses some of the managerial and research implications of these conclusions.

5.1 Analytical discussion

Three types of relationships were suggested as the basis for discussing business model dimensions in section 2 and 4. The structure – conduct relationship is investigated to identify structural conditions that restrict business model options and the possible choices that may be made. Conduct – performance relationships are discussed from two perspectives. From a customer value perspective, services of different categories are believed to generate their value from different attributes. From a resource based perspective, resources are believed to drive costs of different types. Thus, this section includes three analytical discussions treating each of these three relationship types. Finally, we also discuss dynamic considerations and service trajectories.

Structure – conduct considerations

As seen from section 3, mobile tourism services include a multitude of services with varying complexity and partner involvement. Within the context of the mobile tourism services defined in the MOVE project, market, actor, product/service and influence conditions are determined. For example, the MOVE project limits the mobile tourism services to the Lofoten area and the type of tourists that visit this area. Furthermore, the project focuses car tourists due to its relationship with the “Nasjonal turistveg” project. Regulatory policies do not restrict business model options because few of the infrastructural services required to provide mobile tourism services are regulated. Furthermore, the market for tourist services is highly fragmented with several destination companies and a significant number of service providers offering

transportation, sightseeing, accommodation and event services. For infrastructure services, fragmentation is less characteristic with few mobile infrastructure providers, few map/geodata providers, rather few destination/service information providers and a dominant provider of road infrastructure information services (Statens Vegvesen) being involved. Thus, at the tourist service level fragmentation represents a challenge to make services characterized by two-sidedness adopted, but at the infrastructural level, fragmentation is less of a problem. Mobile tourism services may be provided as services requiring technical knowledge if being context sensitive or location based, but they may also be provided with little technical expertise. Still, knowledge of what characterizes the Lofoten tourist is required limiting business models to include providers with this kind of knowledge and expertise. This requires revenue models to include tourist service providers, governance forms to provide a way to organize the fragmented collection of tourist service providers, the value proposition to include the knowledge held by tourist service providers and the segmentation strategy to be focused. The complexity of the services offered and the breadth of the value proposition may, however, be reduced to cope with market fragmentation problems.

Infrastructure provider actors often rely on economies of scale. For the mobile service infrastructure, map/geodata and information/destination services this is also the case for a number of mobile tourism services. For tourist service providers, economy of scope is more typical. Consequently, revenue and cost models differ considerably among the potential partners that may be involved in mobile tourism services. Again, the level of complexity and the breadth of the value proposition may be used to cope with divergent revenue and cost models. For complex services, revenue models of the kind used for other types of mobile data services will be new to tourist service providers, but both time (in the form of genre understanding and learning) and communication (in the form of marketing and social influence) will be necessary to make tourist service providers adopt revenue models of this kind. For example, the differences between visitor based cost and revenue models used by tourist service providers and traffic based cost and revenue models used by mobile data services may be cognitively challenging to tourist service providers which can also only rely on these revenue models for a fraction of their profit. Adding indirect revenue models based on advertising and commissioning increases the cognitive complexity of the business model and represents an additional challenge in the form of complex revenue sharing agreements.

As seen from section 3, no simple and universal categorization of mobile tourism services is easily identified. Also, tourists rely on a multitude of services during their planning, touring and reminiscing phases, so that great variety may be expected among tourists in their experience with online tourism services in general and mobile tourism services in particular. Thus, very few well established habits of mobile tourism services are to be found. The few that exist typically include the use of online information sources in the planning phase, maps and guidebooks during the touring phase and ad hoc social sharing of experiences in the reminiscing phase. For these services, very different payment methods are used affecting willingness to pay for mobile tourism services. Online information services are typically free, guidebooks and maps are often one time purchases or they may be borrowed from previous visitors (friends) and social sharing of experiences are typically free, even if online services are used for this purpose. Thus, payment habits differ from the payment habits established for other mobile data services. The level of sophistication in mobile product/service use among potential Lofoten car tourists is likely to be rather low, and the general technology readiness is thus

also considered to be low. These structural conditions influence the revenue objects and the value propositions that may be offered for mobile tourism services in this area. Thus, revenue objects may have to parallel those of offline information services used by tourists (e.g. maps and guidebooks), value propositions are most likely to have to be of little complexity or complex value propositions have to be carefully designed and marketed to specific segments. Also, knowledge of these factors is most likely held by tourist service providers and not by infrastructure service providers giving tourist service providers an important role in defining value propositions and segmenting markets.

As discussed above, fragmentation is considerable among tourist service providers and much less among infrastructure providers. Also, some of the infrastructure partners hold significant market power in their respective infrastructure service market. Thus, information of what mobile tourism services are, of their potential business models, of the revenue they may generate, and of their technological complexity is highly asymmetrical. Also, few of the partners have any previous relationships that may provide any basis for transferring trust from other domains. Due to high transaction risk and divergent attention, tourism service providers are likely to be reluctant to invest in mobile tourism services to avoid a potential lock in. Thus, trust developing actions are likely to be necessary and should be well integrated into the business models' governance form.

As shown by Watson et al. (2004) online tourism services and in particular mobile tourism services, are not provided under standardized service agreements or the extensive use of standardized information architectures. Some standardization of transactions may be found in reservation systems and destination information systems, but the level of standardization is best described as immature. Thus, transaction risk due to lack of standardization is high and providers of tourist services are likely to be sceptical to being involved with partners with business models that do not offer them a risk premium or risk reduction offering. This may influence the design of governance forms, revenue models and value propositions. Until trust is established among involved partners it is unlikely that the revenue gained from use of the mobile tourism services is sufficient to compensate for the risks involved when the tourist service providers take active part in the development and provision of mobile tourist services. Transaction risk due to immobility and low transaction frequency from the point of the tourist is also high, possibly influencing attitudes towards new mobile tourism services. However, high transaction risk and low transaction frequency requires risk control. Thus, value propositions that offer risk reduction may be more likely to create customer value than those that do not include such a component. Examples of such value propositions are money back propositions, reputation based propositions or sharing of experiences with trusted tourists.

Customer value considerations

As suggested in section 3, mobile tourism services may be categorized according to their drivers of customer value. Table 3.2 illustrated this categorization through mobile tourism service examples. In section 4, an analytic framework was presented that operationalized the intrinsic and extrinsic attributes of the services believed to represent customer value drivers.

Intrinsic attributes are believed to be the drivers of customer value for mobile tourism services like entertainment services used during travel or mobile museum guide services. The value driving attributes are ease of use, usefulness, enjoyment, expressiveness, compatibility, service quality and innovativeness. Not all of these attributes are equally important to all services

of this category. For example, for mobile game services used to provide gratifications of escape or relaxation during the less interesting parts of the touring phase, enjoyment is the main intrinsic attribute driving customer value. For mobile museum guides, usefulness, enjoyment and compatibility may be the important value driving attributes. For museum guide services, usefulness and enjoyment are ensured by the content of the service whereas compatibility is ensured by using standardized interfaces and formats, such as using USB-based interfaces to traditional MP3-players and MP3 as the format of an audio guide instead of mobile phones. The main commonality of these attributes is that they represent inherent attributes of the service itself, not attributes of the complementary services used simultaneously, the complementary infrastructure services provided by a network of service providers or attributes of the user network, such as user network strength or size. That said, almost all services include intrinsic and extrinsic attributes as value drivers, but our categorization of services is based on what is believed to be the *main* driver of customer value for a service category.

When intrinsic attributes represent the main drivers of value, business model options need to be chosen that ensure the quality of the intrinsic attributes, control the quality of the user experience and usage context, and ensure compatibility with preexisting end-user behavior. The main consequence is that service quality and a consistent user experience may require a more closed governance form. Assuming the resources required to design, provide and distribute the service may be controlled by one or a few providers, hierarchical forms of governance may be applied. Empirical support for these relationships has been supplied by Brousseau and Quelin (1996) and Pedersen et al. (2005). Even for services where value is created by extrinsic attributes in smaller networks, this kind of governance form may be favorable (Asvanund et al., 2004). The relationship between governance form and revenue model implies that when closed governance forms are suggested, simple revenue models with simple pricing and simple or no revenue sharing are believed to be optimal. Resource considerations may, however, alter this line of reasoning. These resource based considerations are discussed below.

For all mobile services, mobile specificity of the value proposition is believed to be of great importance to customer value. Still, mobile specificity may be more important to some categories of services than others. For example, focusing accessibility and personalization as the mobile specificity of the value proposition may be more important to services where customer value is driven by intrinsic attributes than by the possibility to disseminate information. Thus, the intrinsic attributes of usefulness may be based on accessibility such as sensitivity to context for a mobile museum guide or personalization in the form of game personalization for mobile games. For the part of the value proposition specifying breadth of the value proposition in these types of services, the value proposition is generally believed to be rather narrow. This also enables the design of mobile specific services that are narrow in the content offered, specializing on the particular gratifications sought by end-users in their particular user contexts, such as in the car, at the museum or at the specific attraction. Services of this kind will typically be directed at specific customer segments, and versioning of the service with individual value propositions is not likely to be required. Thus, no further customer segmentation is normally required.

As examples of services where user network attributes represent the main drivers of customer value we suggested communication services used during travel and community services used to share opinions and experiences. Thus, traditional mobile communication services also play an important role as mobile

tourism services. Providing coverage and interoperability of such services are naturally also important. For example, the provision of GSM-coverage onboard ferries was long not seen as a priority of carriers until providers like Maritime Communication Partners (MCP) took this position with their technology and business model (Methlie and Pedersen, 2005b). The business model may be used as an example of some of the considerations one must make for such services. A technological solution was designed by MCP, but more important was the decision to register as an international carrier and design horizontal roaming and interconnect agreements with a considerable number of national carriers. Thus, the governance form chosen was that of a horizontal contractual agreement following the traditional guidelines for roaming and interconnect agreements for GSM services. Corresponding to this governance form, revenue sharing agreements were designed reflecting the traditional contractual revenue models used for GSM-services in general. The value proposition is simple, providing the services used by the largest customer network – the voice service, and this service is provided using an undifferentiated and un-segmented marketing strategy.

More context adapted mobile tourist services like community services may be analyzed following the same line of reasoning as above. Starting with governance form, simple horizontal contractual agreements are likely to be necessary to ensure the size of the network is sufficient. For services with higher transaction costs, horizontal contractual agreements may not suffice and horizontal integration may be required including close cooperation among providers or even horizontal mergers of providers offering services at the same level (e.g. opinion sharing services, photoblogging services or hotel/restaurant reputation services). As an example, consider the value-destroying effect of a reputation service with inconsistent reputation history of a restaurant or hotel due to too few and skewed evaluations. If contractual agreements are made, simple revenue sharing agreements may follow with the revenue object being traffic, in particular if advertising is used as a supplemental indirect revenue model. For even closer horizontal forms of governance, revenue sharing is no longer an issue.

As suggested above, value propositions should always be mobile specific, but again, the basis for mobile specificity may differ between services creating value through their intrinsic attributes and services creating value through their network size. For the latter category, information dissemination represents the mobile specificity of the service. This also traditionally limits the breadth of the value proposition, but we have recently seen value propositions for successful online community services with exceptional breadth (e.g. MySpace.com). For mobile services, attempts have been made to provide similar broad value propositions for community services also covering the "mobile space" (e.g. lunarstorm.se). While mobile tourism services of this kind is currently provided with narrow value propositions, it is likely that providers with broad value propositions will be more likely to succeed in the future due to the importance of network size as the value driving attribute of this service category. For specialized services, research shows that network strength may partly compensate for network size (Asvanand et al., 2004; Frels et al., 2003). However, customer segmentation may be used to provide "communities within communities" for specialized services supporting the assumption that also mobile tourism services will have to be provided within the framework of a broader value proposition for online and mobile community services.

The discussion of "communities within communities" and "specialized services within a broad value proposition" also illustrates that services may create value through their complementarity with other services. User network and

complements network attributes are closely related as value drivers (Gupta et al., 1999). For some services, however, complements network attributes may be the main drivers of value. Examples of operational complements network attributes are complementary service variety and complementary service quality. It is not unlikely that a negative relationship may be found between complementary service variety and quality. Thus, the control of complementary service quality while obtaining sufficient complementary service variety is an issue for services characterized by indirect network effects being the mechanism driving customer value. Examples of mobile tourist services with these kinds of value drivers are mobile information services, whether being map-based or not, mobile reservation services spanning several attractions or destinations and discount or coupon services where discounts are obtained at the point of sales. When complements network attributes are the driver of customer value it is unlikely that only one provider is involved in the development, provision or marketing of the service. Most often, one or more services represent the platform for the complementarity of other services. A classical example is SMS-based content services. In that case, SMS is used as the platform for service provisioning. The market for SMS-based content services is characterized by two-sidedness. Adoption of the platform is required by end user for service providers to be able to make money offering services on the platform. On the other side, end-users are reluctant to adopt the platform until a considerable variety of SMS-based content services of sufficient quality is available. Thus, the two-sidedness of these markets makes service adoption and value creation more complex than in the markets of the service categories previously discussed.

Governance form is used to stimulate the development of complementary services on the platform. Often, the platform is controlled by a dominant or large provider. In these cases, the platform is used to leverage on the installed base of the large provider. Adopting the platform for one service type makes the user network sufficiently large to easily add new complementary services to the platform without having to worry about the initial two-sidedness. In such cases, access to the user base of the platform is a critical issue and the governance form is designed with this in mind. Thus, partner networks are designed that stimulate owners of the platform and corresponding user base to join the provider network. In a situation where the platform and complementary services are simultaneously adopted by end-users and service providers and developers, a sequencing of service development must be stimulated. Then, governance forms must be designed to stimulate adoption of the service platform by providers, and development of complementary services must be encouraged before any revenue can be generated. In both cases, complex governance forms characterized by openness are used. The danger in using open governance forms is that complementarity service quality may come out of control or complementary service variety may be too large for end-users to appreciate. Thus, open governance forms include measures to control such situations. An example is upfront investments ensuring that only high quality providers may adopt the development or provisioning platform. As the services are adopted, governance forms are likely to change, so dynamic elements must be included as well. This is briefly discussed below.

Revenue models are actively used to identify simple and easily measurable revenue objects and the principles for revenues are generally simple and shared among service providers (e.g. Telenor/Netcom CPA-models). If the governance form is more closed, revenue models may differ across service providers and information of revenue models may not be publicly available (e.g. Vodafone Live).

Value propositions of services where the value is driven by complements network attributes mainly are also mobile specific, but mobile specificity is less dependent on accessibility and more on information dissemination and personalization. For the most successful services characterized by complementarity such as ringtones and logos personalization was one of the main success factors. Broad value propositions were designed with great variety and the option to personalize from the great variety. When value propositions are simple, this is an obvious business model option choice. When value propositions are more complex, such as for mobile tourism services, the choice of business model options becomes more complex. In this case, a balance must be found between offering variety of complementary services and quality of complementary services. Often, this leads to more narrow value propositions, such as limiting the value proposition to services for a specific region (e.g. Lofoten) or of a specific category (e.g. accommodation only). In these situations, personalization is also more complex and does not relate to identity expressiveness in a simple way. Many have suggested implicit forms of personalization of such services to be a solution (e.g. Eskedal et al., 2003), but then identity expressiveness as an important intrinsic attribute of a mobile service is lost. Instead, the tradeoff between complementary service quality and variety should be controlled by governance form and revenue model and the value proposition will most likely have to be broad. The differences in ability among end-users to create value from variety of complementary services should be controlled by customer segmentation. Examples of segmentation criteria for such services in general may be age and sex, but for mobile tourist services, demographic segmentation criteria must be supplemented by psychographic criteria, such as technology readiness and attitudes towards technology and behavioral criteria, such as prior purchase behavior (e.g. target marketing of mobile tourism services to end-users having used MMS or WAP services when in a particular region, for example by an offer in a receipt message).

Resource cost considerations

While many of the customer value considerations discussed above have been supported by empirical research, the resource cost relationships illustrated in figure 4.4 should be considered suggestive and have so far not been tested empirically for mobile services. Thus, a highly exploratory analytical discussion is presented of the cost consequences of ensuring access to resources of different categories and types.

Das and Teng (2000) categorize resource characteristics that are relevant for the competitive advantages of a partner network providing a service to be resource mobility, imitability and substitutability. The arguments for these characteristics are mainly transaction cost based. Thus, lack of mobility, imitability and substitutability all raise transaction costs due to transaction specificity (Williamson, 1985). Transaction cost related issues have been discussed as structural conditions in our framework. Similar to Das and Teng (2000), we are more occupied with value related consequences of resource access here. Consequently, for mobile tourism services, innovation cost considerations are of greater importance. In general, mobile services characterized by specialized intrinsic attributes or complements network attributes as their value drivers will typically be provided in partner networks. In general, resources that are less mobile, imitable or substitutable will raise both the transaction and innovation costs of providing such services. These costs, however, may be minimized by choosing appropriate business model options. For example, lack of mobility, imitability and substitutability may require governance forms to be more closed to minimize transaction cost due to

specificity. On the other hand, open governance forms may be required to minimize innovation costs for services requiring such resources. Thus, optimal governance form results from balancing transaction costs against innovation costs. Consequently, mobile tourism services requiring such resources for their current offerings are best controlled in closed governance forms, whereas mobile tourism services requiring such resources for future development of services are best controlled in more open governance forms.

Resource types may also affect business model option choices. Das and Teng (2000) consider resources to be property based or knowledge based. Property based resources may be less mobile but more imitable and substitutable whereas knowledge resources may be more mobile but less imitable and substitutable. In general services are offered in a partner network where the partners contribute with different types of resources. Access to mobile, but less imitable and substitutable knowledge resources may require open governance forms to reduce both transaction and innovation costs, whereas access to less mobile but more imitable and substitutable property resources may require closed governance forms. In open governance forms, revenue models must be used to control that resource partners maintain a balance of fair revenues so that continued network participation and innovation is ensured.

For both resource characteristics and resource types, value propositions represent the definition of resource requirements. For example, mobile specific value propositions for mobile tourism services may require access to location specific tourist destination information only held by tourist service providers or geodata resources controlled by a few infrastructure providers. These resources, however, differ considerably in resource characteristics and types. Tourist destination information is less mobile, imitable and substitutable and of the knowledge type. It is also service specific due to its location specificity and lack of mobility. Thus, transaction and innovation costs may only be minimized by open governance forms. Geodata on the other hand is more mobile, not imitable and substitutable, but of the property type. Its lack of specificity also implies more universality. Thus, for transaction cost reasons, the resource may be internalized in closed governance forms, but this is likely to increase innovation costs at least for the kind of specialized application represented by mobile tourism services.

Finally, partners' resources may differ in alignment. Similar resources should only be aligned if this contributes to economies of scale or increasing network size for services where customer value is driven by user network attributes. Thus, horizontal governance forms are applied for alignment of such resources. Alignment problems are of most relevance when complementary resources are to be aligned. Resource alignment affects the results or outcome of the chosen business model in terms of reduced costs, created value and sustainable competitive advantage. However, other outcome related variables are also of relevance. One example is alliance or partner network conflict. If resources are complementary but of very different characteristics and types, partner conflict levels may be high. If resources are complementary and of the same characteristic and type, partner conflict levels may be low. If they are substitutable regardless of type, conflict levels may be even higher. High levels of conflict increase transaction cost and may take focus off the innovation required to develop valued services. An example is a Norwegian mobile payment service alliance where conflict levels were high between bank infrastructure resource owners and mobile infrastructure resource owners due to complementarity and resource type differences (Gressgård et al., 2003). When extending this network to provide general electronic ID-services, partners with substitutable resources were included. This resulted in conflict levels rising

to a level ending almost all further service innovation
(<http://odin.dep.no/fad/norsk/aktuelt/pressesenter/presse/071001-070011/dok-bn.html>).

Dynamic considerations and service trajectories

The discussions above seem to assume that business options choices are made at a discrete point in time, typically at the initiation of service development and remain unchanged throughout the lifetime of the service. This is an oversimplification because business model options may change due to changes in structural conditions and they may change over the lifetime of the service or what we term the "trajectory of the service(s)". Changes in structural conditions may be analyzed applying the MAPIT-framework as applied above. Service trajectories, however, requires further presentation and discussion.

Service trajectories were identified through the studies of 18 mobile services reported in Nysveen et al. (2004), Nysveen et al. (2005) and Pedersen et al. (2005). A typical service trajectory starts with the introduction of a service that is adopted for the value of its intrinsic attributes. As the number of users increase, the users may start sharing information of service use or services may be added to the original service that makes end-users benefit from the size or strength of the user network. Thus, user network attributes start driving customer value. Finally, service use becomes an integrated part of the end-users behavior – the service becomes domesticated. At this point the relationship between the use of the service and the use of other related services starts developing into one of service complementarity. Service complementarity may show in the form of an increase in the use of one service leading to an increase in the use of other services. Thus, the services show behavioral complementarity. Such complementarity must not be mixed up with economic complementarity in which the demand for one service increases with the reduction in prices for another service. Over the trajectory of the service value drivers may gradually change. Following the line of reasoning presented above, business models should also change during the trajectory of the service. This is also what may be observed. For example, mobile payment services (or electronic payment services in general) are often introduced as specialized payment services used to pay for particular products or services (e.g. prepayment card charging, car parking, ski lift payments). As the size of the networks of users adopting specialized payment services increases a need to ensure compatibility of the services is obvious to all providers who clearly see that all providers would benefit from the increase in network size when compared to alternative or well established payment solutions. Thus, horizontal contracts may be negotiated altering the business models of the original payment service providers. As network size increases, users require the payment instrument to be accepted at more and more points of sale. Thus, merchants start installing the necessary equipment to accept the mobile payment instrument. As the number of merchants accepting the mobile payment instrument increases, the payment service is valued for its complementarity – the acceptance of the payment instruments by many merchants. It is unlikely, however, that the adoption of the equipment necessary to accept the payment instrument by merchants comes without alterations in the business model of the service. For example, changes in revenue model may occur to stimulate merchants to accept the payment service. Thus, the service trajectory again requires alterations in business models. From our investigations, the trajectory from a service valued for its intrinsic attributes, via increasing importance of user network size to service value, through value driven by complements network attributes seems to be the most typical. It is, however, also possible that alternative trajectories may

be observed requiring other paths in the change of business models over the lifetime of a service.

5.2 Conclusions

In this report we briefly reviewed some of the literature on business models. Particular focus was put on business models for mobile services. Business model dimensions, typologies and instances were presented, and some of the empirical studies conducted on business model relationships were reviewed. In section 3, we discussed categories and categorizations of mobile services and suggested alternative ways to categorize types of mobile tourism services. The main purpose of a categorization system of mobile tourism services in this report was to enable the analysis of business model option variation across mobile tourism service types. We suggested using a categorization system based on the drivers of customer value. In section 4 we presented a conceptual framework for analyzing the business model option choices relevant if applying a value driver based categorization of mobile tourism services. Parts of the conceptual framework have been operationalized as analytical and empirically testable models and have been supported in previous studies. The conceptual framework enabled four types of analyses of business model option choices. First, business model option choices may be analyzed based on the structural conditions of a particular service or service category. Second, business model option choices may be analyzed with the purpose of maximizing customer value. Third, such option choices may be analyzed with the purpose of ensuring access to resources while minimizing transaction and innovation costs. Finally, changes in business model option choices may be analyzed with a focus on the dynamics of customer value over the lifetime or trajectory of a service over time.

The four analysis types were illustrated in section 5.1 with an analytical discussion of business option choices for different categories of mobile tourism services. Of these analyses, the structural, the value driver, and the dynamic analyses were found to represent the most valid frameworks. The resource based framework is still exploratory and requires further refinement before it can be used in empirical tests and to provide managerial implications.

The categorization of mobile tourism services in three categories seems fruitful in business model discussions. Even though it does not always provide a solid basis for managerial business model decisions, it provides a framework for discussion of business model option choices among service providing partners and individual firms intending to develop, provide and market a specific mobile tourism service. It may also be used as a basis for discussing new types of business models, and as such, for business model innovation.

5.3 Implications

While the main purpose of this report is to present theory and provide an example of a theoretically based analytical discussion, the conclusions and the understanding developed during the analytical discussion may also have some managerial and research implications.

Among the most important research implications is that the SCP-model and its corresponding analytical models seem to provide a good basis for developing testable hypotheses on empirical relationships between structural conditions and business model options, between business model options and customer

value, and on the dynamic changes in business model options during the life time of a service or service category. The lack of empirical research identified in mainstream business model research may be due to lack of easily operationalizable theoretical frameworks. Thus, developing testable hypotheses and testing these hypotheses in a three dimensional research design using the value based categorization of section 3 seem to be a fruitful extension of the analytical discussion presented here.

One should be careful in suggesting managerial implications due to lack of empirical material in this report. Still, in all four analytical discussions of section 5.1 normative or managerial implications should be easily identifiable. From the structure – conduct discussion we found great differences in market and actor conditions of the potential partners involved in providing mobile tourism services. Differences in fragmentation and existing cost and revenue model are likely to be challenging when designing the business models of the partner alliances necessary to provide mobile tourism services. For services with complements network attributes as the value driver this is particularly difficult and should be paid much attention by dominant partners and by partners initiating service development. From the value based analyses, we found that managers may use the categorization suggested to design a *set* of business models for categories of services rather than a particular business model for all mobile tourism services. Thus, the offering of mobile tourism services is not easily realized in a common and integrated framework like the one suggested by Finnset et al. (2004). The resource based analyses illustrated how partners control different types of resources that must be aligned in different ways for a successful service to be developed. In particular, specific immobile and knowledge based resources controlled by a fragmented set of tourist service providers represent a particular challenge to the MOVE project that provides the context of this report. Identifying successful business models for services designed in alliances including such partners is particularly challenging, but one should also remember that some types of mobile tourism services may be designed without access to such resources. The kind of service represented by the “KartGuide” and “MoveWAP” of the MOVE project, however, requires such resources implying that collaborative forms of governance must be designed to control innovation costs and ensure intrinsic usability and quality as well as complementary service quality. Finally, the analysis of service trajectories suggested that business model choices are best kept open to change and continuous improvements. Using rigid hierarchical structures to provide innovativeness and give access to required resources is thus unlikely to succeed. Instead, business models providing mobile tourism services in the context of the MOVE project are likely to have to be flexible using contractual agreements, trust based alliances, in- and outsourcing innovations over time, and apply open forms of innovation (Chesbrough, 2003) over the lifetime of the different mobile tourism services.

References

- Afuah, A. and Tucci, C. 2003. *Internet Business Models and Strategies*. MacGraw-Hill, Boston, MA.
- Asvanund, A., Clay, K., Krishnan, R. and Smith, M.D. 2004. An empirical analysis of network externalities in peer-to-peer music-sharing networks. *Information Systems Research*, 15(2), 155-174.
- Bain, J. 1951. Relation to profit rate to concentration: American manufacturing, 1936-1940. *Quarterly Journal of Economics*, 65, 293-324.
- Balasubramanian, Sridhar, Robert A. Peterson and Sirkka L. Jarvenpaa. 2002. "Exploring the Implications of M-Commerce for Markets and Marketing." *Journal of the Academy of Marketing Science*, 30 (4), 348-361.
- Ballon, P. 2004. Scenarios and business models for 4G in Europe. *Info*, 6 (6), 363-382.
- Barney, J. 1991. Firm Resources and Sustained Competitive Advantage. *Journal of Management*, 7(1), 99-120.
- Basu, A., Mazumdar, T. and Raj, S.P. 2003. Indirect Network Effects on Product Attributes. *Marketing Science*, 22, 209-221.
- Berger, S., Lehmann, H. and Lehner, F. 2003. Location-based services in the tourist industry. *Information Technology & Tourism*, 5, 243-256.
- Bohlin, E., Bjorkdahl, J. and Lindmark, S. 2003. Strategies for Making Mobile Communications Work for Europe: Implications from a Comparative Study. Presented at the European Ploci Research Conference (EuroCPR), Barcelona, Spain, March 23-25.
- Bouwman, H. 2003. Designing metrics for business models describing mobile services delivered by networked organizations. Presented at the 16th Bled Electronic Commerce Conference, Bled, Slovenia, June 9-11.
- Brousseau, E. and Quelin, B. 1996. Asset specificity and organizational arrangements : the case of the new telecommunications services markets. *Industrial and Corporate Change*, 5, 1205-1230.
- Brown, B. and Chalmers, M. 2003. Tourism and mobile technology. In Kuutti, K. and Karsten, E. (eds.) *Proceedings of the Eighth European Conference on Computer Supported Cooperative Work*, Helsinki, Finland, Kluwer Academic Press.
- Brynjolfsson, E. and Kemerer, C.F. 1996. Network Externalities in Microcomputer Software: An Econometric Analysis of the Spreadsheet Market. *Management Science*, 4, 1627-1647.
- Campanovo, G. and Pigneur, Y. 2003. Business model analysis applied to mobile business. Presented at the 5th International Conference on Enterprise Information Systems, Angers, France, April 23-26.
- Chesbrough, H. and Rosenbloom, R.S. 2002. The role of the business model in capturing value from innovation: evidence from Xerox Corporation's technology spin-off companies. *Industrial and Corporate Change*, 11(3), 529-555.
- Chesbrough, H. 2003. The era of open innovation. *MIT Sloan Management Review*, spring, 35-41.

- Clayton, A., Jessup, L.M. and Valacich, J.S. 2004. Emerging Business Models for Mobile Brokerage Services. *Communications of the ACM*, 47(6), 71-77.
- Das, T.K. and Teng, B.S. 2000. A Resource-Based Theory of Strategic Alliances. *Journal of Management*, 26(1), 31-61.
- Doyle, S. 2001. Software review: Using short message services as a marketing tool. *Journal of Database Marketing*, 8, 273-277.
- Egeland, E. 2005. *Mobil Multimedia tilpasset bruker, terminal og nettverk - spesifikasjon av en varslingsguide i prosjektet MOVE*. Masteroppgave i informatikk. Institutt for Informatikk, Det matematisk-naturvitenskapelige fakultet, Universitetet i Tromsø, Norway.
- Eriksson, I. 2003, *Mobile Services for Tourism*. Retrieved from europa.eu.int/comm/enterprise/services/tourism/tourismpublications/documents/mobileservices.pdf
- Eriksson, O. 2002. Location Based Destination Information for the Mobile Tourist. In: *Information and Communication Technologies in Tourism*. Springer-Verlag, London.
- Eskedal, T.G., Venturin, R., Giric, I., Andreassen, R., Francis, C., Fisher, C. and Danzeisen, M. 2003. *The operators' vision on systems beyond 3G*. Eurescom Report, Project 1203, Eurescom, Heidelberg, Germany.
- Evans, P.B. and Wurster, T.S. 1997. Strategy and the new economics of information. *Harvard Business Review*, 75(5), 70-82.
- Finnset, W., Akselsen, S., Evjemo, B., Grav, J., Schürmann, A., Lopatina, I. and Egeland, E. 2004. *Konseptbeskrivelse av mobil markeds plass i MOVE*. Oslo, Norway. Telenor R&D. (N 68/2004) ..
- Fjeldstad, Ø.D., Becerra, M. and Narayan, S. 2004. Strategic action in network industries: an empirical analysis of the European mobile phone industry. *Scandinavian Journal of Management*, 20, 173-196.
- Fodness D. and Murray B. 1997. Tourist information search. *Annals of Tourism Research*, 24(3), 503-523.
- Frels, J.K., Shervani, T. and Srivastava, R.K. 2003. The Integrated Networks Model: Explaining Resource Allocations in Network Markets. *Journal of Marketing*, 67, 29-45.
- Gallaugh, J.M. and Wang, Y.M. 2002. Understanding Network Effects in Software Markets: Evidence from Web Server Pricing. *MIS Quarterly*, 26, 303-327.
- Gandal, N., Kende, M. and Rob, R. 2000. The dynamics of technological adoption in hardware/software systems: the case of compact disc players. *RAND Journal of Economics*, 31, 43-61.
- Ghosh, M. and John, G. 1999. Governance Value Analysis and Marketing Strategy. *Journal of Marketing*, 63, 131-145.
- Gressgård, L.J., Stensaker, I. 2004. *Future Mobile Internet Services: Business Model Scenarios*. Bergen, Norway. SNF Report (R08/04).
- Gressgård, L.J., Methlie, L.B. and Stensaker, I. 2003. *Mobile Internet Services: Integration Models and Structural Determinants*, Bergen, Norway. Foundation for Research in Economics and Business Administration, SNF Report (36/03),
- Gryzbowski, L. 2005. Regulation of mobile telephony across the European Union: an empirical analysis. *Journal of Regulatory Economics*, 28(1), 47-67.

- Gupta, S., Jain, D.C., Sawhney, M.B. 1999. Modeling the Evolution of Markets with Indirect Network Externalities: An Application to Digital Television. *Marketing Science*, 18, 396-416.
- Hedman, J. and Kalling, T. 2003. The business model concept: theoretical underpinnings and empirical illustrations. *European Journal of Information Systems*, 12, 49-59.
- Henten, A., Olesen, H., Saugstrup, D and Tan, S.E. 2004. Mobile communications: Europe, Japan and South Korea in a comparative perspective. *Info*, 6(3), 197-207.
- Holbrook, M.B. 1996. Customer value – A framework for analysis and research. *Advances in Consumer Research*, 23, 138-142.
- Höflich, Joachim R. and Patrick Rössler. 2001. "Mobile schriftliche Kommunikation oder: E-Mail für das Handy." *Medien & Kommunikationswissenschaft*, 49, 437-461.
- Jonasson, A. 2001. *Innovative pricing effects: theory and practice in mobile Internet networks*. Presented at the Nelson and Winter Conference, Aalborg, Denmark, June 12-15.
- Joo, J. 2002. A Business Model and its Development Strategies for Electronic Tourism Markets. *Information Systems Management*, Summer 2002, 58-69.
- Kadiyali, V., Sudhir, K. and Rao, V.R. 2001. Structural analysis of competitive behavior: New Empirical Industrial Organization methods in marketing. *International Journal of Research in Marketing*, 18, 161-186.
- Kannan, P. K., Mei Chang, A.-M., and Whinston, A. B. 2001. Wireless Commerce: Marketing Issues and Possibilities. In: *Proceedings of the 34th Hawaii International Conference on System Sciences*, pp. 1-6.
- Katz, M.L. and Shapiro, C. 1992. Product introduction with network externalities. *The Journal of Industrial Economics*, 40, 55-83.
- Lee, Y. and O'Connor, G.C. 2003a. New Product Launch Strategy for Network Effects Products. *Journal of the Academy of Marketing Science*, 31, 241-255.
- Lee, Y. and O'Connor, G.C. 2003b. The impact of communication strategy on launching new products: the moderating role of product innovativeness. *Journal of Product Innovation Management*, 4-21.
- Leung, L. and Wei, R. 1998, "The Gratification of Pager Use: Sociability, Information-Seeking, Entertainment, Utility, and Fashion and Status," *Telematics and Informatics*, November, 253-264.
- Leung, L. and Wei, R. 2000. More Than Just Talk on the Move: Uses and Gratifications of the Cellular Phone. *Journalism & Mass Communication Quarterly*, 77, 308-320.
- Liebowitz, S. and Margolis, S. 1998. Network Externality. In: *The New Palgrave Dictionary of Economics and the Law*, MacMillan, UK.
- Ling, R. 2001. It is in. It doesn't matter if you need it or not, just that you have it. Fashion and the domestication of the mobile telephone among teens in Norway. Oslo, Norway. Telenor R&D, Working Paper. .
- Lopatina, I. 2005. *Context-aware Mobile Gaming*. Masteroppgave i informatikk. Institutt for Informatikk, Det matematisk-naturvitenskapelige fakultet, Universitetet i Tromsø, Norway.

Lot21 2001, "The Future of Wireless Marketing". Lot21 Inc., San Francisco/New York, USA.

Maitland, C.F., van de Kar, E.A., de Montalvo, U.W., and Bouwman, H. 2005. Mobile information and entertainment services: business models and service networks. *International Journal of Management and Decision Making*, 6(1), 47-64.

Mathwick, C., Malhotra, N. and Rigdon, E. 2001. Experiential value: conceptualization, measurement and application in the catalog and Internet shopping environment. *Journal of Retailing*, 77, 39-56.

Methlie, L.B. and Pedersen, P.E. 2002. A taxonomy of intermediary integration strategies in online markets. Presented at the 15th Bled Electronic Commerce Conference, Bled, Slovenia, June 17-19.

Methlie, L.B. and Pedersen, P.E. 2005a. *Network effects and intrinsic attributes of mobile services: Mapping perceived service values on business model choices*. Presented at the Hong Kong Mobility Roundtable, Hong Kong, June, 1-3.

Methlie, L.B. and Pedersen, P.E. 2005b: *Service Innovation – New Service Development with Deep Involvement of Users and Value Networks*. Bergen, Norway. SNF Report (32/05), Samfunns- og næringslivsforskning as.

Montaguti, E., Kuester, S. and Robertson, T.S. 2002. Entry strategy for radical product innovations: A conceptual model and propositional inventory. *International Journal of Research in Marketing*, 19, 21-42.

MOVE 2006. Web reference to <http://www.moveweb.no/>

Muller-Versee, F. 1999. Mobile Commerce. Research Report, Durlacher Research Ltd, London.

Nicholls-Nixon, C.L. and Wood, C. 2003. Technology sourcing and output of established firms in a regime of encompassing technological change. *Strategic Management Journal*, 24, 651-666.

Nordman, J. and Liljander, V. 2003. Mobile Service Quality – A Study of Contributing Factors. Working Paper, Marketing Dep., Hanken Swedish School of Economics and Business Administration, Helsinki, Finland.

Nysveen, H. and Lexhagen, M. 2001. Swedish and Norwegian Tourism Websites: The Importance of Reservation Services and Value-added services. *Scandinavian Journal of Hospitality and Tourism*, 1(1), 38-53.

Nysveen, H. and Methlie, L.B. 2000. *Norske reiselivsbedrifter på internett: Tilbud av distribusjons- og verdiøkende tjenester*. Bergen Norway. Stiftelsen for samfunns- og næringslivsforskning, SNF Report (75/00).

Nysveen, H., Pedersen, P.E., Thorbjørnsen, H. 2005: Intentions to Use Mobile Services: Antecedents and Cross-Service Comparisons. *Journal of the Academy of Marketing Science*, 33, (3), 330-347.

Nysveen, H., Pedersen, P.E., Thorbjørnsen, H. and Berthon, P. 2005. Mobilizing the Brand: The Effect of Mobile Services on Brand Relationships and Main Channel Use. *Journal of Service Research*, 7, (3), 257-276.

O'Brien, P. and Burmeister, J. 2003. Ubiquitous travel service delivery. *Information Technology & Tourism*. 5, 221-233.

- Osterwalder, A., Pigneur, Y., Ondrus, J. and Lathoud, B. 2005a. *Skype's disruptive potential in the telecom market: a systematic comparison of business models*. Working paper, University of Lousanne, Switzerland.
- Osterwalder, A, Pigneur, Y. and Tucci, C.L. 2005b. Clarifying business models: origins, present, and future of the concept. *Comm. AIS*, 16(1).
- Pan, B. and Fesenmaier, D. 2000. A Typology of Tourism-Related Web Sites: its Theoretical Background and Implications. *Information Technology & Tourism*, 3(3/4), 155-176.
- Pedersen, P.E. 2001. An adoption framework for mobile commerce. In Schmid, B., Stanoevska-Slabeva, K. and Tschammer, V. (eds.). *Towards the E-Society*. pp. 643-656. Kluwer Academic Publishers, Ma.
- Pedersen, P. E., Methlie, L., Gressgård, L.J, Nysveen, H. and Thorbjørnsen, H. 2005: *An exploratory study of the relationships between mobile data services business models and customer value*, Bergen, Norway. Samfunns- og næringslivsforskning as, SNF Report (13/05).
- Polanyi, M. 1966. *The Tacit Dimension*. Routledge & Kegan Paul, London.
- Porter, M.E. 1985. *Competitive Advantage: Creating and Sustaining Superior Performance*. The Free Press, NY.
- Sarker, S. and Wells, J.D. 2003. Understanding mobile handheld device use and adoption. *Communications of the ACM*, 46, 35-40.
- Schejter, A.M. 2006. Israeli cellular telecommunications policy. *Telecommunications Policy*, 30, 14-28.
- Schilling, M.A. 2003. Technological Leapfrogging: Lessons from the U.S. Video Game Console Industry. *California Management Review*, 45, 6-32.
- Schubar, A. and Lechner, U. 2004. *The public WLAN market and its business models – an empirical study*. Presented at the 17th Bled eCommerce Conference. June 21-23.
- Shapiro, C. and Varian, H.R. 1999. *Information Rules: A Strategic Guide to the Network Economy*. Harvard Business School Press, Boston, Mass.
- Sengupta, S. 1998. Some approaches to complementary product strategy. *Journal of Product Innovation Management*, 15, 352-367.
- Siau, K., Lim, E.-P., and Shen, A. 2001, "Mobile Commerce: Promises, Challenges, and Research Agenda," *Journal of Database Management*, 14 (3), 4-13.
- Strand Consult 2001. Show me the Money: Revenue Models on the Mobile Internet. Analyst Report, Strand Consult, Copenhagen, Denmark.
- Stuart, T.E. 2000. Interorganizational Alliances and the Performance of Firms: A Study of Growth and Innovation Rates in a High-Technology Industry. *Strategic Management Journal*, 21, 791 – 811.
- Taylor, S. and Todd, P.A. 1995. Understanding Information Technology Usage: A Test of Competing Models. *Information Systems Research*, 6, 144-176.
- Timmers, P. 1998. Business models for E-commerce. *Electronic Markets*, 8, 3-7.
- Watson, R. T., Pitt, L. F., Berthon, P., and Zinkhan, G. M. 2002. U-Commerce: Expanding the Universe of Marketing. *Journal of the Academy of Marketing Science*, 30, 333-347.

- Watson, R., Akselsen, S., Monod, E. and Pitt, L. 2004. The Open Tourism Consortium: Laying the Foundations for the Future of Tourism. *European Management Journal*, 22, (3), 315-326.
- Weill, P. and Vitale M.R. 2001. *Place to Space. Migrating to e-business Models*. Harvard Business School Press, Boston, Ma.
- Werthner, H. and Ricci, F. 2004. E-Commerce and Tourism. *Communications of the ACM*, 47, (12), 101-105.
- Williamson, O.E. 1985 *The Economic Institutions of Capitalism*. The Free Press, New York.
- Yoo, Y., Lyytinen, K. and Yang, H. 2005. The role of standardization in innovation and diffusion of mobile broadband services: the case of South Korea. *Journal of Strategic Information Systems*, 14, 323-353.
- Zahra, S.A. and Nielsen, A.P. 2002. Sources of capabilities, integration and technology commercialization. *Strategic Management Journal*, 23, 377-398.