Killström, Ulla; Virola, Heli; Galli, Luca; Immonen, Olli; Pitkänen, Olli; Kijl, Björn

Business models for new mobile applications and services

Published: 01/01/2006

Document Version
Publisher's PDF, also known as Version of record

Please cite the original version:
Abstract:

The future success of companies may be based on completely different criteria than those, which have made the firm prosper historically. The emerging mobile business is characterized by continuously changing and uncertain environment. The future mobile services and applications are provided by more and also new actors in a value net. A good business model is essential for each of these actors. In MobiLife project we have followed component based approach in modelling the business for mobile applications and services. This deliverable describes the results of a gradual process executed parallel with the technology, architecture and user acceptance evaluation processes. This document describes the key definitions of business model components and presents four generic business models. It sets the results in a wider context including expert interviews results into the document.

Keyword list:

business model, component based approach, marketplace dynamics

Disclaimer:
Executive Summary

The MobiLife Project

The strategic goal of MobiLife is to bring advances in mobile applications and services within the reach of users in their everyday life. This is done by innovating and deploying new applications and services based on the evolving capabilities of 3G systems and beyond. MobiLife brings a holistic understanding of the role of ambient intelligence through a multidisciplinary approach, combining technological and user perspectives with business modelling.

The emerging mobile business is characterized by continuously changing and uncertain environment. The future mobile services and applications are provided by more and also new actors in a value net. The value nets provide the mobile applications in the future. These networks of actors are more dynamic and at the same time more complex than the state-of-the-art way of doing business today. Each actor has to make assumptions about the customers, the production and consumption of services and the analysis of the commercial activities of the company. These assumptions are necessary but not sufficient for the success in the marketplace. Essential for every company is also a good business model.

Purpose of the Document

In MobiLife we study the business models at application and service level. The strength of a business model as a planning tool is that it focuses attention on how all the elements of that business fit to the working whole.

The technical Work Packages and tasks within MobiLife have provided material for business modelling work. Important material has been received and also worked out together from user acceptance perspective as well as technology component development and MobiLife architecture work. That material has been processed further to business modelling purposes.

This Deliverable provides a short description of the general direction in which the marketplace is changing. It also describes the main components needed for defining a company based business model. It presents four general business models, where the approach to the modelling topics differs. Finally the expert interviews are included in the document to provide relevance for the results.

Marketplace Dynamics

Marketplace dynamics chapter provides descriptions of the main opportunities and threats on the marketplace for future business models. The definition of a business model describes the way a company is doing business. It focus the attention on how all the elements of a business fit into a working whole. However, the assumptions of the marketplace dynamics have to be taken into account in business modelling and they have to be modified when changes occur.

The Marketplace Dynamics description provides insight into user’s central role in business model definition. It also discusses the wide scope and nature of the applications and services, which form the competitive environment for the future mobile services. The changing industry structures, converging industries and technologies have a stimulating effect on the evolution towards more and more complicated value nets and new roles for actors. Technological developments drive in the marketplace the emergence of real innovative services and enables those new mobile services which satisfy user needs.

Building a Business Model

The concept of business model may be considered from many different perspectives depending on the purpose of the research. However, it is essential for every company. It can be described as a construct of some key components of a given business. In MobiLife we have followed this component based approach to the modelling task.

The foundation of business model definitions is in a set of basic assumptions about the components describing the theoretical framework for a business model. The business model components – user/customer, product/service, earnings logic, resources, suppliers, organisation/architecture, processes – profoundly influence the success of a company in the
marketplace. They also help the performance of the business. As a result of the work in MobiLife this document presents the most important aspects of each of these components and the key learnings of the modelling work.

**Descriptions of Four Generic Business Models**

A business model is a planning tool that is essential for every company and also in case the services are provided in cross-company collaboration in complex value nets. The results of the work in MobiLife contributed to the definition of four generic business models. These business models are differentiated according to the modelling point of view.

In the first of these generic business models technological changes have clear impact on other modelling topics. The second generic business model meets the challenges of users’ unwillingness to pay and thus the earnings logic component is especially important. The new mobile business possibilities can be used to the extension of existing business. In the third generic business model the adaptation of new services to existing user segments, service promises and processes are key questions. The fourth generic business modelling approach describes the typical situation where a customer can buy some content by ordering it from service provider.

**Expert Interviews**

The work in the MobiLife project has contributed to the business model component descriptions. These results are reflected in the definition of the four generic business models. However, in order to check the relevance of the business modelling results the expert interviews were included in the analysis work. The results of those interviews gave a deeper understanding of the roles needed in the future mobile services, the money flows and revenue sources and the different characteristics of mobile services (personalization, group awareness, context awareness, trust and privacy and multimodality). It also suggests some critical points in modelling the business.
Authors

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Partner Full Name</th>
<th>Person</th>
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<tbody>
<tr>
<td>ELISA</td>
<td>Elisa, Finland</td>
<td>Ulla Killström</td>
</tr>
<tr>
<td>ELISA</td>
<td>Elisa, Finland</td>
<td>Heli Virola</td>
</tr>
<tr>
<td>NEOS</td>
<td>Neos, Italy</td>
<td>Luca Galli</td>
</tr>
<tr>
<td>NEOS</td>
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<td>Dario Melpignano</td>
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<td>NOKIA</td>
<td>Nokia, Finland</td>
<td>Olli Immonen</td>
</tr>
<tr>
<td>TELIN</td>
<td>Telematica Instituut, Netherlands</td>
<td>Timber Haaker</td>
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<tr>
<td>TELIN</td>
<td>Telematica Instituut, Netherlands</td>
<td>Björn Kijl</td>
</tr>
<tr>
<td>HUT</td>
<td>Helsinki University of Technology, Finland</td>
<td>Olli Pitkänen</td>
</tr>
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For further information related to this Deliverable or to the MobiLife project, please visit the project Web site

www.ist-mobilife.org

or contact the Project Coordinator:

Dr Mika Klemettinen
Nokia Research Center
P.O. Box 407
FIN-00045 Nokia Group
FINLAND

Tel. +358 7180 36661
Email mika.klemettinen@nokia.com
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<th>Definition</th>
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<tr>
<td>EU</td>
<td>European Union</td>
</tr>
<tr>
<td>FP6</td>
<td>Framework Programme 6</td>
</tr>
<tr>
<td>WWI</td>
<td>Wireless World Initiative</td>
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1 Introduction

1.1 Why Modelling the Business?

Business models have become a trendy concept. The background and also the reasons behind the sudden interest are in the Internet business. A business model, however, remains essential to every organisation. Defining the business model brings clarity to and helps the performance of the business.

Several authors, management researchers, economists, and organisational theorists, have invoked the concept of a business model in their search for answers to a broadening range of questions. However, there is no generally accepted definition of what a business model is [Magretta02][Slyvotsky96][Christensen00]. The several perspectives to modelling the business give more insight into the discussion. The definitions made from value creation perspectives are usually anchored to the firm’s main principle to create value to customers, owners and other stakeholders. The industry perspective proposes that the characteristics of the industry have a major impact on the business model framework. This perspective usually includes the definitions of business market opportunity, the products and services offered, competitive dynamics, strategy to obtain a dominant position, and strategic option for evolving business. The business model framework has also been approach from the perspective of needed change. Resources, processes, and values have to be considered in an existing organisation compared to the challenge of the needed change. Also the perspectives of company strategy definition, managerial or just the modelling point of view have been common in the strategy literature and studies.

A good business model is essential for every company. A business model’s great strength as a planning tool is that it focuses attention on how all the elements of a business fit into a working whole. A business model can thus be defined as a construct of some key components of a given business. In MobiLife project we have followed this component based definition and approach in our work.

The main motivation for choosing a component based approach comes from the strategy literature. All components included in a business model are also used in the strategy definition of a company. The components included in the framework are: user/customer, products and services, earnings logic, resources, suppliers, organization and processes (Figure 1). However, the business model or components presented in the theory can not be directly adopted to a firm as such. It is important to notice that each business model is centred on a particular firm. All these business model components are necessary for the business definitions also in case they are provided by a network of companies.

Figure 1: A framework for a business model.
1.2 Background and Methods Used in Modelling the Business in MobiLife

The business modelling research in MobiLife is based on literature and public data surveys, complemented with real-life experience from marketplace dynamics and interaction with different stakeholders during the course of the project. The work has followed a constructive approach in the analysis of a business model framework, i.e., the approach has been guided by those topics needed for practical generic business model definitions. The research process has been not only interactive but iterative as well, considering the modelling topics at a high level, analysing the details for modelling, and comparing the findings with general topics. The hermeneutic approach of the research has provided different interpretations to be considered.

The initial marketplace dynamics description – reported in the Deliverable D7 (D1.2) “Initial Marketplace Dynamics (incl. Business Models) analysis” – codified the state-of-the-art academic, market research and media material from a series of different perspectives, covering the key facts and trends from diverse angles and points of views. We described six perspectives: user perspective, society perspective, applications and services perspective, technology perspective, industry perspective and regulative perspective; the resulting picture is truly multidisciplinary and covering.

In order to focus on the most important topics in this research, the main drivers and hurdles that shape the marketplace have been identified under each perspective. Their interaction will have a major impact on the future success or failure of new mobile applications and services.

The foundation of a business model has been seen as a set of basic assumptions about the components describing the theoretical framework for a business model. However, the aim in MobiLife is not to go through a complete set of approaches to determine the components of a business model, but to understand the framework to be used in investigating the business models for future mobile applications and services.

Mapping the marketplace dynamics perspectives and business model components together we defined the opportunities and threats for future mobile business models. The foundation of a business model is a set of assumptions, which relate the business model considerations to marketplace dynamics. These assumptions influence the models in terms of the overall strength and viability. A business model inconsistent with its basic assumptions, or one building on invalid assumptions, will not be viable or feasible, and therefore fails.

MobiLife project investigates applications and services based on user scenarios. The work has resulted in 11 different mock-ups of varying levels of fidelity, which have been tested in a series of user studies (Appendix 2). These mock-ups provided us examples to be studied further in with-in case analysis and cross-case analysis in order to define the business model components. The cases have enabled multiple levels of analysis within the project. By using these case descriptions we gathered qualitative evidence of the characteristics of different business model components in the future mobile based services. That provided us descriptions of each case. We used also cross-case analysis and compared the findings in order to specify those topics necessary for a business model and ended up to proposals. The definitions of components were worked out in an interoperable and iterative process with the technical Work Packages of MobiLife project.

MobiLife project specifies a service architecture enabling advanced mobile services by supporting multimodality, context awareness, personalisation and group awareness while maintaining privacy of the users. This work has provided deeper understanding of the orchestration/architecture component in a business model for mobile services. Related to the architectural topics we describe the roles, especially the new roles, necessary but not sufficient components of the future business models. Each market actor has one or more roles to perform and may participate in more than one value net. A role represents a set of functions that enables to make a mobile service and to deliver it to the environment. The roles define the business architecture in providing the services to the user. However, all this depends on how well the other architectural levels with several questions are settled.

And finally, expert interviews were included in the study. The objective of these interviews was to check the relevance of business modelling results generated from the MobiLife mock-ups as cases.
The research results of marketplace dynamics, business model components and the opportunities and threats for the future business models based on mobile applications and services have been described already in the Deliverable D1.2 [Galli05]. Those topics having the greatest impact on modelling the business are, however, included in the discussion of the research results in the following chapters.

1.3 Approach for the Work and Structure of this Deliverable

MobiLife project follows an interactive approach that acknowledges that the user requirements must be learned partially from experiments with novel service and application prototypes. The user centric work has meant the collections of user requirements, testing the prototypes and influencing the applications and service development process.

The technology work has been focused on developing novel view on multi-modality, personalisation, privacy and trust as well as on context technologies and mechanisms. The work has been consolidated into collections of functional/technical requirements, specifications and architecture frameworks.

Parallel to these two processes - user acceptance evaluation process and technology development process - the business modelling process has got an important role. The definitions needed to be done to meet the modelling objectives have been performed interactively with technical work packages and user centric research team. This has meant workshops in order to define business modelling topics for future mobile services by using applications and services defined in MobiLife.
project as case material. It has also meant analysing and writing analyses together with technical Work Packages regarding architectural topics. The following chapters will present the results of this work.

**Chapter 2** provides a short description of the general direction in which the marketplace is changing. **Chapter 3** then describes the main components needed for defining a company based business model. **Chapter 4** then presents four general business models, where the approach to the modelling topics differs. Furthermore, in **Chapter 5**, the expert interviews are included in the document to provide relevance for the results. **Chapters 6, 7 and 12** include the conclusions, next steps and references, respectively, while the **Appendices in Chapters 8-11** give descriptions of business models for the MobiLife mock-ups.
2 Marketplace Dynamics

The future success of companies may be based on completely different criteria than those, which have made the firm prosper historically. This is due to the possibility to digitize almost everything including text, sound, speech, film, graphics, animation, and music. The European market is very fragmented from size and type of service providers’ point of view. The companies are competing at all angles of the traditional telecom product spectrum. Despite the year after year growing number of competitors in mobile business, consolidations are also taking place. There can be seen trends that may cause significant disruption and drive opportunities for business in ICT industry in the form of market growth. However, the real impact of these trends can only be seen when applied to service development and to future business models.

This chapter paints a picture of the most important marketplace topics that have to be notified while modelling the mobile business. It crystallizes the data and analyzes included in the Deliverable D1.2 “Marketplace Dynamics”. It points out those perspectives and trends, which should be included in early assumptions of mobile marketplace dynamics for a company’s business models. The company has to make decisions of the position, which it is targeting in the marketplace and of the value net it is contributing to.

2.1 User/Customer in a Central Role

Marketplace dynamics analysis from the users’ point of view revealed a set of opportunities and threats for future business models that benefit the mobile solutions. It is worth to note that some issues and trends can be seen both as opportunities and threats, depending on what specific idea or application and service is on stake. It also depends on the type of consumer. Some consumers are interested in high-tech services in general, while others have very cautious attitudes towards every new technology.

The needs, attitudes and intentions of the mobile services users vary, but some important and strong trends can be seen. Usefulness and convenience have demonstrated to be taken in the highest regards by the users, both in the mobile business and in the Internet world [Conaty05]. Usefulness is often connected to organisational context, but it has importance also in leisure time especially in services designed to help in everyday life. On the other hand, emotional and irrational needs are important drivers as well. The balance of these factors should be searched at the specific application and service level. Behaving spontaneously (anywhere, anytime) and taking advantage of the idle time are two trends offering interesting possibilities for future mobile services.

This complex mix of rational and irrational needs and attitudes is neither homogenous nor fixed. Customers’ expectations are not stable but changing [Slywotzky96]. Segmentation and mass customisation are strongly needed to be able to satisfy different needs of different people. Also a deeper understanding of emerging informal social structures is needed. Mobile applications and services should support also informal communities and new types of user groups defined by interests and cultural preferences.

A number of threats have also to be considered relating to the user component while modelling the business for mobile applications and services. Innovations in the mobile business have quite often been dampened by the predominance of technology-led approaches. It is difficult to understand customers’ needs, even for the customers themselves. Series of design cycles have to be completed to find out customer demand and required product performance before a product/service can be launched. In addition services should not be launched before technology is reliable enough and usability has reached the appropriate level.

One big obstacle for adoption of new services is that people are not aware of them. In addition people are slow to change their routines and tend to stuck in old behavior. Marketing, advertising and media exposure are very important in this respect. Focus should be in marketing the practical uses of services instead of the technological capabilities behind them. Also pricing decisions should be done very carefully. If the price is regarded as too high compared to
perceived value or if it is too complicated to evaluate, it can restrict the use especially in lower income customer segments.

<table>
<thead>
<tr>
<th>Main phenomena / trend</th>
<th>Impact on business modelling</th>
</tr>
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<tbody>
<tr>
<td>Usefulness and convenience</td>
<td>The growth of services designed to help in everyday life. Services convey clear sense of convenience are regarded as positive.</td>
</tr>
<tr>
<td>Emotional and irrational needs</td>
<td>The need to communicate is strong. Positive impact on group awareness.</td>
</tr>
<tr>
<td>Behaving spontaneously</td>
<td>Preference for services “anywhere, anytime”. Easy to discover services related to context.</td>
</tr>
<tr>
<td>User does not know options/services</td>
<td>Low awareness among users of all the extra services in mobile device. Old routines are very strong.</td>
</tr>
<tr>
<td>Technology perceived as not reliable Enough</td>
<td>Technologies launched before the usability is ready, decreases the users interest in new mobile services.</td>
</tr>
<tr>
<td>Users not interested in high-tech Services</td>
<td>In marketing to mass market practical ways of using the services are important.</td>
</tr>
<tr>
<td>Control of one’s own life</td>
<td>Avoiding control of technology provides possibilities for new services using personalization.</td>
</tr>
<tr>
<td>Price</td>
<td>Willingness to pay describes the perceived value of the mobile service.</td>
</tr>
</tbody>
</table>

Table 1: User perspective - impact on business modeling.

2.2 Wide Scope and Nature of Applications and Services

Mobile and wireless applications and services are very diverse in scope and nature, especially if one wants to look at future developments. Besides, some emerging trends in the field are actually strongly linked to the evolution of the ICT environment at large, adding an even broader term of reference. This is why we will look especially at the solutions matured in the Internet realm (e.g., social networks, digital music, eGovernment initiatives etc.) or in the “smart home” and “mobile enterprise” environments [D’Ottavi 2004].

Marketplace phenomena show that personal communication needs and desires are still one of the major drivers in the usage of mobile personal devices: it is no wonder that this is not to fade as they match fundamental human needs [Harper03]. The opportunity is then to devise innovative ways to extend voice and messaging services well beyond what is currently available, starting with group communication, multi-modality and multiple device support.

Messaging (including multimedia messaging) is also a clear example of user-created or “conversational” content. More generally, Personal and semi-professional publishing (think, e.g., at the explosion of blogs and wikis) is a huge online domain whose boundaries are increasingly blurring with the professional realm. Hence the opportunity is to empower user content production, elaboration and delivery, including the cycle of individual and group interactions that is related to that context. On the other hand, the new centrality of users in creating and sharing content brings new challenges for businesses and regulators as well. One of these business challenges is to explore to what extent advertising and marketing-based models already widespread on the fixed Internet can possibly be applied in the mobile and wireless setting.
Mobile technologies have also long been seen by industry analysts as the enabling factor of a faster, more efficient and productive way of performing work and doing business. Such is the case, for instance, of the envisaged mobile enterprise as a “real-time enterprise”, intended as an organization that pursues a set of strategic objectives related to the capabilities offered by mobile and wireless solutions. These objectives have been described as linking people and information, capture information early in digital form and never “freeze” it, promote **dynamic collaboration by exploiting always-on employee connectivity** and illuminating “information shadows” [Jones02].

The impact of mobile can thus be extremely high and completely transform the work and business practice. Taken with this perspective, mobile work would include the mobility or flexibility of the workplace and the organization, increasingly adapting to the changing needs and opportunities of the mobile worker and team irrespective of time, place and other context-related constraints, so that at the end the network may become the working place [Schaffers04].

Several constraints limit the user experience and hence the potential of fully enjoying innovative applications and services. **Lack of interoperability** between different platforms closes users in separated “islands of services”, efficient only in their restricted domain; **too complex, unfriendly and expensive devices** greatly impede a large social acceptance of advanced applications and services.

Moreover, there are still a lot of uncertainties about the **effective success potential of applications and services other than voice and messaging**. Without clear evidence about demand dynamics and market readiness, MobiLife-type of innovations are at risk of missing a sound business case.

<table>
<thead>
<tr>
<th>Main phenomena / trend</th>
<th>Impact on business modelling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal communication needs and desires</td>
<td>Innovative ways to extend voice and messaging services, e.g. group communication, multi-modality, multiple device support.</td>
</tr>
<tr>
<td>Self produced content</td>
<td>Applications and services that enable the users to produce and distribute their own content is important.</td>
</tr>
<tr>
<td>Sharing practices, dynamic collaboration</td>
<td>Use of media digitations and portability, capturing information in digital form.</td>
</tr>
<tr>
<td>Transforming work and business practices</td>
<td>Adapting to the needs of mobile workers.</td>
</tr>
<tr>
<td>Lack of interoperability</td>
<td>Developing architectural topics.</td>
</tr>
<tr>
<td>Too complex and unfriendly devices</td>
<td>Improving complicated interfaces and lengthy configuration procedures.</td>
</tr>
<tr>
<td>Uncertainties about other services than voice and messaging</td>
<td>No evidence about demand and Business results.</td>
</tr>
</tbody>
</table>

Table 2: Applications and services perspective - impact on business modelling.

### 2.3 Changing Industry Structures

The picture of the current and future dynamics within the mobile services industries is not very clear because of even **contradictory trends** on the marketplace. The convergence in the marketplace has impact on several of these trends. The mobile services industry borders are blurring. The roles of actors are changing and the convergence of industries (e.g., from Information Technology, Consumer Electronics, Content Industry) bring opportunities not only for network operators but also for many new actors. This evolution has a stimulating effect on the development and exploitation of new, innovative mobile services.
The smart combination of technological developments drives in the marketplace the emergence of real innovative mobile services. Smartly imagining and combining emerging technological capabilities to create innovative and attractive mobile services and related business models could be a key success factor for future mobile services. At the same time we see how the mobile services industry is slowly transforming from rather static value chains to more dynamic value nets with new and more players from industries like IT, telecom, content, and consumer electronics. They are more and more operating in each others, formerly separated markets and some are also starting to cooperate with each other. The borders between these industries are blurring. Therefore, the opportunities for interesting MobiLife type of mobile services can be seen as a combination of a user centric, multi industry view with multi actor business models and multi actor value networks.

Most industry players lack the resources and capabilities to exploit opportunities for mobile service provisioning on their own: to be able to offer these services co-operation between lots of different stakeholders in a more open market will be necessary. Mobile services business environments are getting increasingly complex and at the same time dynamic. This leads to an increasing need for managing interorganizational co-operation in order to develop and provide new mobile services.

When looking at current mobile services, often a nodal actor can be recognized in the value net as the one that has the most power and to which other actors should adapt themselves more or less. Often such an actor has important and unique resources like an exclusive billing relation with the end customer. The future mobile services are expected to work in a more open environment where it could be more difficult to identify a nodal actor, or where there may be multiple nodal actors, each for facilitation of a certain aspect of a service.

One noticeable trend in the marketplace is the transition from supply driven to user centric, demand driven value creation: end users and user communities are getting more and more central roles in value nets and in the value creation processes. In order to deliver context aware services, also an even more active and central role of the end user is needed.

In the marketplace there is an increasing industry interest for mobile data services as possible new growth markets. This may speed up the market acceptance and service lifecycle of MobiLife type of services. More and more retail channels are getting “digitised”, e.g., distribution of music (e.g. iPod) providing new opportunities for service and content providers to deliver, share, manage and consume content. In online music distribution the content rights owners take a large share of revenue (up to 60%) making it difficult for service providers to create a viable business. New business in content services based on subscription models offer interesting possibilities and margins for service providers and their enablers. At this moment a lot of retail channels are getting digitized (e.g., music, books, travelling, business). Also the supply channels are being digitized so that the supply net can operate through the Internet. This leads to new ways of value creation with new value nets and business models.

The changing business landscape for the provisioning of mobile services forces actors to carefully position themselves in the mobile services value network. Familiar roles and revenue models have to be reconsidered as new opportunities arise, and, at the same time, competition increases. New business roles and revenue models become feasible, especially those already underlying current services on the Internet, such as the advertising or brokerage models.

Service providers in the 3G arenas are well aware of the fact that there is not a single ‘killer application’ enticing people to quickly adopt new mobile services. Rather, a carefully composed bundle of services is required that will be different for each customer (segment) and that varies with the customer’s context. Complementarity between bundled services may stimulate demand whereas cost sharing provides a solution for cost reduction arising from economies of scale and scope.

The marketplace dynamics provides a lot of opportunities and also threats for mobile services. One threat is the fact that operators have invested a lot of money in (2.5G+) data networks and services, but the amount of subscribers is, although growing, still relatively low. Therefore it is very important to pay extra attention to value propositions as well as possible revenue models of future mobile services.
Main phenomena / trend | Impact on business modelling
--- | ---
Smart combination of technological developments | Real innovative services and business models possible.
Convergence of industries | Borders between industries blurring, providing user centric, multi industry view to business models.
From value chains to value nets | Increasing need for managing inter-organizational co-operation.
Digitisation | New business models for providing content.
Complex inter-organisational Cooperation | The provision of services call for clear role definitions and governance mechanisms in order to create and capture value.
Changing earnings logic | Attention to value propositions as well as possible revenue models.

Table 3: Industry perspective - impact on business modelling.

2.4 Technology as an Innovation Enabler

Technology enables innovation and creation of different new applications, thus it provides an underlying support for satisfying user needs. In this section, technologies are described from the point of view of those opportunities and threats they place for mobile industry and for mobile application business model point of view.

As a result of convergence (fixed-wireless convergence, mobile media convergence, home technology convergence) technologies that were applied in one area of applications, can now be applied to another area. This creates new competition and can create competing business models. Players that are strong in one area can enter new areas. New entrants are more likely than before. Business models that apply in the fixed networks can be applicable for wireless networks, too, and vice versa. Mobile TV may lead to new business models involving collaboration between broadcasters and mobile operators. Also, the mobile TV offers new ways to target programming and advertising thus creating possible new revenue sources and possible new advertising driven business models.

Unlicensed frequencies, like using WiFi for providing broadband internet access in hotspots, make wireless access provisioning possible for new entrants like corporations or groups of users. On the other hand, telco operators can extend their current cellular service to broadband access.

P2P environments utilize resources contributed by the participating nodes. Control and coordination are at the edge of the network. P2P systems enable new types of applications and business models. Disruptive substitutes may appear for existing services and distribution models.

Proximity technologies (RFID, proximity transactions, sensors) can enable use of mobile devices for industries that are currently not utilizing mobile terminals. This may be an opportunity for players controlling the mobile area to provide value for the players like retail merchants.

Easy identification becomes important when consumers are accessing multitude of systems and services and interacting with other users in group-aware applications. Identity management can be a valuable asset and control point. Players that can manage consumer identity and groups effectively and are trusted to maintain user privacy have an advantage can sell this service to other players.

Efficient, automated personalization can make services more convenient to use and help in accessing the vast data content. Personalization can be competitive advantage and added value to services. It can enable aggregation type of business models.

Utilization of location information and more complex types of context can enable new types of applications and unique services for mobile environments.
Standardization (adoption of formats, protocols, interfaces etc.) can happen through standards organizations or by industry (de-facto standard). By definition of open interfaces standardization can make entrance to market easier. However, strong players can effect (de-facto) standardization.

Difficulties in service discovery, provisioning, finding and initiation of services, prevent services from becoming widely used. A business model for mobile applications should enable methods for promotion and provisioning of services.

As part of convergence, the mobile space is exposed to the negative aspects of the internet: spam and viruses. Not taking trust and privacy aspects properly into account can lead to reluctance in adopting mobile applications. Successful management of the openness and protection from the negative aspects may become essential for a business model.

### Main phenomena / trend

<table>
<thead>
<tr>
<th>Main phenomena / trend</th>
<th>Impact on business modelling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Convergence of technologies</td>
<td>Technologies that were applied in one area of applications can now be applied to another area. Players that are strong in one area can enter new areas.</td>
</tr>
<tr>
<td>Unlicensed frequencies like WiFi hotspots</td>
<td>Wireless access provisioning has become possible for new entrants like corporations.</td>
</tr>
<tr>
<td>P2P technologies</td>
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</tr>
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<tr>
<td>Automated personalization</td>
<td>Personalization can be competitive advantage and added value to services. It can enable aggregation type of business models.</td>
</tr>
<tr>
<td>Context-awareness</td>
<td>Utilization of location information and more complex types of context can enable new types of applications and unique services for mobile environments.</td>
</tr>
<tr>
<td>Standardization (official and de-facto)</td>
<td>Standardization is part of orchestration. Open interfaces can make entrance to market easier. Strong players can effect (de-facto) standardization.</td>
</tr>
<tr>
<td>Service discovery issues</td>
<td>A business model for mobile applications should enable methods for promotion and provisioning of services. Service discovery enables new types of businesses.</td>
</tr>
<tr>
<td>Harmful phenomena: spam, viruses, trust and privacy problems</td>
<td>Successful management of openness and protection from the negative aspects may become essential for a business model.</td>
</tr>
</tbody>
</table>

Table 4: Technology perspective – impact on business modelling.
3 Building a Business Model

3.1 Business Model Components

A business model describes how a company creates value to customers, owners, and other stakeholders. A business model is a planning tool that is essential for every company and also in case the services are provided in cross-company collaboration in complex value nets. In the MobiLife project, we have followed the component based business modelling approach. This approach defines user’s/customer’s role in the business. It also discusses how to define a service promise and what is a service promise’s impact on the other modelling topics. In future mobile business models the key question is related to the earnings logic and how to make money with the business. The assumptions made regarding these business modelling components profoundly influence the models strength and viability on the marketplace.

Defining the business model brings clarity to and helps the performance of the business. The components that need still to be included in the business model are resources, suppliers or a network of suppliers, organization from architectural point of view and processes to provision the services. Especially the development and changes in technological resources and business as well as in service architectures can be seen as key enablers in the future mobile business.

The business modelling components are described in the following sections from a general modelling point of view. Also, those key topics that have been regarded as important in analysing the possible future business models in MobiLife project will be pointed out.

3.1.1 User/Customer

A key question in building a business model is what types of customer benefit a firm should seek to provide. Without customers there can not be any successful business. This increases the importance of the user/customer component. It also gives the guidelines to the definition of the other business modelling components. In MobiLife the application and services development has been followed by a user centric design, and users’ acceptance for the concepts has been evaluated during the development work. This has also contributed to the definition of user/customer component in the mobile business models.

Results from the marketplace dynamics analyses, reports from many different researchers and also the results from MobiLife user evaluations show that usefulness and convenience have demonstrated to be taken in the highest regards by the users, both in the mobile business and in the Internet world [Conaty05]. On the other hand, emotional and irrational needs are important drivers as well. The balance of these factors should be searched in defining the user/customer component for a business model. Trust and privacy issues are also important from user’s point of view and have to be properly taken care in services.

In order to define a viable business model it is important that a company learns about the precise dimensions of customer demand and required product performance. Customer needs and expectations are always service or application specific and they vary depending on the customer segment. The company must be much more than customer-led [Hamel94]. A company’s relationship with a customer is an access channel to the customer’s ongoing value-creating activities. Any customer, whether another business or an individual, uses a wide range of inputs in order to create value. A company’s offerings have value to the degree that customers can use them as inputs to leverage their own value creation. In this respect companies don’t profit from customers. They profit from customers’ value-creating activities [Normann93]. Customer perspective is important for the company also in differentiating itself from other service providers with a unique and valuable proposal.

Companies have to collect information about customers through various means, including market and customer research and information gathered from the field in order to understand people’s needs. The process can be costly and time-consuming because people’s needs and expectations are often complex and subtle. However, in highly competitive business
environment it is the only possibility to create profitable services. Ignoring customer needs and experiences is even far more expensive.

Innovations in the mobile business have quite often been dampened by the predominance of technology-led approaches. MobiLife project is trying to avoid this mistake by clearly identifying the expected user's benefit for each designed application and service concept, testing it in user research cycles starting from scenario evaluation with customers and ending to user feedback collection from integrated services and applications. In addition to this also social acceptance and business viability are analysed.

![MobiLife user centric process](image)

Figure 3: MobiLife user centric process.

A company cannot meet the needs of all customers on the market. In business model definitions companies have to choose the most promising segments in relation to their business. **Segmentation** is one of the most fundamental concepts in marketing. It is about understanding the needs of customers and, therefore, how they decide between one offer and another. This insight is used to form groups of customers who share the same or very similar value criteria. A company is then able to determine which groups of customers it is best suited to serve and which product and service offers will both meet the needs of its selected segments and outperform the competition. Requirements for the successful segmentation are:

- homogeneity within the segment
- heterogeneity between segments
- stability of segments
- segments are measurable and identifiable
- segments are accessible and actionable
- segment is large enough to be profitable

The user segments for MobiLife services and applications vary. For the most of applications and services there seems to be quite clear user segment. On the other hand some applications and services are still quite technology oriented and thus user segment is harder to define because in some cases the actual content of the service is still not clear. However, the content is usually what defines market potential, technology behind it is just enabler.

In addition to clarity of used segment we have also analysed initially the potential size of the market for MobiLife services and applications. For some applications and services the market potential is very wide, services could be offered to mass markets even worldwide. In some cases, however, the market seems to be too small to make a stand alone sustainable business. There the
market should be expanded somehow, e.g., to cover more generic needs of users or to include the service to existing business.

Demographics (e.g. age, education, incomes) have traditionally been used when segmenting customers. However, nowadays especially in ICT it has been noticed that they do not explain anymore very well the use of services or products. Instead psychographic and behavioural variables like lifestyle, values and past usage experiences seem to affect strongly the adoption and usage of products and services.

**Customer's expectations are not stable but changing.** Consumer attitudes change most at the beginning of the use of a service or product, in the phase when expectations change into experiences. Users are concerned for quality and constantly demand for improved price-performance relationship. As customers’ priorities change and new designs present customers with new options, they make new choices. These changing priorities, and the way in which they interact with new competitors’ offerings, are what trigger, enable, or facilitate the value migration process [Slywotzky96].

All the MobiLife mock-ups of services and applications have been researched with potential users (see MobiLife D1.3). The results show that the new mobile services compete not only with other mobile services but also with traditional ways doing things (e.g., electronic family calendars vs. paper based calendars). One key question in the adoption of new mobile services is how well the service meets the current behaviour of users. If only minor changes are needed the adoption is to happen faster than if a user has to adopt very big changes to his/her routines.

### Learning’s from MobiLife in defining the user/customer component:

- **Definition of user benefits call for research of precise dimensions of customer demand and required product performance.** Testing the expected user’s benefit takes time, requires several means and research circles but leads to learning and application and service specific definitions.

- **People’s needs and expectations are complex.** The customer’s priorities are not stable but changing. Segmentation is necessary for marketing purposes but not sufficient for user/customer component definition in a business model. Lifestyle, values and past usage experiences affect strongly the adoption of the service.

- **New mobile services present customers with new options.** They compete not only with other mobile services but also with traditional ways doing things.

### 3.1.2 Products/Services and Offering

The product and service component in a business model is the one in which customer value creation has to be reflected. The main objective for a company is to **develop products that ascertain optimal customer value creation.** The definition of a value promise to customers is a process, which includes different phases and activities. It is related to user research and technology development. It reflects and responds to the value creation from the customer point of view.

The creation of value for buyers can be either in the form of differentiated product or service – i.e., an offer that clearly stands out from the competitors – or one produced and hence sold with lower costs [Spanos01], so that reduced production costs are given back to the customers. Several marketplace phenomena as reported in [MobiLife05] could be taken as demonstrations of this principle (e.g., with mobile push email or camera phones).

With regard to the value generation for buyers, it is important how this happens through a process and what principles guide this process. Here is the value proposition concept that comes at hand: **value propositions include a description of all relevant value elements and drivers identified as important in a business model** and hence for any future mobile business model. This business model idea and schema should then work as a guideline for the entire product development process, meaning that the product development can be seen as one value creating process [Eisenhardt00].
The key process of product management includes several steps, such as offering development, testing of products, identifying internal relationships and linkages with external co-operations. The process length and complexity make it a hard challenge, characterized by several risks. Still on the marketplace there are certain successful cases that show a very high degree of integration and consistency across the entire product and service development lifecycle.

Looking closely at the mobile and wireless environment, it is important to highlight that products and services are more and more a blend of the terminal, the service provided by the operator, and the applications that runs or can be downloaded or bought separately and in a different moment by the end user or customer (e.g., from a physical store or from a Web portal). The marketplace analysis reported in [MobiLife05] includes several related cases, e.g., with digital music download services and mobile gaming.

Applications are an essential element of the services offered to customers in advanced mobile and wireless environments. As the telecommunications market shifts from voice-centred offers to differentiated usage situations, it is important to clarify what it is distinctive of services in general – actually product management and service management are sometimes used as synonymous and product and service as well. In the marketing theory four special service characteristics are usually highlighted: intangibility, inseparability, variability and perishability [Kotler01]. All of these key characteristics have a big impact in a service business, in which customers and the frontline services interact to create the service.

Another specificity of the service context is that their usage is in itself a learning process – to some extent one could claim that only their actual usage allows a company to build a sound intelligence about them. This circumstance could turn into a special advantage in the cases where a company can rely on the Internet to launch some practical trial or early version of a certain service; usage feedback and market data can then offer a concrete basis to improve subsequent versions or event to adjust the business model and the service value proposition. This process is actually almost the standard one for several Internet offers and more generally in the software and application industry.

As discussed before, business models express the dynamic of different components. So, the causalities between the different components of factors of a business model have to be taken into account. Causalities help in devising what new product or service concepts can be developed by the company: the interplay of well-known factor data and characteristics with others that are in a more open stage shapes the product and service development process. An organization that supposedly has a clear view of certain user needs and possess good, innovative technology may follow up analyzing other factors or components profile (e.g., what should be the earning logic, what suppliers would be suitable etc.).

A more specific causal logic is related to the role of technology, which is a key element alongside other resources and capabilities but of obvious crucial importance in technology-enabled businesses.

The impact of technology adoption life cycles [Moore99] has in fact to be carefully considered. Technology-based products pass through multiple phases of adaptation during which the market, i.e., the customers behave in different ways that are specific to each phase. At the beginning of the cycle the main objective is to build market share, almost independently from the product or service quality, and thus other factors in the business model have to be accordingly adapted. When the novelty of the technology decreases and more mainstream customers join the offer in bigger numbers other elements gain importance, such as price, quality and delivery standards. The company needs to be aware of this user acceptance dynamics as well as of the overall market situation, in which certain technologies may or may not be already available. If end-users are already familiar with some substitute products in their private life or in the work sphere there is for instance a better probability to achieve a successful match.

In any case, business models comes first also in the face of technology development: if a good and sound business model is in place, technology can be adapted and developed without any real necessity of having the most powerful and advanced solutions from the very beginning. See, e.g., the mobile social service Dodgeball, offered in the US to friends and friends of friends willing to
exchange personal contact information and opportunities for dating or an evening out; Dodgeball started with a low technology approach in the start-up phase, relying on the basic messaging services; once the user and customer base was built they started to move towards higher levels of complexity and advanced technology as the acquisition by Google gave them access to a different scale of design and development capabilities.

Modularity is a key concept in challenging the demand for customised products and services [Sanchez01][Hamel94]. When managed strategically, modular products, processes and knowledge architectures enable firms to create greater product variety, introduce technologically improved or new products more rapidly and lower costs of product creation and realisation [Sanchez99]. Modular architectures also affect the processes inside the company as well as between different companies in a value network. More importantly, the dynamic customisation of products and services requires an organisation that is fundamentally committed to operating in this new way. Product or service modularity requires the partitioning of a task into independent modules that function as a whole within an overall system as well as a consistent business architecture.

Intelligence through continuous information exchange with users/consumers allows the companies to create products and processes using the best possible modules. In this perspective, and from the current project specific point of view, the MobiLife process of iterative development cycles demonstrated that active user involvement in enabling technology evaluation (with application and services testing) is a way to align the technological architecture and components development with user expectations. E.g., the need of a visually rich and clearly understandable user interface for group management features prompted the development of a group management common component with an efficient and appealing interface metaphor; this common element can be applied to the specific applications that better match some specific user need.

The Internet impact has to be also taken into account. Web services and interfaces have accelerated and redefined the possibilities of a remote product or service experience. Every company has now to define how its products and services can be experienced in the new marketing infrastructure. In general terms, the main question is how best to use the Web power to create superior linkages with customers [Venkatraman98]. This is firstly a strategic issue but one that put some important requirements on business and technology infrastructures, as customers access products and service from a heterogeneous range of interactive and personal devices.

The Internet catalysed also the process of digitisation that has in parallel radically transformed the media landscape – and it is still doing so. This process challenges current device and channel specific approaches, pushing towards a truly seamless multiple devices and multiple channels user experience.

From MobiLife point of view, its enabling technologies provide the basis for a differentiated offer and as such are source of value creation. As for the Internet and digitisation, personalisation and multimodality, group awareness with privacy and trust support, context-awareness and ubiquitous availability enablers could shape mobile and wireless products and services on a wide scale.

In MobiLife the applications will be enabled by the technologies developed, but they are also driving the research. The applications are developed in several stages and at each stage they are tested with actual user. The results of these tests will be taken into account not only in the application development and technology work but also in defining the service promise to the user.

So, as for personalisation technologies, the value expressed by an efficient usage of personal preferences means much more convenience for the user as the data of personal interest are directly sent and presented to her with minimal interaction. Personalization is a strong reason for the customer to remain as a customer.

Group awareness or peripheral awareness of each other is another important value driver in many MobiLife type of services. If a service can get communities involved, valuable content is created by active group members with no cost to the service provider. The content attracts new users and thus audience for advertising and potential customer base for charged services.

The integration of trust capabilities – as well as the mobile setting – allows differentiating chargeable group-awareness enabled services from the ones freely available in the Internet.
Context information refers to a very broad range of data and descriptions; it can be related to time, location, network connections, applications, sensors, remote sources as well as higher levels like being with a group of friends or family members [Wagner2005]. In terms of products and services distinctive characteristics, context-awareness and automatic reasoning allow making information and services distinctively convenient adapting them to the specific conditions of a given situation. These context and reasoning capabilities are mainly expressed through representation of single user and/or group whereabouts as well as identification of services (offline and online) relevant in a certain location (e.g. ticketing system at a bus stop station). Proactive service discovery mechanisms thus make these applications radically different from existing Internet services (even if used in a mobile setting), prompting a shift from the user having to search and browser content pages to the user being proposed information and services when they are really needed.

There are four aspects identified that are emerging as almost compulsory features of new applications: Personalisation, context awareness, group awareness, and trust & privacy. In the more networked ICT environment, these aspects enrich and protect the basic communications as well as offer new possibilities for more personalized applications in relation to users’ needs and current situations.

<table>
<thead>
<tr>
<th>Technological aspect</th>
<th>Meaning for product/service component</th>
<th>Service Promise to the user</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personalisation technologies</td>
<td>The user is able to control the appearance and features of the application to suit his/her needs. Increases loyalty and satisfaction of the user.</td>
<td>“Solutions for your problems”</td>
</tr>
<tr>
<td>Context-awareness technologies</td>
<td>The application can adapt itself and the user interface to correspond to the always changing environment of the user. Easy accessibility anywhere.</td>
<td>“Services and media, available wherever you are.”</td>
</tr>
<tr>
<td>Group awareness technologies</td>
<td>The correct phone settings / media shares are automatically applied to fit in current social environment.</td>
<td>“Crowded market or home alone, you are connected”</td>
</tr>
<tr>
<td>Trust and Privacy</td>
<td>The user has to have trustworthy interactions with the services and other users in order to protect his/her personal and contextual information. If trust is lost, so is the user.</td>
<td>“You are in control”</td>
</tr>
</tbody>
</table>

Table 5: Technological aspect's meaning for product/service component.

Learning's from MobiLife in defining the products and service components:

- **Products and services are more and more a blend** of the terminal, the service provided by the service operator and the applications that run or can be downloaded or bought separately and in a different moment by the end user or customer. This challenges the definition of a service promise.

- **Services usage is in itself a learning process**: Technology can be adapted and developed without having the most powerful and advanced solutions from the very beginning. Active user involvement and expectation evaluations build a sound customer relationship. This enables the use of higher levels of complexity and advanced technology and contributes to the service promise in a positive way.

- **Personalisation, context awareness as well as group awareness differentiate the service promise in the marketplace**. However, they also enrich and protect the basic communications and offer new possibilities for more personalized applications in relation to users’ needs and current situations.
3.1.3 Earnings Logic

The earnings logic component of the business model spells out how organizations create revenues. It defines the financial arrangements between actors in the value network by describing how revenues, investments, costs, and risks are shared among actors.

It should be noted here that creating revenues (‘making money’) is not the only way of capturing value from mobile service provisioning. Quite often also intangible benefits, like image building or cross-selling opportunities, are equally important.

If the earnings logic is not clear, there is no viable business model. Therefore, the earnings logic component can be regarded as one of the most crucial business model components. Important concepts within the earnings logic component of the business model are the following:

- Costs,
- Revenue model and pricing,
- Investments, and
- Division of costs and revenues.

The options available for each concept mentioned above will depend on service and customer characteristics, involved industries, competition and actors’ strategies and interests. The final choices will be laid down in so-called financial arrangements between the cooperating partners.

Below the four concepts mentioned above are briefly elaborated upon.

**Costs**

The relative importance and absolute magnitude of cost drivers will vary from industry to industry and from firm to firm. Exploiting and shaping these structural factors in defining the earnings logic is very important. Drivers are partly related to internal relationships in a firm, partly related to external factors, and partly related to relationship between internal and external factors [Stabell98].

**Transaction cost economics** explains the firms cost structure. Transaction costs include the costs of planning, adapting, executing, and monitoring task completion. A transaction occurs when a good or service is transferred across a separable interface. Transaction cost economics theory identifies transaction efficiency as a major source of value, as enhanced efficiency reduces costs. The emphasis of transaction cost economics on efficiency may divert attention from other fundamental sources of value such as innovation and the reconfiguration of resources [Amit01]. The business logic of the value network and the individual cost drivers form a framework to analyse and achieve insight into the cost structure.

The cost structure of most service businesses, including mobile services, is characterized by a high ratio of fixed to variable costs [Shapiro99] and by a high degree of cost sharing (such that the same facilities, equipment, and personnel are used to provide multiple services) [Guilliman87]. The high fixed costs typically lead to **economies of scale** as increased production lowers the average production costs.

Similarly the high degree of cost sharing leads to **economies of scope** as the provisioning of a number of different services together leads to reductions in cost. Modularity in the service provisioning architecture is a way to obtain cost advantage, as components or modules may be shared by several services. Service bundling, i.e., the combined offering of separate services as a package for a single price to customers, is another way of achieving cost advantage [Guilliman87]. **Complementarities** between bundle components may stimulate demand whereas cost sharing provides for cost reduction.

**Revenue models and pricing**

The revenue model lays-out the process by which a company actually makes money by specifying how it is going to charge (or subsidize in the case of advertising supported models) for the services provided. In the case of mobile services provisioning the...
cooperating actors will each follow their own revenue model. Ideally the different revenue models are such that the individual revenue drivers are aligned to create a win-win situation. At the end of the value chain the customer will be charged a price for using or subscribing to a service.

The following tables give examples of pricing models for mobile data transport (including communication services) and mobile content, respectively.¹

### Table 6: Overview of mobile data transport pricing (network operator perspective) (adapted from [EBS05]).

<table>
<thead>
<tr>
<th>Mobile Data Pricing Model</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session-based charging</td>
<td>Per-minute charges</td>
<td>Linking to multiplayer games</td>
</tr>
<tr>
<td></td>
<td>Per-session charges</td>
<td>Wi-Fi 802.11b connectivity</td>
</tr>
<tr>
<td>Volume-based charging</td>
<td>Per-kilobyte charges</td>
<td>Mobile Internet Surfing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Uploading/downloading digital content</td>
</tr>
<tr>
<td>Usage based</td>
<td>Pay-for-what-you-use</td>
<td>Pay per SMS or MMS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Traditional voice</td>
</tr>
<tr>
<td>Flat rate</td>
<td>&quot;All-you-can-eat&quot; models</td>
<td>GPRS/UMTS flat fee monthly tariff</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fixed broadband connections</td>
</tr>
<tr>
<td>Package based</td>
<td>Pay per packaged deal</td>
<td>Mobile Internet Access and Basic Content</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Subscription Services (I-mode, live!)</td>
</tr>
</tbody>
</table>

### Table 7: Overview of mobile content pricing (content provider perspective) (adapted from [EBS05]).

<table>
<thead>
<tr>
<th>Mobile Content</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pay-per download</td>
<td>Pay per content item</td>
<td>Content downloads such as music</td>
</tr>
<tr>
<td>Subscription based</td>
<td>Unlimited usage included in e.g. monthly fee</td>
<td>Streaming audio services</td>
</tr>
<tr>
<td>Event based</td>
<td>Charge based on event report of actual use of the content</td>
<td>Downloaded content is only paid for when actually opened or consumed</td>
</tr>
<tr>
<td>Context pricing</td>
<td>Price depends on context (time, location, quality), e.g. freshness of information</td>
<td>Online sports or concerts</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Stock quotes</td>
</tr>
<tr>
<td>Personalized Services and Content</td>
<td>Pricing based on personalization</td>
<td>Based on using personal information, content providers can customize their offerings even further.</td>
</tr>
<tr>
<td>Value-based pricing</td>
<td>Pricing based on customer value</td>
<td>Online auctions (by nature)</td>
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<tr>
<td></td>
<td></td>
<td>Airline tickets</td>
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<tr>
<td>Contextual advertising</td>
<td>Advertisement based free end user service</td>
<td>Context-aware leisure time suggestor</td>
</tr>
<tr>
<td>Sponsored/subsidized service</td>
<td>Service supports or improves existing service/public good service</td>
<td>Real time public transport information service</td>
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<tr>
<td></td>
<td></td>
<td>Mobile emergency preparedness service</td>
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</tbody>
</table>

Note that charging for content services is becoming more and more advanced and moves towards new models like context based and value based pricing. This is quite different from the traditional approaches used in the ‘voice business’. The first is **cost based pricing**, i.e., setting a price such that costs are covered with an acceptable margin. This approach has as fundamental problem that allocating fixed costs depends on sales volumes that are intrinsically linked to prices. The second approach is **competitive pricing**, i.e., prices are

¹ Source: [http://www.ebstrategy.com/mobile/revenue_models/carriers.html](http://www.ebstrategy.com/mobile/revenue_models/carriers.html)
set based on similar offerings in the marketplace. The danger in this second approach is that it may stimulate the notion that services are commodities, and expose the entire industry to price wars [A.T.Kearney03].

For a consumer there is no relation between the production costs of a service and its value. Contrary to the service provider, a consumer is simply not interested in the costs of generating the service, but only in the value the service represents for him. So pricing a service may be based on the consumer's perception of the service's value. This is called 'perceived-value pricing' [Kotler88] or value-based pricing [Jonasson02]. As consumer valuations show considerable variation, value based pricing is quite challenging [Klein00].

The role of pricing changes along the lifecycle of the service. It may be impossible to charge for a service or required equipment in the initial phase, e.g., when the value of the service increases with the size of the installed base. This leads initially to 'give-away strategies' such as those observed in, e.g., mobile telecommunications.

When thinking about new services, the concept revenue model is very important. In the market place it is still unknown how revenue models of future (context aware) mobile services will look like. [Jonasson02] argue that the previously accepted pricing structure for mobile services, based on charging per megabyte, is insufficient for the introduction of wireless broadband (3G) services. They draw this conclusion from an extensive consumer survey regarding consumers' willingness to pay for a large number of mobile Internet services. Charging per megabyte would make some services too inexpensive to generate sufficient revenue, whereas others would be too expensive to create any demand. Pricing of services therefore need to be taken at a service-specific level to generate satisfactory profits in 3G and B3G. The basis upon which each service is charged is likely to vary over services.

When looking at potential revenue models of MobiLife types of services, user research showed that the end user willingness to pay is questionable for the majority of services. However, advertisement may be an applicable revenue source for these services.

A successful Internet company like Google is primarily based on contextual advertisements based on given search terms. A contextual advertisement revenue model may also be the most appropriate revenue model for a mobile service offering (e.g., TimeGems), which offers suggestions on how to spend leisure time, taking into account personal profiles and explicit preferences, availability and other relevant context information of the users. By matching the profile and status information of users with the available services, end users are able to easily enjoy the most appropriate content services (e.g., an interesting exposition in a nearby museum, mobile content, concert, movie) in a given context. However, in order to get enough revenue based on advertisements, a service needs a large customer base.

Some future mobile services may also be subsidized. Think of a MobiLife service like Emergency Preparedness that supports car owners (and passengers) and people taking care of relatives, friends, and/or patients in the case of an emergency. Also MobiCar, a MobiLife service that supports the formation of ad-hoc groups that allow individual users to share a car to reach close destinations ('ad-hoc carpooling') may be subsidized. Mobile services that support or improve existing services may be sponsored. In such a context, mobile services need not to be profitable themselves. A MobiLife service like Bus Stop is a good example. This service allows a user who is waiting for public transport, e.g., a bus at a station, to receive updated information, automatic payment support and navigational help regarding her travel for free. Such a service may improve the user's loyalty towards the transportation company, which may lead to increasing sales.

Investments

An important question is how investments are divided within value networks. Investment decisions weigh the interests of the actors involved and take the mutual benefits

---

of multiple organizations into account. Inter-organizational investments require explicit articulation and collective agreement on the terms of investment and timing [Miller00]. The share of each participant and the corresponding partnership ratio must be defined. The success of these arrangements hinge on whether or not the role of each member within the terms of the institutional framework is clearly defined. The MobiLife project itself isn’t focussed on investments needed for offering mobile services.

### Division of costs and revenues

When services are offered by a group of organizations in a value network, it is especially important to pay attention to how costs and revenues are shared within the value network [Betz02]. Organisations have to balance different interests and earnings logics to create a ‘win-win’ situation, in which each player has incentives to co-operate.

The costs incurred by each firm in the value network are directly linked to the transaction costs of the roles and tasks performed by the firm. The value network and each firm within it have to make decisions regarding the division of roles. The division of revenues will depend on (1) the degree to which the resources and capabilities brought in by each partner firm are considered critical, (2) the transaction costs of each firm associated with its role, and (3) the division and timing of investments. For fair and viable revenue sharing arrangements it is important to value the contribution of each partner to the service offering and also the (intangible) benefits each partner receives.

In order to be able to share and distribute mobile data service revenues in value networks in the market offering phase, a service architecture is needed that is able to accurately monitor the actual usage of services and that has an advanced billing system for collecting, reporting, and sharing revenues. The MobiLife project is focussed on developing technical components needed for such architecture.

### Learning’s from MobiLife in defining the earnings logic component:

- **Familiar revenue models have to be reconsidered** as new opportunities arise, and, at the same time, competition increases. The future revenue models may be based on value based prising, bundles of services, or of complementarity between services.
- **The user’s willingness to pay for the mobile services is questionable**. Advertisement based revenue sources, subsidized as well as sponsored services have also to be taken into account.
- Division of roles, investments, costs and revenues between the actors in a network call for measuring, monitoring and visualizing the performance of mobile services. Metrics for actual service usage are needed not only at the company level but also at the network level.

#### 3.1.4 Resources

The means to create value are defined in the resources component of the business model. It includes the assumptions on how the resources have to be conceptualised as bundles of resources, skills and technologies that enable the company to provide a particular benefit to customers. Technology alone is no longer a viable approach to the generation of value growth.

A key question in the creation of a business model is the allocation of three types of resources: human, technological and financial. Resources can also be divided both into tangible ones like human assets – meaning people – equipment, technologies, and cash; and into less tangible ones like product designs, information, brands and relationships with suppliers, distributors, and customers. These two – tangible and less tangible assets – are very different kinds of asset categories. However, they all create and strengthen the firm’s possibilities to perform.

The resources are either owned or they are controlled by a firm by various kinds of agreements and arrangements. In the latter case the firm needs to carefully manage the resources in order to maintain the control.
Technological change is not important for its own sake, but is important if it affects competitive advantage and industry structure. Whereas the sustaining innovations make a product perform better for mainstream customers, disruptive innovations create entirely new markets. When considering response to disruptive innovation, managers must take into account the unique resources-processes-value framework that defines a company and shapes its capacity to change. This means changing the business model [Christensen00]. Technology alone, not embedded in an effective business design, is no longer a viable approach to generating sustained value growth [Slywotzky96].

Capabilities in this context refer to the firm’s ability to exploit and combine resources through organisational routines in order to accomplish its targets. Creation of value depends on the competencies and ability to provide and deliver efficiently benefits that are important to the customer. What gives a company or organisation to deliver value and benefits is their competencies in business processes and enabling technologies. Hamel and Prahalad call these abilities core competencies of the company [Hamel90]. Core competencies are collective learning and coordination skills behind company’s product lines. These capabilities are basic advantages in competition [Hamel92]. According to Hamel and Prahalad [Hamel90], core competences arise from the abilities and skills to integrate and coordinate various groups in the organisation. To qualify as a core competence, a capability must also be competitively unique or not easily imitated by competitors. While company may be able to hire excellent scientists for a technology it does not mean that it will automatically gain a core competence in that technology.

Figure 4 shows the capabilities needed in network-value production in an order of ascending complexity. The dynamic capabilities are presented on two rows. The lower row refers to more traditional capabilities (with the exception of production and delivery capability that are not generally considered dynamic), and the upper row to those needed in managing strategic inter-organisational relationships and business nets. A set of capabilities is generally required to produce any type of value. The more complex the value system is, the more multifaceted the required set of capabilities becomes [Möller02].

Analysing Figure 4 from the left, the management of an efficient customer-driven supplier net, the ability to integrate and coordinate the value activities of each net member is essential. A hub company needs to be able to mobilise a set of actors willing to form a tightly coordinated supply and channel net. The coordination capability requires information and management systems that combine the business processes of each actor and monitor the efficiency of production,
logistics, and customer delivery and service. The creation of strategic nets to develop novel products and business concepts demands several complex capabilities. Network-orchestration capability at the right end of the value-creation continuum refers to an actor’s capacity for influencing the evolution of a whole new business network. Orchestration presupposes the ability to envisage the emerging business field – which may be very complex like the convergence of the ICT field suggests – and its key actors, and to identify potential trajectories [Möller02].

Various economic players participate in value nets in order to create and capture value. The value creation is highly dependent on the core competences of these potential players. In building a viable business model for mobile applications it is critical to identify core competencies of potential players, e.g.:

- Terminal design, hardware and software design (specifically in developing intuitive user interfaces with minimal interaction by maximal utilization of context and personalization) and integration, manufacturing and logistics (mobile terminal vendors, consumer electronic vendors).
- Service platform and application development (IT companies).
- Subscriber management: identity, payment, helpdesk (operators, merchants, banks).
- Content production (media companies, advertisement agencies).
- Content distribution (broadcast companies).

There are a number of implications for MobiLife key technological features: personalization, trust and privacy, group-awareness, multimodality:

- **Personalization and context management** requires intimate knowledge of the customer. The capabilities required include (a) technical: automatic analysis of large amounts of event data in order to understand user behaviour; (b) organizational: finding partners and organizing cooperation by applying knowledge on user behaviour for various types of services. A large information base of personalization data covering users from different groups and locations, as a resource, is required having a critical mass for personalized applications.

- **Trust and privacy:** Trust and privacy are needed for developing strong and intimate customer relationship. When achieved, means strong brand and added perceived value. The capabilities required include (a) technical: development of secure solutions; (b) organizational: secure operation, fast response to incidents, strong brand management.

- **Group-awareness:** If a service can get communities involved, valuable content is created by active group members with no cost to the service provider. The content attracts new users and thus audience for advertising and potential customer base for charged services. This is an example how users-customers (“prosumers”) can participate in creation of a resource (data) for the service provider. The capabilities required include (a) technical: development of solutions that are easy to manage and use for non-professionals (communities); (b) organizational: brand management in order to attract communities, media type of competence in order to create an attractive media for advertisers.

- **Multimodality:** The ability to manage multiple devices and interfaces requires (a) competencies in several UI technologies and (b) orchestration capabilities for defining required interfaces in cooperation with other companies.

<table>
<thead>
<tr>
<th>Technological aspect</th>
<th>Key features (innovativeness, functionality)</th>
<th>Meaning (needed capability) for the business model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personalisation technologies</td>
<td>Adaptation to user preferences either automatically or based on user control</td>
<td>(a) Technical: automatic analysis of large amounts of event data in order to understand user behaviour; (b) organizational: cooperation by applying knowledge on user preferences for various types of services</td>
</tr>
</tbody>
</table>

Business Models for New Mobile Applications and Services
<table>
<thead>
<tr>
<th>Context-awareness technologies</th>
<th>Adaptation to user context</th>
<th>(a) Means to analyse user context (sensors, software algorithms); (b) cooperation by applying knowledge on user context for various types of services.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group awareness technologies</td>
<td>Adaptation to social environment</td>
<td>(a) Development of solutions that are easy to manage and use for non-professionals (communities); (b) brand management in order to attract communities, media type of competence in order to create an attractive media for advertisers</td>
</tr>
<tr>
<td>Trust and Privacy</td>
<td>Intelligent combination of trusted platform technologies with intuitive trust-enabling user experience</td>
<td>(a) Development of secure solutions; (b) secure operation, fast response to incidents, strong brand management.</td>
</tr>
<tr>
<td>Multimodality</td>
<td>Ability to manage multiple devices and interfaces</td>
<td>(a) Competencies in several UI technologies and (b) orchestration capabilities for defining required interfaces in cooperation with other companies.</td>
</tr>
<tr>
<td>Service platforms</td>
<td>Advanced terminal and server platform components; fast and flexible network connectivity</td>
<td>(a) Complex set of UI, data management and connectivity software and hardware development skills; (b) software and hardware integration, definition and maintenance of development interfaces</td>
</tr>
<tr>
<td>Service lifecycle</td>
<td>Making services available to customers, including service creation, provisioning (deployment, usage, retirement, operational management), and lifecycle management</td>
<td>(a) Complex set of IT skills, (b) advertising, cost-efficient (automated) help desk operation</td>
</tr>
</tbody>
</table>

Table 8: Meaning of the technology aspects for modelling the business.

**Learning's from MobiLife in defining the resources component:**

- **The definition of resources component is highly related to the other components of a business model.** *Providing mobile services (as complete offerings) requires a number of quite different resources and capabilities*, e.g., oriented to device manufacturing, service innovation, efficient connectivity or CRM, or to global or local presence.

- **MobiLife functions personalization, context-awareness, trust and privacy are interlinked in the resources of the company:** the users need to trust a company (related to company brand) in order to let it deal with their intimate information like personal preferences and context. By having the capability to do that well, e.g. respecting privacy, the company gradually acquires trust.

- **Customers can participate in creation of data resources for the company** by actively creating content (e.g. services for virtual communities) or simply using the service (e.g., collected personalization data based on user behaviour).

### 3.1.5 Suppliers/Actors

Getting the right suppliers and building sustainable value nets with the right actors and roles for mobile services are key aspects with respect to business modelling. The drive to create value and benefits for customers requires assembling of core capabilities beyond boundaries and the capabilities within the company. Putting together a network of companies to develop the set of
capabilities necessary to build a value proposal that delivers benefits and high value to customer becomes a major challenge for the companies.

The **smart combination of technological developments** is driving the emergence of real innovative mobile services. Its important to **transform from rather static value chains to more dynamic value nets with new and more players** Therefore, smartly imagining and combining emerging technological capabilities to create innovative and attractive mobile services and related business models could be a key success factor of MobiLife type of services. One of the key ways that a company assembles this network of suppliers is through developing strong relationships with suppliers and key partners that are crucial in adding value to the offering. Also the end users and user communities are getting more and more central roles in these value nets and in the value creation process.

A **supply chain has traditionally been defined as a network of facilities and distribution options** that performs the functions of procurement of materials; transformation of these materials into intermediate and finished products; and distribution of these finished products to customers. A supply chain essentially has three main parts, the **supply, manufacturing and distribution** [Ganeshan95]. Supply chains exist in both service and manufacturing organisations, although the complexity of the chain may vary greatly from industry to industry and firm to firm.

The traditional thinking about **supply chain management is moving from suppliers to thinking about partners, relationships management, and networks**. Bovet [Bovet00] defines value net as a business design that uses digital supply chain concepts to achieve both superior customer satisfaction and company profitability. According to Bovet, a value net is not just about supply but about creating value for customers, the company, and its suppliers. Nor is it a sequential chain, instead it is a dynamic, network of customer/supplier partnerships and information flows. The traditional supply chain manufactures products and pushes them through distribution channels; in contrast value net begins with customers, allows them to self-design products, and builds to satisfy actual demand [Bovet00]. Difference to concepts of traditional supply chain management is in the description to highlight dynamic, collaborative, and agile nature of the new markets, the markets that are enabled by digitalisation and ubiquity of communication networks where ability to strategically reconfigure supply chain if needed is crucial.

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The characteristics of the supply markets have changed with the easiness to create networks on **the virtual markets**. These virtual markets combined with the vastly reduced costs of information processing allow for profound changes in the ways companies operate and how economic exchanges are structured. Thus the ways value is created and the business models are modified is being challenged [Amit0]. As an electronic network with open standards, the **Internet supports the emergence of virtual communities** and commercial arrangements that disregard traditional boundaries between firms along the value chain. Business processes can be shared among firms from different industries, even without any awareness of the end customers. As more information about products and services becomes instantly available to customers and as information goods are transmitted over the Internet, traditional intermediary businesses and information brokers are circumvented and the guiding logic behind some traditional industries (e.g., travel agencies) begins to disintegrate. At he same time, new ways of creating value are opened up by the new forms of connecting buyers and sellers in existing markets (re-intermediation) and by innovative market mechanisms (e.g., reverse market auctions) and economic exchanges.

We can see in MobiLife type of services and applications that the emerging mobile services value nets are more dynamic and complex than the old, rather static telecom centric value chains for mobile services like voice communication. These new value nets have more as well as new actors and include actors from different industries that are increasingly operating in each others, formerly separated, markets like IT, telecom, consumer electronics, and media. Each of these actors has one or more roles to perform in the value net. Various economic players may participate in value nets (e.g., companies, families, public bodies, non-profit institutions) by taking responsibility for one or more activities or roles in a value net. These may also participate in more than on value net. In Figure 5, an illustration is given of the complexity of mobile service value nets and the large amount of organisational roles and relations needed for offering mobile services.
Actors can be more or less powerful in the value network depending on their resources and capabilities. Hawkins (2003) identifies three basic types of partners in a value network: structural partners, which provide essential and non-substitutable (in-) tangible assets, contributing partners, which provide goods and/or services to meet specific network requirements, and supporting partners, which provide substitutable, generic goods and services to the network. Structural partners in principle are better positioned to exert control over the network than supporting partners.

Actors differ with respect to the strategy and goals they pursue with the collaboration. Collaboration requires partners to share information and give insight into their ways of working. However, strategic interest may induce partners to act against what is agreed upon, hide the truth or try to extract confidential information from their collaboration partners. Organizations may defend themselves by drawing up thick legal contracts and strictly monitoring partner’s activities. Trust between partners is thus an important condition for an open and constructive collaboration.

Collaboration gives rise to complex interdependencies between organizations because no single partner has formal authority over another partner. Every adjustment has to be discussed and jointly agreed upon [Klein-Woolthuis99]. In order to govern the collaboration actors need to agree formally and informally on how to divide and co-ordinate the value activities. These agreements should clearly define the responsibilities for each actor.
In future service creation it is all about customer and network value creation: when designing and developing a mobile service a company has to take into account that all important (1st and 2nd tier) actors (e.g., telecom operators, content providers, etc.) in future mobile service value nets should be able to capture value. Otherwise, the service and its business model will not be viable. This means that besides telecom operators, also new players from industries like IT, consumer electronics, and content are getting active in the mobile services business and the borders between these industries are blurring. Therefore, it is important not to analyze opportunities for interesting MobiLife type of mobile services from a specific industry perspective, but to have a user centric, multi industry view with multi actor business models and multi actor value networks.

In the future MobiLife type of mobile services there will be typical traditional roles with only minor changes in value drivers and earnings logic (e.g., network provider, application developer, device manufacturer, content provider, advertiser). Most new services, however, demand changes in some current roles. E.g., in addition to consuming, a user may also participate in creating content (e.g., in health monitoring). In essence, the service concepts to be developed are mostly globally applicable. However, because a lot of future mobile services are context dependent, also local organizations (like museums, restaurants, public transport companies, etc.) may become increasingly important actors of future mobile service value networks at least as information providers for or as providers of products or services related to context dependent mobile services being used by end users.

Also new roles are expected to emerge:

- **Personalisation Provider**: manages personal profiles and adapts the service offering to them
- **Identity and Trust Provider**: manages users and third parties identities, gives users and third parties a possibility to set and update appropriate trust levels
- **Context Information Provider**: provides and distributes context information (e.g., location, situation) of users
- **Group Awareness Provider**: offers community functionality that supports having peripheral awareness of each other

The most important question in the entry of this new role is whether there is realistic earnings logic for them. E.g. continuous flow of context information increases costs, which have to be covered by relevant revenue sources. The new roles can be performed by existing companies like telecom operators, IT and other Internet companies or we will see an entry of new types of actors who create their business around though new roles.

**Leanings from MobiLife in defining the suppliers/actors component:**

- New technologies provide new business possibilities for traditional as well as quite new actors.
- The mobile services, giving value for the customer, are provided by a network of actors. Each of these may be responsible of one or several roles or functionalities. Partnerships, relationships management, and information flows have great impact on the ways how to collaborate.
- Traditional roles, new roles, interdependencies between organizations as well as constant need for dynamism increases the complexity and set new and more requirements to earnings logic definitions as well as organisational and architectural questions.

### 3.1.6 Organization and Architecture

The amount of relationships between organisations in mobile service value networks is growing and increasingly complex. In this environment organisations can only capitalize a technology if they define a business model that especially pays attention to the service architecture, information, knowledge and money flows between all needed business actors, what their roles are, and what the potential benefits for the various actors are. The organisation/orchestration component in a
business model defines those key topics that combine the actors in a value net together. It enables the provisioning of the future mobile applications and service.

Most industry actors lack the resources and capabilities to exploit new mobile services on their own and co-operation between different stakeholders will be necessary. When looking at current mobile services, often a nodal actor can be recognized in the value net that has the most power and to which other actors should adapt themselves more or less. Often such an actor has important and unique resources like an exclusive billing relation with the end customer.

Interorganisational co-operation includes the definition of governance systems (network governance systems) which describe how the inter-firm coordination is organized and what kind of informal social and formal contractual relationships between the firms is needed ([Jones97]. Strongly related to network governance mechanisms are concepts like orchestration and organisational arrangements used to organise collective action. Different roles in provisioning the mobile services need to be fulfilled by one or several actors. Each of these actors has different requirements and strategic interests which need to be constantly taken into account in order to organise or orchestrate collective action [Tunzelmann03]. The creation of value for the end user as well as the capturing of value for participating organisations is measurements for a successful co-operation.

The organisation/orchestration component describes those structural mechanisms that provide the necessary backbone and stability for different actors. The network form of governance carries with it special problems of adapting, coordinating, and safeguarding exchanges, because it relies on autonomous units operating in a setting of demand uncertainty with high interdependence, owing to customised, complex tasks [Jones97].

The business models, and therefore also value networks, need to be continuously revised when new challenges and opportunities emerge. This means that the governance system has to be more dynamic and external aimed in order to repeatedly reconfigure the needed resources. (Inter) company-level governance systems based on rules and discipline mechanisms play an important role here. Orchestration can be seen as the capability to mobilise and integrate resources for the purpose of providing an offering to a customer and simultaneously create value for the customer, the value net orchestrator (or nodal company) and the subordinates (or network members) involved. The value net orchestrator considers the constraints, based on which conversations are nurtured to define and execute the purposeful resource allocation to create, produce and provide the customer with the offering.

When designing organisational arrangements, there are several parameters to consider. The industry context, the position of a company within an industry, technological developments, the need for flexibility and changes are some of them.

MobiLife aims to understand how the innovative mobile applications and services can be defined from the business model perspective. The project also specifies a service architecture enabling advanced mobile services. The use of technological standards and concepts like open Service Oriented Architectures (SOAs) play an important role in this context.

The networks of actors providing the future mobile applications and services include more actors as well as new actors. Each market actor has one or more roles to perform and may participate in more than one value net. A role represents a set of functions that enables to make a mobile service and to deliver it to the environment. The roles form the business interface needed to provide the services to the user (Figure 6). The governance mechanisms of the business are defined at this level. It also includes the definitions of the responsibilities, compensation to each actor as well as provided service levels. The confidentiality of the information is defined.

Service interface defines the management of resources. It includes data and interface definitions, controls who asks, what asks, who manages the value chain and different functionalities. The main questions asked in defining the Technical interface focus on how to execute the services, how the negotiation and communication between interfaces are done as well as interfaces between different technologies.
For the future mobile services a relatively high level of standardization and interoperability will be needed. MobiLife project (Work Package 5) works with the specification and architectural topics. That work produces those results needed for the definition of organisation/orchestration component in a business model. The work has especially focused on those functions enabling the future mobile services:

- **Privacy and Trust Function**: Future mobile services and applications deal with data related to the user, which raises the issue of trust and privacy of the personal user data calling for specification of a trust engine and defining privacy policies.

- **Personalisation Function**: Architecture for the profiles and preferences of users and groups to the service, applications and MobiLife components, and supports learning of user and group interests as well as user and group preferences.

- **Context Awareness Function**: New context information and changed context information can be notified to interested components and application services, and context information can be requested from the Context Awareness Function.

- **Group Awareness Function**: The Group Awareness Function takes care of raw, interpreted and aggregated context data. This function handles context data related to individual users and to groups of users. It supports the service developer by providing users’ and groups’ current context information through well-defined interfaces, managing groups and managing group preferences and information.

- **User Interface Adaptation Function**: Today, a great variety of mobile terminal devices exist that users can employ to access services. The devices are heterogeneous with respect to their capabilities to handle input, present user interfaces or the media they support.

- **Service Usage Function**: The Service Usage Function covers all aspects related to the service usage; in particular it covers every step in the 'timeframe' between service discovery and service offering. Service Profile Function holds a repository of services known to the system, their descriptions and properties and offers functionalities for service discovery, proactive service provisioning and service composition.
With regard to the separation and distribution of the MobiLife system components, basically, every three different domains on the technical interface layer (Figure 7), based on identification of services. However, all these approaches to modelling the business will most probably summarise order to develop reasonable and functional business models for future mobile applications and traditional mobile service provider stakeholders. These new roles extend the today’s common mobile service value chain significantly adding important new players.

There are several possibilities to combine the different architectural role and function definitions in order to develop reasonable and functional business models for future mobile applications and services. However, all these approaches to modelling the business will most probably summarise three different domains on the technical interface layer (Figure 7), based on identification of potential stakeholders and the functional separation of the MobiLife architecture’s components:

- The MobiLife Application domain,
- The MobiLife Service Enabler domain, and
- The MobiLife Core Platform domain.

With regard to the separation and distribution of the MobiLife system components, basically, every reasonable business model can be regarded in two dimensions:

- An open model features several companies playing the roles of MobiLife Application Providers, as well as for MobiLife Service Enabler Providers. This means that those functional components can be operated by different companies and that therefore common reference points / interfaces between the different domains are needed in order to specify their interworking.

- In contrast, a closed model features one company operating and providing all MobiLife applications and MobiLife service enablers. The development of those components might be still done outside this company.

Of course, there also combinations of these options possible. So, the actual degree of openness can be between the two extreme views, described above.

Supporting the new roles needed for future service provisioning and the potential business models have a strong impact on the specification of the MobiLife architecture. Additionally, the
roles and business models influence the ongoing specification process, i.e., they impose a further
refinement and update of the MobiLife architecture specification. All the three architectural domains
and their components inside respectively can be developed and provided independently from each
other. The MobiLife architecture specification follows the service oriented architecture (SOA)
approach. It will thus support openness and scalability as well as modular approaches to service
definitions, which all are important for the future mobile business models and customised value
creation.

Because all components in the three architectural domains can be developed and provided
independently of each other, they have to offer component deployment descriptions and
interfaces for lifecycle management (starting, stopping, etc.), accounting, etc. These interfaces
must be clearly defined in the MobiLife service infrastructure specification. This is also an important
step to deal with the challenges of the increasingly networked world that product and service
managers face today.

Facing the revenue questions included in earnings logic component description, the MobiLife
architecture has to support operational management functions beyond the lifecycle management,
including accounting features. To be able to share revenues in value networks, system and
application monitoring is needed to support billing systems for collecting, reporting, and
sharing the revenues. Accounting features have also to be offered for the MobiLife service
enablers, so that attaching billing systems is also possible here.

Learning’s from MobiLife in defining the orchestration/architecture component

- Interorganizational collaboration between different actors calls for exact definition of
governance systems as well as orchestration of the value net.
- The different architectural domains and careful architectural specifications are the key enablers and thus necessary for the future mobile services. Business interface, service interface and technical interface in service oriented architecture play an important role.
- The new roles in the future service provisioning have a strong impact on the specification of the service architecture. The different architecture components can be developed and provided independently from each other.

3.1.7 Processes

Processes bind the different business model components together. The efficiency of processes
has always been a way to enhance business performance. The importance of well-defined
processes grows even bigger when products and services are not any more developed and
produced by single companies working in a stable business environment. When value nets
become more and more complex and at the same time product and service lifecycles shorten, it is
not possible to handle the business without properly defined processes.

Process is a group of repeating functions being dependent on each other in timing and/or
functionally, which produces a certain outcome. The purpose of a business process is to
describe 1) what actions will be done, 2) why they are done, 3) what preconditions are needed and
4) what the actions will produce. The processes of a business consist of the activities and
procedures with which a business procures resources, adds value, and produces and sells
products and services. Some processes are formal, in the sense that they are explicitly defined
and documented. Others are informal: they are routines or ways of working that evolve over time.
Both of these types of processes typically occur simultaneously in a company.

The basic idea behind conceptualising and categorising business processes in organisations is to
identify and design repeatable processes that have enough elements of consistency (e.g.,
clearly identified inputs and outputs) to justify developing a common, "averaged" process for the
organisation. The key elements of an organisational process can be seen to consist of
sequentiality, routinisation and organisation of activity chains, input-output and material
flows, organisation of work and the cross-functional and inter-organisational nature of
organisation [Tikkanen03].
For provisioning the new mobile services the needed processes should be concretely described in a business model. Processes are very much dependent on what the services developed will be and what are the roles of different actors; thus the descriptions have to be done separately for each business model. Processes between different actors are slow to change and it is very important to start analysing them at early stages of applications and services development in order to be able to take into account all needed aspects. The new applications have to be connected to the existing processes of different companies in the definition of a business model. The common way to structure the processes is needed in doing business in an open value creation system and open market. The enhanced telecom operations map by eTOM provides one example of a common structure for processes (Figure 8).

![Figure 8: The Enhanced Telecom Operations Map®](TeleManagement Forum05)

**eTOM describes all the enterprise processes required by a service provider** and analyses them to different levels of detail according to their significance and priority for the business. It serves as a blueprint for process direction and provides a neutral reference point for internal process re-engineering needs, partnerships, alliances, and general working agreements with other enterprises. Although eTOM framework has been focused on information and communications services and technologies management, work is also of interest in other business areas. In developing new mobile services and applications changes are needed in many existing processes. In the following chapters some parts of eTOM are analysed from the new mobile services' business model point of view.

The main category “strategy, infrastructure and product” includes, among other things, infrastructure and product lifecycle processes. In a market networks and services are evolving and new technologies are introduced more rapidly than existing ones are retired, leading to bigger and more complex networks and services, which cannot be handled without properly defined processes. The whole process of service planning, deployment and assurance needs to be easy, quick, systematic and reliable. This calls for efficient and interoperable tools in the service creation, deployment and assurance areas. This is especially true due to the increasing number and
complexity of services in an environment where content and service components may be provided by third parties.

In the operations category eTOM presents the processes needed to operate the business. The most essential process here is customer relationship management (CRM). **The purpose of CRM is to enable organizations to better manage their customers through the introduction of reliable systems, processes and procedures for interacting with those customers.** The principal business drivers for having CRM are: increasing customership lifetimes, reducing costs and improving efficiency. The main obstacles to becoming customer-centric are poor processes and practices, especially in the areas of communications, service and delivery. **Business process re-engineering (BPR) is often an unavoidable consequence of the introduction of CRM.** Unless the process is changed across the business, however, CRM will simply be an expensive new initiative with no benefits. Linking processes will also ensure a more consistent experience for the customer [Optima Media Group05].

In MobiLife project it is difficult to define concrete business processes, because the developed applications and services are not even meant to be commercialised within the project and thus, e.g., actors for different roles in processes are not defined very concretely.

The roles of different actors and the needed new roles in mobile business models call for new requirements for process definitions. It is important to move from the older customer care or service orientation to a **customer relationship management orientation** that emphasises customer self-management and control, increasing the value customers contribute to the service and the use of customer related information in order to customise and personalise the services.

If the value network can be connected electronically using standardised processes and interfaces between companies, it helps in improving the responsiveness of the overall system. **Properly defined process can help in boosting both strategic and operational work** of a company and thus to achieve better cost efficiency. In an ideal situation the information flow should be friction-free across networks, applications, and devices.

In future mobile services there is a need to manage resources across technologies (i.e., application, computing and network) by integrating the processes. If this is not done well enough in modelling the business, it can be threat to the success of companies. Networks and services form complex structures and the rhythm for new technologies escalate. At the same time there is a greater **need for automation and optimisation of business processes.**

The roles taken by different actors are changing. The operator focus is moving from managing the network technologies to managing the end-user service experience, which demands different management solutions and processes. **The current mechanisms are having difficulty handling new challenges and at the same time reducing the operating costs.**

Another challenge is to recognise that while the future mobile services are provisioned in a network of companies interacting with each other, the **process flows are very often defined by external parties.** This calls for efficient and interoperable tools in the service creation, deployment and assurance areas. This is especially true due to the increasing number and complexity of services in an environment where content and service components may be provided by third parties. Markets are also changing continuously and it is extremely important to follow the changes constantly and to design processes in a way that they can be easily modified when needed.

**Learning’s from MobiLife in defining the process component:**

- **An effective process enhances the business performance** of network of companies and binds the different activity chains and input-output flows as well as cross-functional and inter-organisational information flows together.

- **Processes between different actors are slow to change.** A common way to structure the processes is needed in doing business in an open value creation system and open market.

- **The new applications have to be connected to the existing processes of different companies in the definition of business model.** Business process re-engineering is often an unavoidable consequence.
3.2 Legal Challenges to New Business Models

Legal rules can affect business models in many ways. At their best, they enable business models, but too often they also harm useful activities. We have concluded in a previous report [Galli05] that the following business drivers are important from the legal point of view:

- **Balanced legal rights.** For example, privacy needs to be protected, but data protection must not prevent useful business; reasonable consumer protection enables, not harms, B2C business. They ensure the interests that will enable consumers to shop with confidence and thus increase the commerce.

- **Anticipated outcome of legal processes.** Understandable, unambiguous, and easily applicable laws diminish uncertainty and risks related to future operations.

- **Up to date rules to minimize transaction costs.** Laws that are up to date and cover a case in question, decrease the need to draft contracts case by case, and thus they reduce transaction costs.

- **Fair allocation of intellectual property.** It encourages both to produce and to consume information goods, if rights in them are allocated in a fair way.

On the other hand, the following legal hurdles are also important:

- **Unbalanced legal rights.** Too strong or weak privacy protection, unbalanced consumer protection, unfair allocation of intellectual property rights, and so on, cause social problems, slow down economic growth, and hinder businesses that depend on those rights.

- **Outdated laws are difficult to apply.** Old laws in the new context make legal decisions unexpected and random. Outdated laws create also barriers to entry the markets with new technologies.

- **Technology-biased laws introduce extra costs.** Despite good will, it is impossible to make laws completely technology neutral. More biased they are towards certain solutions, more difficult it is to entry markets with different technologies.

- **Unclear legal status of new communities** slows down the pace people can avail of them.

We conclude that the most important legal areas in the MobiLife context are the following: [Galli05]

- **Privacy and data protection.** Privacy is one of the fundamental rights. Especially, the protection of private information or data protection is essential to MobiLife business models. New technologies enable products and services that can avail of private information. The dilemma is that they may, at the same time, be useful for individuals and jeopardize their privacy. Private information can be very valuable for business.

- **Intellectual property rights (IPR),** especially copyright. Intellectual property rights protect intangible valuables, like music, software, multimedia, or inventions. Those are objects of intellectual property rights: copyright, patent, trademark, etc. They can be used to prevent some unauthorized gaining of intangible objects, that is, to exclude free-riders. In recent years, IPR protection has strengthened remarkably. New legal means, like database protection, extend the exclusive IPR to cover subject matters that were formerly common property. Anti-circumvention rules, i.e., the legal protection of technical protection, or Digital Rights Management (DRM), prevent end-users to exploit their legal rights. Therefore, the ever-strengthening IPR touches MobiLife business models increasingly.

- **Contracts and consumer protection.** Contracts are the primary legal means to manage rights and duties within bilateral relationships, but they do not bind third parties in general. In a network environment, it can be difficult to identify contracting parties. EU legislation aims at harmonizing the legal framework of electronic contracts. Consumer protection restricts the freedom of contract: in a contractual relationship between a consumer and a company not everything can be agreed freely.
These legal topics will be discussed more in detail in the forthcoming MobiLife report D1.6 “Legal and Regulation Framework Specification: Competence within Mobile Families and Ad-hoc Communities.”
4 Business Models for New Mobile Applications and Services

In a business model all the important parts for the business of a company should fit together. It tells how a company or a set of companies intend to create and capture value. This chapter exploits the business modelling framework and results presented in Chapter 3. It describes four generic business models for new mobile applications and services. These generic business models give practical insight into the modelling work with their different kind of approaches to business model components. The attention has been focused on those business modelling components which are most challenging to solve.

- The first generic business model describes the situation where a company meets new technological challenges. In order to benefit these challenges all the other business model components have to be defined accordingly.

- The second generic business model takes into account the possibility to provide information to users. However, the user is not necessarily willing to pay for the services. Thus the success of this kind of business model is related to the solutions regarding the earnings logic for that company who acts as a service provider. All the other business model components, e.g., role needed for organizing the revenue flow have to be done accordingly.

- The third generic business model describes an extension to existing business of the company. The key in this modelling task is to adapt new mobile possibilities to business and consider what kind of ties the service promises, user segments, processes etc. have.

- The fourth generic business model describes a business model that is based on content delivery. This description takes into account the challenges the mobility brings to the business.

All of these business models include the components needed for modelling a business. The value mechanism are included and pointed out in the figures describing the roles needed for the business model and the service and financial flows between these roles.

The value for the user means benefit. In a business model it is always a question about money and the source of revenue is indicated as value as money. The value proposition has to be given to the user and the role responsible of this task is also included in each figure. The value creators - all of them - have impact on the value proposition. They all have clear roles again, they all change somehow the proposition and it could not be done without those roles. Finally there are several roles needed for the provisioning of the service but these roles do not change the value proposition and can been seen as costs for the service.

4.1 Business Model A: Technology Based Business Model

Technological developments drive in the marketplace the emergence of real innovative mobile services. The new technologies generate changes in the business models. Also the actors needed for provisioning the service may be different. Additionally, the use of new technology may provide a quite extraordinary value proposition to the customer compared to the competitive alternatives of the traditional, until now used business models. If the company aims to benefit from the new technological possibilities, it has to reconsider the definition of resources component in the business model. It also has to consider what kind of impact the changes in resources component has to the other components of the business model. As an output of these analyses, the company defines and applies new business model in order to take a good competitive position on the marketplace.

This section describes a generic business model that is based on new technological challenges. The convergence of industries provides a possibility to sell and distribute some mobile applications to consumer and enterprise customers as software, either separately or as a part of the terminal or service package. Typical examples are general purpose communication and collaboration applications, groupware applications, media players etc.
Considering those applications described in MobiLife project, this model would be suitable for the MyLife Viewer application. It provides the user with an all-embracing view of the different aspects and activities of his life. It covers personal, family, work and hobby related activities by using group related views. Another example would be the MobiLife Infotainer application.

Figure 9: Roles in technology based business model.

Users and customers

The applications in this model are sold as part of a complete package or service offering to the user. It may be part of quite a new service bundle of add new features in the existing services. The definition of the user benefits may base on the experience of existing services. However, if the complete package or service offering is quite new, the precise dimensions of customer demand and required service performance have to be defined in order to describe the user component for the business model.

The customer may be a consumer (individual or family acquiring mobile service package for its members) or enterprise (acquiring mobile service package to its employees). Segmentation is done for the entire package (e.g., working people, teenagers, media enthusiasts). The segment needs to be sufficiently wide.

Usefulness and convenience are relevant for applications in this model. In case of consumer users, ease of use and entertainment are key factors. In case of professional usage, productivity (using the applications for work processes) and manageability can be regarded as most important. In both cases the services should not be launched before technology is reliable enough and usability has reached the appropriate level.

Product/service promise
The product and service component in a business model is the one in which customer value creation has to be reflected. In this technology based business model the product is defined as a seamlessly integrated solution: terminal (e.g., terminal intended for a certain segment like mobile workers, media enthusiasts), network, terminal and service applications. Integration to various internet services (web, email etc.), and in the enterprise systems also office systems, is very important.

The particular application behind the definition of this business model is used to motivate for purchasing the entire new package, or purchasing a particular terminal model. E.g., an enterprise might purchase mobile terminals and associated connectivity and other services because of a mobile email solution, or a consumer could buy a new terminal because of a music application. The value proposition is based on practical or innovative usage possibilities. In order to meet the customer value creation expectations the definition of the product/service component forms a guideline for the entire product/service provisioning process.

The technological development based mobile applications can integrate with legacy systems, such as legacy calendar systems, and offer additional functionality. They can provide context-based reminder and navigation services as well as personalised communication support within and between the groups. Through serving the individual user this application one also supports different types of groups. The trust level between different groups varies based on user perception and experience. All these features of the service can be used to define the service promise to the user.

Earnings logic

The application is sold by the service provider (providing the entire mobile service package including the terminal) to the consumer or enterprise customer. The customer either pays some extra for the application when acquiring the service package or the price is not separately visible. In the latter case the application is part of an enhanced service package and motivates the customer to buy this combined product.

The service provides extra value to the customer and we assume that s/he is willing to pay for it. The division of roles, investments and costs in this specific business model is clear and there is no need for definition of metrics for actual service usage.

Resources

The definition of this business model starts from resources component. It conceptualises the resources, capabilities and technologies that enable the company to provide the application to the customer. For the service provider, it is important to have, e.g., the following resources: efficient, reliable server equipment, operated with sufficient security and customer relations management system with cost-effective helpdesk.

New technology like an enhanced calendar system is provided as part of the service offering. This technology by itself is owned by the companies designing and providing the related software (terminal software provider, services software provider). The service provider needs to have a certain control over the technology (e.g., defining requirements or features and ensuring interoperability) the capability to utilize the technology to offer benefits to the users. It needs to have capabilities for lifecycle management.

Suppliers/value net

The value proposition in the business model is given by a service provider. The application could also be sold separately by the software vendor, terminal manufacturer or the operator, but this option is not considered here. The general nature of the application and suitability for a large target group justifies this model.

In addition to providing the application related service for its customers, the service provider (an example of a service provider is a mobile operator) is assumed to cover the following roles

- Connectivity provider (operator)
• Trust services, identity services and group awareness services providers

For the value creation the service provider needs to cover the roles of terminal software provider (terminal application software) and service software provider (service application). These are provided by terminal manufacture and system integrator who have to be included in value net. However, they do not change the service promise and are as such included in the value net as costs basis.

Orchestration

It is assumed that in this business model, a single company (an operator) is acting as a complete service provider, responsible for the application services provider, connectivity provider and trust services, identity services and group services provider roles. Orchestration is focused on managing relationships with the terminal manufacturer companies and services software companies for creating robust end-to-end offering for the customers. Standardization (de-facto) may be necessary for this mobile service. Joint marketing is useful in launching the services for the software provider could benefit having the company (brand) name visible to the user.

A nodal company could be, e.g., a company acting as the terminal software provider and services software provider.

The governance of these relationships is based on contractual relationships between the actors and no additional definitions are needed.

Processes

The effective process is needed for the business performance. The service provider needs to have in place processes for supplier chain management (SCM) and customer relationship management (CRM). With suppliers especially important is management of terminal software releases and service software releases (testing, interoperability issues, delivery). These have to be designed early enough in order to have a common structure.

The CRM includes processes for software update deliveries and helpdesk operations. These are included in the definition of business model for the awareness among users of all the extra services in devices is slow. Old routines are very strong. Practical help in using the services are important.

4.2 Business Model B: Contextual Information Applying Advertising Based Model

In an interconnected world with a ubiquitous internet infrastructure people will be more interested in online services. In such a context, mobile services based on so called context aware advertisement revenue models may become increasingly valuable.

Context related services benefit the technological development and thus the resources component definitions are important also in this generic business model. However, the main challenge for the services using context related information and thus also for the modelling task is the earnings logic. Familiar revenue models have to be reconsidered for the user in not necessarily willing to pay for the services.

For a company and for the business model definition, however, the revenues are all about. Advertisement based revenue sources can sometimes be discussed. The design of this business model is related to the definitions made in earning logic component of the business model.

Considering those applications described in MobiLife project, this model would be suitable for the Time Gems. The recommender service is a mobile application that offers suggestions on how to spend leisure time, taking into account personal profiles and explicit preferences, someone’s availability to hang out with other people and any other relevant context information. The earning logic in that service is based on context aware advertisement revenue models.
Users and customers

Any customer, whether another business or an individual, uses a wide range of inputs in order to create value. A company’s offerings have value to the degree that customers can use them as input to leverage their own value creation. The emotional and irrational needs are important drivers. The most likely user groups for the service in this business model seem to be people interested in socialization through online services, people with some well-defined, specific interest about, e.g., a certain type of movie or sport (the application would help you in finding buddies with a similar interest) and travellers, especially independent travellers.

In essence, the leisure recommender application supports a very diverse set of users and situations. When commercializing such a service, it would be useful to have a clear focus on what consumer segments could have the best potential. In other words, a proper market analysis is essential.

The most promising service provider categories seem to be advertisers, event organizers and ticketing agencies. Also on this supply side more market research will be needed in order to be able to select the potential and interests of advertisers, publishers (traditional and Internet based, e.g. portals, search engines) and other actors in the value network (e.g. media agencies or public agencies) in such a service. By having a clear supply and demand focus, the marketplace and business feasibility and viability of a service like the leisure recommender service improves.

Product/service promise

The main distinctive benefits and key features of this application are:

- It is personalised;
• It can allow you to save money, receiving e.g. last-minute promotions;
• It saves time, makes the setting of time schedules easier;
• It offers further information than traditional fixed paper-based listings;
• It is multimodal;
• It overcomes language difficulties making travel plans easier.

These features are used in service promise definition for the business model.

Interest-based customization (including recommendations) has already a central role in many internet-based services (think of the recommendation system of Amazon and the advertisement model used by Google). Having such services in a mobile, personalized, context-aware environment could proof to be valuable as well.

Since the recommender service benefits for the end user resembles very much the ones offered by search services (e.g., of leading players as Google), it would be useful to explore in which ways the mobile context can make future application really distinctive on the market, e.g., by using a benchmarking approach for comparable features.

By matching the profile and status information of users with the services available, content providers and end users are getting matched in such a way that end users can easily enjoy the most appropriate services (e.g., an interesting exposition in a nearby museum, a concert, a movie, mobile content) in a given context. Content providers are able to ‘automatically’ come in contact with valuable prospects.

From a product/service perspective, one should make the application as distinctive as possible when compared to Web portals and mobile portals by optimally profit from context and group functionality. Also a good balance between the commercial exploitation of personal profiles and the privacy of end users needs to be found. For being able to offer context-aware services like this one, information about the users preferences, his/her location, eventually his/her agenda, etc. is needed. When this information isn’t properly managed, some severe privacy issues could emerge.

Earnings logic

Advertisements are supposed to be an important revenue source for mobile services in the future. Advertising based revenue models (including Internet examples like Google and Yahoo!) may also form the basis for the revenue model behind a service like the recommender service. More specific, a so-called contextual advertisement/marketing revenue model may be the most appropriate revenue model for the recommender service.

The identified revenue sources are limited to business-to-business money flows. According to the user tests in MobiLife it seems unlikely that end-users would be willing to pay for the service. This means that when the service provider shows potential interesting content services to customers via the application, each time the end users sees and/or selects such a content services, the content provider pays a small fee to the service provider. Also for each time a content service is being ‘consumed’ via the leisure recommender service, an additional fee may be paid to the service provider (a sort of commission; e.g., for amount of tickets sold, amount of digital content sold, etc.). In order to become profitable, the provider will probably need a large customer base. Therefore, an international market focus is most probably needed.

Resources

The resources component in this business model definition includes several technological enablers which can be taken into account. The service provider has to provide an intelligent matching system between the priorities of its customers (e.g., via preference profiles and usage of context information like location information) and available content services. This forms the basis of the value proposition of the recommender service. Therefore, enablers like personalisation technology, context awareness technology, and, when offering group based recommendations, also group awareness
technology play an important role. Of course, also the content as provided by the content providers can be regarded as important resources. Also the availability of a proper micropayment system is important in this context.

Suppliers/value net

The identified value network roles for the recommender service are mostly the same as the roles involved in Internet portal value networks. The main difference is the more relevant role of the network operator because of the mobile setting of the service.

The following role and related activities have been identified (see also Figure 10):

- **End user**: potentially any consumer with an enabled device.
- **Customer**: end users if the application is offered as a premium service.
- **Content provider**: any provider of an offer, online or offline-based, directly or as a reseller or packager; e.g., a provider of chat services for a specific community (e.g., football fans) or a ticketing agency for a movie theatre; both of them could provide their services directly or via an intermediary, e.g., a mobile portal.
- **Advertiser**: invests directly or indirectly (through, e.g., a media agency) in the recommender service to promote its products/services.
- **Service provider and aggregator**: puts things together for the end user; packages content provider offers, matches their content to the personal profiles and delivers them to the users.
- **Payment system provider**: provides the facility that from the service provider side allows to deliver and check out bills (either periodic or one-off), from the end user side to pay them.
- **Network provider**: offers connectivity, positioning, context detection.
- **Application provider**: provides application needed for offering the service.
- **Optional**: a generic “trusted third party” role, e.g., for guaranteeing the privacy of the end users.

When commercializing a service like the recommender service, a further clarification of the actual service provider is needed: which actor is most likely going to cover this role? A network operator, an Internet start-up, or a company like Google? Therefore, the main opportunities and challenges for these actors should be analyzed.

Orchestration

The service provider plays the role of a sort of intermediary between content providers and (potential) customers. Therefore, the service provider has an important orchestration role: in order to be able to offer a service like the recommender service, the service provider has to create and manage relationships with a diverse group of content providers and intelligently market their services to the end users of the recommender service. This is a complex task.

For this service a relatively high level of standardization and interoperability will we needed. This as quite many of the future services and applications deal with data related to the user which points out the importance of trust and privacy of the personal user data. The definitions and control systems as well as the enabling architectural interfaces for the roles needed for service provisioning are defined in this business model component.

Processes

For the recommender service some crucial processes can be identified. First, the matching and related customization process needed for matching the available content services to the right user of the service (e.g., based on information and context aware information like location and time information) can be seen as a core process of the service provider. Also the availability of a (micro) payment services is important in order to be able to collect
advertisement fees from content providers and collect and distribute end user payments for ‘consuming’ content services via the recommender application. Also effective marketing can be seen as an important process: without a large user base the profitability of the service seems to be questionable.

4.3 Business Model C: Mobile Extension to Existing Business of the Company Based Model

Mobile technologies and their potential in creating new forms of business dominate the description of this business model. As such, it reflects the role of information technologies in the change of existing businesses. The main challenges that this business modelling task meets are linked to existing business processes. These processes describe what actions the company is doing today, why they are done, what preconditions are needed and what would be the results of these actions. Business processes include activities by which the company adds value, produces and sells products and services. Adding mobility features to existing services differentiates them from the competitors, increases the quality of service and gives new possibilities from which to get some benefit. However, the modification of a business model to include also these features has to be done with care to avoid the loss of existing customers. The description of this business model is related to these challenges.

The possibility to digitize almost everything, including text, sound, speech, film, graphics, animation and music increases the possibilities to benefit from mobility in quite many different existing businesses. In order to simplify the business model description we focus on describing a solution designed for sharing wellness information among selected individuals or groups. This solution integrates fitness monitoring features and comparison capabilities into one package. It supports user as well as family life by sharing wellness, environment and location information. And it can be included in health care businesses as well as in the business of small sport clubs. The following discussion will explain the underlying logic according to the business model components.

Considering the applications described in the MobiLife project, this model would be suitable for the Wellness-aware Gaming System; this application is actually dedicated to sharing wellness information among pre-defined people and groups.
Users and customers

Users and customers are extremely interested in wellness information. One example is heart rate monitoring, which is especially relevant for the different type of physiological conditions. A company providing health related services has access to the complete set of rich data and information available (on a connected PC) regarding certain users but the same possibility can be provided for the users themselves.

In the perspective of the end-user, in this case the dimensions of usefulness and convenience would be the most relevant. Monitoring wellness information, e.g., heart rate parameters, provides critically useful information. It may possibly be stored and forwarded e.g., in special cases to medical specialists or coaches information repositories. Still, a more precise definition of user benefits calls for research of the exact and detailed dimensions of customer demand and required product performance.

Usefulness and convenience would be the most relevant for the customers as well, but for different reasons. Customer means in this business model a person or a company paying for the service or responsible for providing the service to the end user. The information generated about the end users (i.e., the training centre customers or health care customers) could potentially be very useful for planning proper health related activities, increasing the service level and sophistication, augmenting the organization knowledge base.

Moreover, in case in which the service is provided to existing user/customers and it can be integrated with standard devices and platforms (mobile phones, PCs, Web services etc.), it would be distinctively convenient.

The definition of user / customer component in this business model implicitly includes the issue of segmentation and strong integration of a deep, structured understanding of end users and customers. The mobile service provided is very different from the traditional ones (i.e., face-to-face discussions or paper documentations). This is consistent with the result of MobiLife research about the characteristics of new mobile services as innovations related to traditional ways of doing things.
Service providers (e.g., health care and training centres) seem to be in one of the best positions in the market for having a sound knowledge of their customers (end users of the service in this case), as they have already an established relationship with them and are most likely ready to profit from the new learning allowed by this service extension.

**Product/service promise**

The welfare state is based on the principle and practice of caring about all people, in an inclusive way. If individual users are provided with new opportunities for health care services, then the service **promise has to be simple enough to be understood by each of the targeted individuals and groups** – including the case of aging people. The relationship with the provider of the services is up and running, so new services add value to those one with which the user is already familiar. Trust and privacy issues are of key importance too.

**Differentiation is one of the forms in which value is created** for the buyers of a certain product and service. This logic is at work in the case the service is provided to users such as the members of a training centre: they would experience an improved and better-than-average service, because wellness monitoring and data sharing add something new and specific to the standard training service. In other words, **the existing business leverages on innovative mobile technologies provided or “packaged” by a third party (i.e., the service provider) to distinctively shape and differentiate its offer.**

Specific **characteristics of the technologies** employed are important in the case of a wellness service. The service could include generation and efficient sharing of personalized information, e.g., distributing body information over standard, largely available mobile devices and PCs. This means more convenience for the end user as well as for the organization that integrate this innovation into its normal service (the customer according to the scheme reported in Figure 11).

The definition of the service component in this business model may also be motivated by the reducing costs point of view: the idea of capturing value by adding new technological features in the service provides training centres’ type of customers with new possibilities to add service quality with competitive costs. For a health care company or public health care institutions these new enabling technologies would mean an opportunity to offer the service to multiple prospects thanks to their access to an existing customer base.

**Earnings logic**

The service is a mobile extension to existing business. The earnings logic is thus strongly related to the service already provided to the user. However, it can also be defined as a premium service – the added value can be charged separately.

A similar logic is applied to costs and investments which are allocated according to business opportunities, risks and roles of different actors in the value net providing the service.

Users are supposed to be willing to pay for the services. The service is added to the existing service and the usage is paid at the same time. In case of health care services either the final user is willing to pay it as a private service or the service is included in the service of public health care providers.

Starting with the business model of training centres providing health monitoring, some revenues are created or maintained (i.e., not lost because of the competition) as the **described solution enables a differentiated offer that justifies a higher price for the services already provided to end users (e.g., access to the training centre facility and training assistance) or reduces churn or both.** In our example it would mean that subscribers of a training centre are willing to pay something more, e.g., for their annual fee to get access also to this innovative wellness monitoring service integrated with their standard devices, or that they renew their subscription with the training centre because it is the only one providing this innovation in their residential or working area.
In the case of a health care company providing the service it would be possible to directly charge the end-users. Otherwise, it could also be provided by public health care providers as a service and public health care providers themselves would pay for the service. However, public health care providers own revenue source is usually sponsored by the state.

**In both cases the operator will get new revenues.** The service increases the usage of mobile connectivity; new revenues would **possibly be generated for the mobile retailer and manufacturer as well**, since this advanced application motivates users to get a more updated device. The demand of more connectivity and more advanced devices would also be pushed by the customer and by the service provider as their activities would require them as essential facilities.

Regarding costs, it is worth to note that the company providing the service to end users could benefit of **some economies of scope**. These innovative services are included into existing offers according to a bundling logic; wellness monitoring is something already performed in a more traditional way at wellness centres and as such it just extends an existing activity. A health care company could enlarge its customer base without investing more in human resources.

**The provisioning of the service calls for a service provider who is expected to get a relevant share of costs and investments** as it would the one subcontracting the application provider for acquiring or licensing the software assets and it should also acquire or lease several sensors and resell them in a packaged service to its business customers (as said, for example training centres, sports teams but possibly also health clinics etc.); increased costs may incur because of this new initiative.

**Relevant investments would be needed also from the application provider and sensor manufactures sides** as they will be researching, designing and developing all the technology systems and components (or maybe partly assembling them for external providers).

**The operator investments in its network and value added services platform would be potentially repaid by an increasing number of business customers** as this new breed of service providers and companies mobilising their business (i.e., extending their existing business through innovative mobile and wireless technology capabilities) would require it to deliver their changed, renovated products and services.

In this business model the earnings logic is shaped on the principle of **sharing costs, investments and revenues between several different actors, in a distributed way**. As companies invest to digitalise their business and operations, they save money or get more money and a better competitive position in the marketplace.

**Resources**

Human, technological and financial resources needed to put in place this service are likely to be most successfully aggregated by the specialist company acting as service provider. Extending a wellness service with an advanced solution requires a sound understanding of a vertical market typical of a specialist business; combining the service with other ones means also better access to complementary technological and financial resources.

Similarly to what was said for the end-users, doing so with standard technologies would grant that these innovations come at possibly acceptable costs and without disrupting the available technical infrastructure, excluding the necessity of buying proprietary devices or software.

The extension of existing services with mobile feature requires the capability to exploit and combine resources through organisational routines. Creation of value depends on the competencies and ability to provide and efficiently deliver benefits which are important for the customers' health. These valuable capabilities are created and acquired over time with several actors. This calls for strong coordination capability, as service provisioning requires
information and management systems that combine the processes of each actor. The service quality has also to be constantly monitored.

Suppliers/value net

Two distinctive characteristics or critical areas define the supply chain and the value network of the case at hand. The first one is the **supply relationship between the company extending its current business** (i.e., the customer of Figure 11) and the service provider.

The provisioning of this service calls for a service provider who is an established specialist of similar services. As such, it would **take advantage of both economies of scale and economies of scope**, offering the same service to different training centres and packaging it with other sector offers like advanced machinery or “smart” clothes (i.e., clothes with sensors) for end-users and professionals coaches as well as for health care providers. This is a key element as the technologies and the service that actually enable this extension are packaged and delivered by the service provider.

The second defining characteristic of this model is the **supply multiple relationship between the service provider and both the application provider and the sensor manufacturer (and the mobile manufacturer as well)**, where there is actually a **network of partners** whose combined efforts are essential to put the service in place.

As for the service providers that here are supposed to be specialists of sport and medical devices for physical performance industries, or specialist retailers of these products and services, again they are most likely better positioned than others to offer a similar innovation to their existing customers (or prospects), as they have as well already established relationships and a sound knowledge base.

Summing up, the following roles and related activities have been identified (see also Figure 11):

- **End user**: potentially anyone using an existing product or service provided that has a mobile device and subscription; more specifically, in the perspective of the given example, someone attending training centre activities or the member or a sport team.
- **Customer**: any company or organization that acquire the mobile service extension of its existing business or activity; again, in the example perspective, a training centre company or a sport team or a sport association, professional or semi-professional etc.
- **Service provider**: the organization specialized in the business or activity sector of the customers with the right mix of market, technological and other capabilities that allow to assembly, package and deliver the service, e.g., a company in the sector of wellness, sport or health machinery, equipment and information services.
- **Application provider/system integrator**: the technology company focused on designing an implementing the hardware and software solution; some of even most of the components needed could be well provided by third parties, with the application provider taking advantage, e.g., of local market expertise, vertical knowledge, strong integration and innovation capabilities or other factors.
- **Sensor manufacturer/vendor**: the technology company focused on designing and implementing the core components related to body information monitoring; given the advanced nature of the business it may be a highly specialized entity with strong innovation and research orientation.
- **Mobile device manufacturer**: a typical role in the value net; in the case at hand its contribution in providing devices with advanced capabilities and standards interfaces is a key factor.
- **Standards organizations**: the distributed nature of this model that it is supposed to be applied by a large number of different actors from all sides on the market
makes this an important and essential role, especially when looking at mobile and Internet-related bodies.

- **Operator (includes Network provider, Subscriber/End user centre, Identity and Trust provider):** it would be the provider of several standard technologies and processes that would be actually enabling service providers and existing business to mobilize their offers; Figure 11 specifies three sub-roles included here as typical value-added services but others may be detailed as well.

- **Mobile device retailer:** apart for the essential role of displaying and selling devices to end-users, it could play a more critical contribution in the case of special marketing initiatives aimed at promoting these types of innovations; as such, its potential impact should not be overlooked.

As a further remark, the nature of this model, i.e., its applicability to existing businesses, imply that the type of actors called for covering these roles may vary a lot; in any case, it should be noted that similar patterns have been observed with the fixed Internet. This (at least to some extent) seems to be an emerging paradigm also for some mobile services, as reported also below in the wider discussion based on experts’ feedback.

**Orchestration**

The definition of this business model – especially in case of a health care company and public health care provider – has to pay attention to the service architecture, information and knowledge sharing between different actors. This basic requirement for capitalizing the technology as part of the existing business architectures, service architectures and technological architectures calls for a high level of standardization and interoperability. These architectural specifications are the key enablers of the service. The company would like to keep the premises of existing services stable. However, the mobility provides characteristics that require dynamism also at the architectural and at the service provisioning levels.

The governance systems have also to be defined exactly for the information included in the databases and flows between different actors are strictly private. Rules and responsibilities between different actors are of extreme importance in the case of health care services.

Modularity is a key concept in challenging the demand for customised health care services. Modular services, processes and knowledge architectures enable service providers to create greater service variety, introduce technologically improved or new products more rapidly and lower costs of product creation and realisation. Modular architectures also affect the processes inside the company as well as between different companies in value nets.

**Processes**

The biggest challenges in modelling the business as an extension to existing business are met in the main processes of service provisioning. The company providing the service to the user has to modify at least partially its standard processes and procedures. An effective process enhances the business performance of a network of companies and the provisioning of the health care service might need new actors in the value net.

Similarly the service provider will have to adapt itself as required by the integration of a technology-based business-to-business offer. In customer service this may require specific customer support, service level agreements with its key suppliers and careful management of new information flows. There might also be a need for a help desk-type of service provided for end users.

**4.4 Business Model D: Content Delivery Based Model**

In the Internet and in different mobile services is quite typical to use a business model where a customer can buy some content by ordering it from service provider either by making a separate order each time or by using, e.g., monthly subscription. Digitalisation is giving huge
possibilities for this kind of business models when almost every content (text, pictures, music, films etc.) can be delivered in digital form.

Examples of existing services utilising content delivery based business models can be found, e.g., from news services, music downloads and offerings of ring tones. This model could also be utilised in some MobiLife applications and services where some content is offered to the users as a main service proposal or as a part of some wider service package (e.g., Infotainer, TimeGems, Tourist info system, see Appendix 2).

The figure below shows a possible value network for the content delivery based business model. In the following paragraphs the picture is described utilising business model components.

![Content based business model value network](image)

**Users and customers**

Content delivery based business model can be used to sell very different kinds of information or entertainment content to users. **The business model itself does not set constrains to user segments.** Segmentation has to be done according the content itself. E.g., financial information might be relevant for business people, and fans of a certain band create one potential segment for music, videos etc. of this certain band. Because of this precise dimensions of customer demand have to be studied to be able to offer right content for right customers.

In content delivery based business model the user is quite often also the customer especially in the consumer market. Thus emotional and irrational needs are important in segmentation and also ease of use is essential. However, also company’s can offer their
employees access, e.g., to some business relevant information and thus the company is
the customer and employee a user. In business market usefulness and convenience are
important. In the consumer market parents could represent their minor kids as customers.

**Product/service promise**

Product or service promise is very much based on the offered content. The content
can be, e.g., news, music, videos, map, contact information etc. There are lots of different
kinds of examples on the market already. The main point is that the content has to be
relevant to the user and the user has to have a device through which she/he can use the
content. In MobiLife context the researched devices are mainly mobile but they can as well be, e.g., PC or TV or the service can support multimodality.

The main technological enablers researched in MobiLife project (personalisation, context-
awareness, group-awareness, privacy and trust, multimodality) have important role in
creating new distinctive service promises to the users. E.g., personalisation and context-
awareness can help user to receive easily and conveniently content she/he is interested in
mobile context.

**Earnings logic**

Earnings logic in addition to content itself is very central in content delivery based business
model. Customer can make, e.g., a monthly subscription to receive automatically to his/her
mobile device news she/he is interested in for one month period. Another possibility is to
make each order separately. The latter one is extremely challenging for the service provider
because the customer has to make a positive buying decision every time she/he
wants to use the service. Ease of use and proper payment systems have critical role
here.

Consumers are used to free internet services and thus it is difficult to make them to pay for
mobile services. Because of this the service promise must be very attractive to be able
to receive enough customers for sustainable business. Content based delivery model can
be the only business model used or there can be, e.g., a combination of the content based
delivery model and the business model utilising advertising (see Section 4.2). If part of the
service is sponsored by advertising, the service can be offered to the user cheaper and
thus it is easier to achieve larger user groups.

**Resources**

Content is the most important resource needed in the content delivery based business
model. There has to be enough interesting content for each segment pursued to be able to
make sustainable business. Other resources are used to provide to the user with an access
to the content she/he is interested in. There has to be appropriate end user devices, access
to (mobile) network and also the availability of a proper payment system is important in this
context. Technological enablers offering added value in mobile setting are personalisation
and context-awareness. There has to be a good balance between to commercial
exploitation of personal profiles and the privacy of end users to avoid privacy and trust
risks.

**Suppliers/value net**

In the value net of content based business the following roles exist:

- **User/customer**
  - In most cases the user and the customer are a same person, but in the case of
professional services and minor kids they might be separate.

- **Service provider**
  - Traditionally service provider has quite often been operator, but separate
service providers could also become more common or, e.g., the content
provider could also take the role of service provider in this kind of a business
model.
• **Content provider**
  - In the content delivery based business model this is a very central role, because the actual content is the thing of which end users are paying for. Thus, especially in the future the power and importance of content providers in the value net are supposed to grow.

• **Payment system provider**
  - In the content delivery based business model payment system provider is a central role because the customer is paying every time she/he wants to use the service. Thus the payment solution has to be easy and convenient to use for all players in the value net. Otherwise it might even be an obstacle for the service use. There has to be also a fair division of revenues between different actors in the value net.

• **Context provider**
  - Nowadays content services do not utilise context information, but it might create added value to the service promise, e.g., in a way that a user gets tourist information about places she/he is passing (see Tourist info mock-up in the Appendix 2).
  - Context provider role could be taken by operator or it could be a separate role that creates business for new types of companies.

• **Personalisation provider**
  - As well as context awareness also personalisation is a technological enabler researched in MobiLife. Personalisation is especially important in mobile services, where displays are small and navigation difficult. Personalisation makes the use of service more convenient by utilising user interest profile and thus offering only interesting content to the user.

• **Application provider**
  - **Mobile device manufacturer**
  - **Network operator**

  - In all mobile service the mobile network is essential, otherwise the services can not be used. Especially in the content delivery based business model the problem, however, is that customers are willing to pay for the content, the network itself does not bring so many added value. Thus content providers’ possibilities to become leading actors in the value net grow if the network operator is not capable of taking also the service provider role.

**Orchestration**

**Service provider orchestrates the whole service offering** acting as an intermediary between user/customer, content provider, payment system provider, technological enablers (personalisation and context information provider roles) and application provider.

**The role of service provider can be taken by a single company, operator or content provider.** Example of content delivery based business model orchestrated by operator is Vodafone Live!. Vodafone has positioned itself to directly influence and profit from the customer's total wireless experience instead of simply providing a connection. Vodafone’s role is to package, promote and sell the content, subscriptions, and services offered by content companies. Vodafone also works closely with handset manufacturers.

**Processes**

Core process in content delivery based business model is as the name says: delivering interesting content to the users and also the management and sharing of money flows to the different actors in the value net is important.
In the changing environment the viability of the business model calls for a common way to structure the processes. The processes between different actors are slow to change and the delivery of interesting content requires more open value creation system as well as open market.

There also has to be common way to handle the DRM policies. Otherwise it can become a major obstacle for content delivery based business models.
5 Setting the MobiLife Research Results in a Wider Context

After the definition of business model components, analysis of the MobiLife applications and services from business modelling point of view and describing the expert interviews of the four generic business models were executed. The objective of these interviews was to check the relevance of business modelling results in the MobiLife project.

Interviews were conducted in the form of semi-structured conversations. The approach was thus qualitative increasing the understanding of MobiLife research results. The interviews focused on business people and entrepreneurs (12 interviews), and academics and scholars (8 interviews). The expert interview description and the interview questions are presented in Appendix 3.

In the following sections, we describe some key topics of the results from the expert interviews. The special focus is in new perspectives on the business model of mobile applications and services.

5.1 Roles and Actors Analysis

In the business model analysis of the MobiLife project, several needs for changes in traditional roles were found. Also several totally new roles were identified. The following discussion with authentic quotations from the interviewees’ answers clarifies the relevance of the discovered changes. The interviewees were asked (i) which roles are needed or even crucial in new types of mobile services and (ii) which type of companies could play these roles in the value network.

In the interviews the roles issue was considered with slightly different accents by different experts. Somebody thought that there will not be big changes in roles and actors at least within a short timeframe. They thought that there would be an evolutionary shift during which the current system of roles and actors would progressively give room to a different mapping but still based on an extension of the current actors’ coverage of new and more consolidated roles. Other interviewees expected more changes to happen in existing roles and also new roles to emerge, which would lead to more complicated value nets.

"The amount of intermediaries will increase with the increase of virtual operators and also because of Internet. The consumer will get the service but in a more complex way. There may be a very complicated technical provisioning chain."

There was quite a lot discussion about the changing role of an operator. The operators have had quite central role until now. Some interviewees expected that this will change because they thought people are not ready for paying network connections anymore, but to rather buy content and services packaged. This trend would give more power, e.g., to content providers.

"Teleoperators have until now been in an important role. However, quite a lot of roles based on services will be outside that role."

"I think that the natural order for the mobile operator is to be the billing entity, and the publisher would be the broadcaster. The mobile operator is not a publisher and should not try to become that. The mobile operator has to be a value-added carrier where the value added is the “atomic” billing capability so that whatever the model it can collect the cash and distribute it to relevant parties."

According to the interviewees the actor who has the most knowledge about customers, will have most of the power in the value net in the future. One possible interesting actor in the future could be retail trade. They collect huge amounts of information about customers, e.g., trough different customer loyalty programs which they could utilise when expanding their current role.

Also the role of the customer is changing. In many future mobile services customers are expected to change their current behaviour and take more active role than before.

"Don’t forget the increasingly active role of the end user e.g. as content provider for web, photo and videologs."
In addition to changes in current roles, also totally new **roles were expected to appear**. There will, e.g., be need for new kinds of **managerial and aggregator roles**.

> “Everything will be digitalized, it will be stored. There are huge amounts of information, the management of information increases all the time, it grows with linear scale, exponentially. How will it be managed?”

> “So there should be in the ecosystem these kinds of aggregates that aggregate and coordinate things and offer it as service and then whole ecosystem should understand this is how it should go. And not be too jealous.”

Small companies might be the most possible actors playing the new roles and the new roles could offer opportunities for start-ups. Some scepticism was, however, recorded about the **real potential of the emergence of new firms relying on new business opportunities** related to the new emerging roles mapped in the technology and business architecture.

> “When GSM was specified, the specifications included smartcard. SIM card industry did not exist during the 80’s and now it is probably a prospering industry as the mobile boom continues.”

> “What it is to be seen if there is a need for a new specific actor to step in and cover these roles. Well I don’t think so. I would expect more to have the current actors extending their operations to cover also these new or expanding roles.”

Existing companies might be mostly interested to take **roles that are related to their existing core businesses**. E.g., operator was seen as a natural player for security and billing issues, but also, e.g., credit card companies could be interested to act as billing or micropayment providers.

### 5.2 Earnings Logic and Revenue Sources

Earnings logic is important and one of the most challenging components for new business models. The key question is where the money in providing mobile services really comes. The users’ willingness to pay is sometimes questionable.

As mobile services include more and more applications other than voice and messaging, the industry is increasingly searching for **sustainable revenue models** needed for profitably exploiting new mobile Internet services. Based on the interview results, **different revenue models** are expected to **co-exist**.

> “The three basic models (subscription based, transaction based and advertising based) are all relevant and will co-exist also in the future”

> “We may see an evolutionary trend that may let room for all possible models to co-exist”

However, **advertisements** are expected to be the **most significant revenue source** for mobile Internet services. The users’ possibility to choose has to be taken into account also in this revenue model as an “option that people use the same service without advertisements and pay a little”.

> “As for advertising, there is a lot of money in it (and a very strong concentration in the market structure). Advertising based models are not going to fade and since television too is going mobile anyway, take for sure that some form of advertising will be there”

**Content** was indicated as an **important revenue source** as well. However **revenue sharing schemes** should therefore become more **favourable** to independent **content providers**.

> “The i-mode model should be the reference – we should recognize that the value is mainly in the content and revenue sharing percentages should reflect that. They should be strongly in favour of the content provider …”

Customers may pay for content they will like, but of course only when “she/he thinks that product/service is valuable for her/him”.

Business Models for New Mobile Applications and Services
Broadly speaking, several interviewees pointed out that as people are used to free Internet services, this experience is likely going to have an impact on how earnings models of mobile services will look like. Some differentiation should, however, be included in the model.

“There should be some evident fair added value that it would be charge in mobile internet if it is free in the regular internet”.

This was also linked to the perception that current price levels are sometimes too high for consumers, especially when compared with for instance the volume-based discount on voice tariffs that enterprise customers are able to get from operators.

“I expect a B3G context mostly based on a low flat fee model …. I can not imagine to spend tens of eurocents for each single piece of content or pictures that I want to exchange … Business applications maybe could sustain higher prices. Today is the other way round!”

Several interviewees mentioned the importance and need for a standardized micropayment system, even enlargements to today’s views of payment.

“I believe there will be a standard for payment, so that anybody can put a service to the network and when somebody wants to use the service there will be money on your account.”

“Credit card is only a temporary solution for payments. Mobile device will include all identification systems, the security/trust is at the level that you can buy something and you are authenticated to buy something.”

It is not clear yet which players will profit most from the mobile Internet services. However, “content providers and device manufacturers make a good chance.” It seems that telecom operators won’t be the big winners because “(data) communication will be a sort of ‘standard service’ with low margins.” “Traffic is the most important revenue source for operators, content forms less than a third of their total revenues.”

5.3 Personalization

Personalization is one of the application and service characteristics that have impact on the service promise to the user. It is the appliance of adaptation based on profiles and preferences in order to make usage easier and the perception of information services more pleasant to users and groups.

Most of the interviewees considered that personalization is an important service feature for user convenience and hiding the complexity. It encourages using services and adds value to them.

“Everything will be digitalized, it has to be possible to limit the complexity, and personalization is used for limiting the complexity. People are different and have different ways to use the service.”

“[personalization] makes the use more comfortable and thus encourages consumers to use services.”

Personalization is seen important especially for mobile services because of UI limitations etc. It is a way to differentiate the mobile environment from the PC internet.

“[Personalization is] essential in mobile services with small displays, needed in all mobile services.”

“Personalization is important; it is one of the topics that differentiate mobile environment from the Internet-world. Locality combined with personalization”

In order to be valuable for the user and viable for business, personalization needs to be automated and work seamlessly for the user, without any user effort or costly management.

“The management - who will pay for it?”

“People do not have patience to input their information or choose from menus – the process is too heavy. That’s why I believe in automatic personalization.”
Some interviewees pointed out that personalization must not artificially limit choices or options for the users. It has to give the user a perception of choice but limiting unnecessary complexity.

"I am a bit sceptical about these, so that personalization services would be in the network. […] Is it then not irritating if I next time want to act differently and the machine keeps telling you are not part of this group?"

"I would say that in good personalization the consumer gets a picture that he has full freedom of choice – can do whatever he wants. But still somebody has made the choice for you: here you have fish and meat options, which one do you take."

Because of social and regulatory privacy issues, there will be limits how services can utilize and distribute personalization data. The limitations are however relative to the perceived consumer benefits (in return to giving up some privacy), cultures and contexts.

"Privacy issues involved. But if there are certain benefits consumers give up some privacy."

"We can give a lot of things to somebody to take care of. But somewhere there is a limit. And the limit is different in different cultures, contexts, situations."

Because of privacy issues with storing personalization data in services, there is an opportunity to do personalization in the terminals where the user clearly is in control, and thus add value to the terminal devices and application software.

"Main part of personalization will be done in terminal / device. The usability, “response time”, management and trust can be more easy and trustworthy solved by personalized terminal."

"People have a threshold to give out a lot of information for personalization to some indefinite place. People rather personalize devices/terminals that are in one’s own control."

Even if personalization as such has value for the user, service providers need to think carefully how to deploy personalization as scalable, viable business. Service providers need to find suitable target groups for personalized versions.

"Personalisation has to be scalable."

"Rather I would use time for turning it upside down: how to find big enough groups, what are the common denominators there – and concentrate on these groups. Make two versions of the service rather than try to take everything into account."

The interviewees expressed various opinions on who (role, actor) could be running the personalization business. The views expressed indicate that as a main trend personalization would be centralized, run by global – possibly entirely new - players that can integrate multiple services.

"Centralized personalization will be a stronger phenomenon. It’s a megatrend."

"I don’t believe anybody could run this as a business. Unless it would be completely global, happen as an extension of global brand like Google, Amazon."

"New players might be better solution than existing actors taking this role, because existing players are always thinking mainly their own interests which could slow down the development."

5.4 Group Awareness

The future mobile services will have group awareness capabilities. It will add value to the user and characterise the service promise.
Enablers like personalization, multimodality and context awareness were broadly recognized as having an **important role** by the experts, even if some pointed that in relative terms other factors may even be more crucial.

> “Concepts like personalization and context awareness are important. However, I think it is even more important to make every device accessible for everybody (based on open standards and open networks), make them traceable as well (GPS), with a high enough security level, with personal identification functionality, together with improved screens, improved cameras, and stronger power sources. Then let the world compete for the space. It will explode.”

In our opinion this is worth to mention as it points out that the impact of some innovative and very powerful technologies may be limited by more basic facts related to access, security and identity management; overcoming long-time hurdles such as battery life may be not less relevant. This is also a confirmation of the importance and complexity of technology adoption and technology life cycles in several businesses, as reported before.

Other comments highlighted that group awareness is not an absolute novelty if considered from an IT history point of view and is not specific of mobile either.

> “This is one of the most interesting perspectives. It is a theme that has been around for years in the IT industry and then somewhat disappeared. There is still a lack of applications, good metaphors and interesting ideas – really a lot to do.”

New critical technical challenges are also ahead: **intelligent rule engines** are needed, e.g., to elaborate decisions from the collected context and presence information.

> “Enablers like personalization, multimodality, and context awareness are important. Presence awareness may be very useful for supporting communication and context aware services. In order to offer such services, intelligent rule engines need to be developed.”

**Group awareness capabilities are expected to have an impact on communities.** They have been dubbed as a central theme, on which some developers are heavily working at this stage, both on private and professional ones.

In some form or another, communities have **always existed** – think about the family or the village – and this respect they are **not a new way of behaving**. This seems especially true for family life. Communication needs are a defining element of family life and existing communities, offering some good potential for group awareness solutions.

> “You can keep the relationship no matter time and place, or about 70% of the globe. It is no more limited to the place. Now in the service the context is following you.”

> “People want to communicate with close ones independent of where they physically are.”

Still it can not be taken for granted that innovative technologies could bring some benefit.

> “I believe that all the communities exist already. The question is about how technology can help them. E.g. sports clubs, cancer associations, houses for the elderly, school classes. These are part of everyday life but there is no technology used.”

Actually some experts warned that group awareness capabilities could even spark **new hurdles and unwanted effects**. The coach following a group on young sport team members with heart rate monitors is an example of a new “technical form of power” and thus of democracy in a broad sense.

> “E.g. the coach following the sportsman with “hear rate measurer” - that is the technical form of power”

Communication overload is another risk: it was noted that there should always be the possibility of being “not available”.

> “Problem of communication overload, ways of being “not available””
No common understanding was recorded with regard to the **business models** related to these needs and applications domains.

“There is some kind of need, but is there any business model? Who will create the services?”

“That would be a good role for the operators or MVNO”

Some feared that **service providers could be missing** while others suggested some concrete hypothesis.

“How can my son’s football club offer some intelligent application? The technology exists, but which service provider is going to enable a community that is technically non-competent and non-resourced, doing something valuable? On the internet this is easy – you can make a blog or something”

On the other hand, **users’ willingness to pay once they recognize the usefulness** of some services is clear.

“We have learned from SMS that people are ready to pay”

Specific industries could have more opportunities than others. Some suggested for instance that **sensors** could be used to build **intelligent clothes**.

“Use of sensors and intelligent clothes [is] interesting”

### 5.5 Context Awareness

Context awareness is generally regarded as an important element of future mobile services. In business context for example, context awareness could play an important role with respect to **improving knowledge workers productivity**, e.g., in the form of more **advanced calendar and schedule management systems**.

“I expect the emergence of different kinds of business applications based on context awareness. These applications may get more and more integrated, e.g. based on smartly used calendar information.”

“The presence will be important – if the information is already in the calendar, then why one should give the presence information.”

Although a lot of research is focussed on context awareness, some interviewees were questioning the **business potential** of context awareness.

“It is interesting but it is very difficult to think about applications with real business potential.”

“There have been many nice (funny) ideas in [universities and research centres], but I have not heard that any of them has been a real success.”

Definitely the most important aspect with respect to personalization technologies turned out to be the **privacy aspect**. The end users should always have control over their own personal information and the way this information is being used by service providers. Besides, **completely automated** context aware **services** are not preferred: the **end user** should always be **in charge**.

“Personally I’m not willing to share anything about my context, the information can never be exact enough. It is easier to tell yourself about your context”

Because of the privacy issues, there may be preference in implementing context awareness functions in the terminals where the user has full control. This would add value to the terminal devices and application software.

“Terminal might be a solution also here.”

“Many context awareness features could be based just on an intelligent terminal without operator or service provider involved. This is the most natural approach from user point of view – terminal manufacturers should utilize this.”
The value of context information in itself is small, the real value lies in how this information is being used in end user services.

“The value of [personalization information like] location information is extremely small as such. It only becomes interesting when there are good applications utilizing [personalization information like] location information.”

Context information can be valuable for targeted advertising. Identifying the context of the target group can be essential for the success of the marketing campaign.

“Especially in advertising it is valuable. Targeted advertising is very valuable both for the advertiser and the target. That is the bases for the business model.”

“In marketing, you need to think what is the time of the say when to send your message. That is the exact time. Then you start wondering what would be the context of the target group this time of the day. You need to know that because the success of the campaign can really depend on that.”

5.6 Privacy and Trust

More and more data is stored and delivered online in digital form, which creates a need for good trust and privacy solutions. Also the openness of business environment is increasing and thus making control of threats harder and ever more important to take into account in business models.

The interviewed experts had differences in opinions about the importance of privacy and trust issues and there also seemed to be some cultural differences between Finland and Italy. Finnish interviewees emphasized the importance of trust and privacy solutions while Italians saw them not so important.

“Trust and privacy are the most essential themes in mobile services. If you make one mistake, you can loose customers’ trust forever.”

“The privacy dimension is important but may be overestimated. Everything that happens in the digital dimension is traceable but it is also true that governments or malicious firms are NOT really able to dig into this ocean of data.” (Italian interviewee)

Interviewees agreed that trust and privacy have to taken into account on all levels in business. Even if there is some actor who is taking care of the trust and privacy provider role, all the other actors should also pay attention to it. Problem is that users are not familiar with issues related to trust and privacy which may create irrational fears and thus slow down the adoption of new mobile services. On the other hand the threats have not actualised yet, which may make some users indifference about them.

“Internet is like bloodhound, you do not understand it but even after a week there is still a smell left.”

According to the interviewees trust must be earned, otherwise it will not exist. Trusted players are more important in mobile services than e.g. in buying some physical product where one can easily check whether it is good enough or not. In mobile services it is more about trust, it is harder for users to assess if, e.g., your personal information is used in a proper way. Interviewees thought that it is easier to trust local actors and also to players who already have well known brands.

“In Europe there is common ethic and moral and thus it is quite easy to create trust. E.g. in China the situation is completely different. Business is however global.”

“In this Internet era, we are thinking that we would by some services from Hong Kong, but we do not behave like that. We do not know the service provider.”

“The old institutions have tremendous added value in trust.”
5.7 Multimodality

Among the interviewees, multimodality is seen relevant to reflect people’s different needs in different contexts, e.g., by enhancing TV watching experience with interaction.

“Different solutions for different contexts and needs”
“The multimodality does not mean only receiving the information, e.g. TV-program but having social relationship with people, sending information in a way”

Different modalities may be needed or preferred in different cultures, geographies (Japan preferring pictures vs. Europe preferring text) or demographies (elderly preferring larger displays). People with different education and society status can prefer different modalities.

“In western countries written text is preferred but e.g. in Japan pictures”
“Special needs of e.g. elderly people (can’t see small fonts etc)”
“Of course we have the digital divide dimension: people with different abilities or special needs.”

The interviewees confirm the assumption made in MobiLife (e.g., the Infotainer application) that there are multiple types of devices being used but the user experience should be integrated.

“Only one device - I wanted that earlier. But PCs are full of problems. If the device would be like play console, they are multifaceted and can be used for many things.”
“It should look like the same to the user”

The interviewees point out some potentially important new modalities, like haptics, but also express the concerns related to difficulties in understanding all issues, implementing optimal solutions and deployment in mass scale.

“In future haptic input will be interesting”
“It is always good to offer different modalities but the implementation matters very much”
“Multimodality is important issues. As researcher we are a little bit lost with it.”
“As for the mass consumer, I don’t see a big need of new interfaces. I guess we need a lot of more functional integration before that”

5.8 Summary of Expert Interviews

The expert interviews gave a deeper understanding of the critical business modelling questions in focus. The specific attention was paid to the roles needed in the future mobile services and the money flows and revenue sources. Also the different characteristics of mobile services (personalization, group awareness, context awareness, trust and privacy and multimodality) were included in the discussions with the interviewees.

The interviewees’ opinions were quite in line with the findings from MobiLife business modelling work. They agreed, e.g., with the changes in the actors’ roles, the possible extension of current actors’ coverage as well as their new roles. The interviewees emphasized the powerful position of the actor in the value net that has the most knowledge about the customers. They also raised the importance of managerial and aggregator roles in this value net in order to handle the amount of information needed for future services.

Key challenge identified in MobiLife and also in interviewees’ answers for the future business models was the definition of earnings logic (where the money comes). The interviewees believed that the different revenue models co-exist in the future in search for sustainable revenue models. They supported the advertisements’ role as a revenue source. They pointed out very strongly that the experience people have in using free Internet services will also have an impact on how earnings models of mobile services will look like. They also expressed the need for a standardized micropayment.
The **use of personalization, group awareness and context awareness** in future mobile applications and services are focus areas in MobiLife research. These were also recognized as important by the interviewees and the main differences between interviewees and MobiLife results were mainly how the topics were emphasized. From their point of view some of the characteristics were not providing any novelty or were associated in the business context. Some experts warned that the new characteristics may even spark new hurdles and unwanted effects. The experts pointed out the importance that the user has definite control on how much his personal information including context is shared to other users, and if and how they are available for communication. The users’ possibility to choose was also here regarded as important. At same level cultures were believed to drive the preferred characteristics or functionalities for the services.

**Privacy and trust** is in high priority in the MobiLife project, in technical point of view but also in regulative and legal point of view. The interviewees proved this approach importance and confirmed that trust and privacy have to be taken into account on all levels in business and in all services.
6 Conclusions

The research in MobiLife has focused on business models for new mobile applications and services. In order to provide a clear description of business models, several phases were included in the research. The research process has been iterative and the hermeneutic approach has provided step-by-step interpretations for the next phase of the research.

The marketplace dynamics analyses provided the first group of results painting a picture of those important marketplace topics that have to be notified while modelling the mobile business. Early assumptions about mobile marketplace dynamics are essential and help the company to make a decision of the targeted position in the marketplace. Several trends are related to users/customers role in modelling the business. These trends have an impact on business modelling and they define the business possibilities for the company. The wide scope and nature of applications and services for their part describes the competitive environment where the company should differentiate itself in order to have success in business. The changing industry structures give quite new possibilities for defining a business model. The smart combination of technological developments – also in mobile – is one of the trends having positive impact on real innovative services and thus new business models. The technology as such can be seen as an innovation enabler. Technologies that were applied in one area of applications can now be applied to another area. The traditional actors on the market as well as the new actors can enter new business areas. These results that have been identified shape the marketplace dynamics (Chapter 2) and they have been used in the next step of the work.

The second group of results from the work is related to the definition of a framework for a business model. The business model has been defined as a construct of some key components of a given business. The main motivation in choosing a component based approach comes from the strategy literature. A good business model is essential for every company. It is a planning tool that focuses attention on how all the elements of a business fit into a working whole. In MobiLife we defined the components (user/customer, products and services, earnings logic, resources, suppliers, organization and processes) first based on theory. This theoretical framework was then used in analysing the applications and services in MobiLife.

The third group of results is the key learning’s in analysing the MobiLife mock-ups for mobile applications and services from business model components’ point of view. These mock-ups provided examples that were studied further in with-in case and cross-case analysis. The case descriptions provided qualitative evidence of the characteristics of different business model components in the future mobile based services.

The key learning’s in user/customer component focuses on complexities of user needs and expectations as well as definition of required product performance. If the user is already familiar with substitute products in private or in work sphere the adoption of new services is easier. Four different aspects (personalisation, context-awareness, group awareness, trust and privacy) are pointed out as compulsory features of new applications in products and services component. Also challenges of a service promise and how to define it are regarded as important. The familiar revenue models have to be reconsidered and, e.g., advertisement based revenue sources are regarded as one possibility in earnings logic component. The need for performance metrics is also notified.

The means to create value are defined in the resources component and this definition is highly related to the other components of the business model. Customer’s role in participating in the creation of data resources of the company by actively creating or simply using services is important. These new technologies provide new business possibilities for traditional as well as for quite new actors. The changes in traditional roles and the need of dynamism are described in learning’s from suppliers/actors component. Interorganisational collaboration between different actors calls for exact definition of governance system, orchestration of value net as well ad careful architectural specifications (orchestration /architecture component). And finally the analysis of processes component points out as learning’s the need for effective processes to enhance the business performance and to bind the different activity chains and different information flows together. These key learning’s present only some of the results that are included in Chapter 4.
The fourth group of results is presented in a form of four generic business models (Chapter 5). The identified topics needed for definition of business model components were applied in generic business cases. The described generic business models have different kind of approach to the modelling topic. These generic business model examples pave the way for companies interested in applying the component based business model in their own business. The technology based business model describes a situation where a company meets the challenges of new technological possibilities and defines the other business model components accordingly. The key question in contextual information applying advertising based business model is related to the earnings logic component for the revenue sources are in this case not so obvious. The mobile extension to existing business of the company based model is related to challenges how the new mobile possibilities are adapted to existing user segments, service promises or processes. And finally the content delivery based model takes the challenges of mobility to a situation where a customer buy some content by ordering it from service provider. The four generic business models described in this document provide understanding to the use of component based business modelling framework as a tool for a company. They point out that the approach to the modelling topic has to be started from that component that is the most challenging to solve and have the greatest impact to the other components of the business model. They also point out that the future business models do not necessarily rely only on existing actors in the market.

After the above discussed research results expert interviews were included in the research methods. The objective of these interviews was to check the relevance of business modelling results in MobiLife project. This expert interview phase in research provides the fifth group of results. The interviewees’ opinions were quite in line with the findings from the MobiLife business modelling work. The results gave a deeper understanding of the emphasis of the topics in focus.

The sixth group of results can be drawn from the way of working. The research process synchronized user research, business modelling and technological development in a unique project-wide flow. The interoperability between different Work Packages in MobiLife project has provided material for the definition of business models. The way the modelling work has been executed at the same time with technical and architectural development and user centric design process can be regarded as one result of the project. Working parallel with the application and service development work provides insight into the challenges the modelling work meets in case the time to market is still quite long. Innovations in the mobile business have quite often had predominance of technology-led approaches. Defining a business model at the same time with the service development aims to avoid this mistake by clearly identifying the expected user’s benefits as well as the business modelling topics for each designed application and service concept.

Business viability depends on the realistic earnings logics for new actors who would like to take the needed roles. The willingness of the existing actors to adopt changes in their roles and value nets is also dependable on relevant revenue sources. The amount of actors collaborating in a new way has an impact on the tentative relationships between roles and the provisioning of the service. This calls for clarity in architectural questions and leads to many changes in existing processes within and between the actors. When value nets become more and more complex, at the same time product and service lifecycles shorten. These phenomena give motivation to the next steps of the research.
7 Focus on the Next Research Phase

In the MobiLife project the business modelling process has provided as a result an understanding of how the process can be executed at the same time with the technology development process, which in turn is based on the user centric design. It further provides propositions of the key issues that have to be taken into account in modelling the business at application and service level.

The research process has been gradual and it still continues. In order to have a good picture, some of the critical topics for future mobile business models have to be researched further. Earnings logic and especially architectural topics related to money flows need still to be specified.

Mobile service value networks are getting increasingly dynamic and complex, and the topics enabling or hindering that development are still undefined. Legal rules can affect business models in many ways and these legal topics will be discussed more in detail in the forthcoming MobiLife report D1.6. “Legal and Regulation Framework Specification: Competence within Mobile Families and Ad-hoc Communities” due March 2006.

The changes in the roles as well as the new roles needed for the provisioning of the future mobile services can be defined for the modelling purposes at the same time with the development of technological topics. However, “who of the existing actors will take the roles”, “what kind of new actors are needed in the marketplace” and “what drives this evolution” are topics, which are difficult to analyse at this stage of mobile service development.

The new roles have strategic importance for many already existing actors. The scenarios of the future socio-economic development are needed in order to describe under which kind of environmental development the new business models based on mobile applications and services will reach market success. The further work will focus on defining business scenarios for MobiLife both on the micro and macro levels. The macro level scenarios will consider world-wide issues such as future economic development within particular regional areas and the effects of globalisation. The implications of the mobile technology development in societal questions will be also included in these macro level scenarios.

The micro level scenarios will deal with the development of technologies such as 3G, the internet and digital television. The market situation and competitive environment as well as evolutions of products and services, costs, and issues such as deregulation are also included. Shifting changes in work patterns, effects on families and individual is part of these descriptions too.

The resulting four scenarios with explanatory factors “Changes in business logics” and “Changes in market growth” will be described in Deliverable D1.8. “Report on Market-Place Dynamics and Socio-economic Implications”, due June 2005.
8 Appendix 1: Roles

In this chapter different roles existing in value nets of new mobile services is defined to provide a common view of the terms used in this Deliverable.

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
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<tbody>
<tr>
<td>advertiser</td>
<td>May be allowed to add advertising to a customer service in exchange of a fee for the service provider.</td>
</tr>
<tr>
<td>aggregator</td>
<td>Combines different service offerings into a new value added service.</td>
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<tr>
<td>application developer</td>
<td>The one who develops a set of capabilities enabling an entity to use a set of services.</td>
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<tr>
<td>application provider</td>
<td>Provides, on the top of the platform, the software that makes a service possible.</td>
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<tr>
<td>broker</td>
<td>Performs the brokerage function to e.g. find the solution that fits optimally user’s preferences. May play a role of clearing house performing e.g. the clearance of the payments between the parties involved. May play a role as an adaptor for information / content adaptation to the context. Examples: payment broker, information broker etc.</td>
</tr>
<tr>
<td>consumer</td>
<td>Anyone who uses or consumes goods or services.</td>
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<tr>
<td>content provider</td>
<td>Content owner, content distributor, content integrator, content adaptor.</td>
</tr>
<tr>
<td>context information provider</td>
<td>Provides and distributes context information (e.g. location, situation) of users.</td>
</tr>
<tr>
<td>customer</td>
<td>A person or organisation who consumes goods or services of a certain company and who is paying for the goods or services.</td>
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<tr>
<td>device manufacturer</td>
<td>E.g. hand-set provider that provides hand-sets (mobile devices, phones).</td>
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<tr>
<td>end user</td>
<td>Person who uses the service.</td>
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<tr>
<td>financer</td>
<td>May provide funds for investing in a service.</td>
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<tr>
<td>group awareness provider</td>
<td>Offers community functionality that supports having peripheral awareness of each other.</td>
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<tr>
<td>identity provider</td>
<td>Provide the entity’s ID, e.g. ID guarantor, ID checker. Credibility information provider.</td>
</tr>
<tr>
<td>information provider</td>
<td>Information broker, information producer, adaptor, integrator/aggregator, distributor. Provides the information necessary to produce the end-user service, customers are usually service provider or content providers. Owns and administers information collection from the owners/distributors.</td>
</tr>
<tr>
<td>network operator</td>
<td>Communication/connectivity provider, that takes the roles of access, core and transport network providers. Network connectivity service to customers. Owns and administrates the infrastructure.</td>
</tr>
<tr>
<td>payment provider</td>
<td>Provides (online) payment solutions.</td>
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<tr>
<td>personalisation provider</td>
<td>Manages personal profiles and adapts the service offering to them.</td>
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<tr>
<td>Role</td>
<td>Description</td>
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<tr>
<td>platform provider</td>
<td>Provides for generic functionality in a platform that is used by a range of services.</td>
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<tr>
<td>public agency</td>
<td>Any official organization dealing with the user’s role as citizen (e.g. emergency services, local administrative bodies etc.).</td>
</tr>
<tr>
<td>regulatory body</td>
<td>Responsible for regulation and legislation.</td>
</tr>
<tr>
<td>service platform provider</td>
<td>Service platform provider provides the service environment such as service capabilities (=service enablers) and the execution environment (network service platform provider, terminal service platform provider).</td>
</tr>
<tr>
<td>service provider</td>
<td>End-user service provider, may play a single service provider role. Combination of the service provider and service integrator role.</td>
</tr>
<tr>
<td>subscriber</td>
<td>Subscriber is a role of a party that legally signs responsible for a user with respect to service usage and the consequences of the service usage for a service provider. A subscriber defines the authorisation of one or more users. A subscriber can itself be a user.</td>
</tr>
<tr>
<td>systems integrator</td>
<td>Provide consultancy and technical professional services to design, implement and possibly contribute to manage the various applications, services and processes which constitute a certain solution.</td>
</tr>
<tr>
<td>trust provider</td>
<td>Gives users and third parties a possibility to set and update appropriate trust levels.</td>
</tr>
<tr>
<td>user</td>
<td>Any person who uses a product or service to solve a problem or obtain a benefit, whether or not they purchase it.</td>
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Appendix 2: Descriptions of Business Models for MobiLife Mock-ups

This chapter contains initial analysis about business models for MobiLife applications. This analysis is based on documents produced by technical WPs (applications, mock-ups), D1.2 Initial Marketplace Dynamics (incl. business models) Analysis, D1.3 Mock-Up Evaluations, inter-WP workshops, separate discussions between WP1 and technical WP representatives and work within T1.3.

The analysis is intended as the first feedback from WP1 T1.3 to technical WPs.

9.1 Family Maps

Family Maps is an application concept intended to provide geographic information for families with babies. It will help families to solve practical problems, helping them to find locations where they can take care of their babies or spend some time relaxed. The application also uses sensor based information about the baby's condition.

9.1.1 Target Group

The end user is well defined including

- Families with babies – based on the mock-up evaluation see the service useful at least partially
- People with non-standard needs like handicapped – are willing to use technical means to manage

The paying customer is somewhat less clear. A number of possible customers have been suggested. Families with babies and advertisers are seen as most promising customers. The service enables targeted ads. Also users are willing to receive ads (as witnessed in the mock-up evaluation). Media houses like baby journals can be seen as potential customers or members in the value net. The cities (services for tourists and handicapped) are seen as less potential because of budget limitations and the narrow nature of the service. For travel agencies this service may be too complex to combine in their value offering.

In general, the target market seems to be too small to make a sustainable business. The market should be expanded somehow, e.g., to cover more generic tourist information.

The character of the service is new; it does not meet the current family behaviour (i.e., it is new behaviour to keep looking at a monitor while moving in the city). It does meet the current trend of virtual community (possibly P2P) opinion sharing (however, this feature was not seen interesting in the user study).

9.1.2 Value Drivers

The main distinctive benefits of the service are the following:

- Context sensitive
- Mobile
- Timely
- Can get the proper information automatically, very little interaction

Taking account personal needs is perhaps less evident.

The service has clear benefits over using a travel guide book, browsing the web prior to travel or mobile browsing. In some cases and some users, using own eyes can be the most viable alternative.
The concept of taking into account personal needs and context to provide proper information with minimal interaction is new as such even if some similar features exist as mobile tourist information service.

Does it offer added value compared to existing products and services so that the market will adopt it? Is the marketing approach a new one? One marketing approach is using media, e.g., baby journals that also have internet sites, extend to mobile services. Problem in having relatively narrow applicability vs. complexity to set up the service.

9.1.3 Value Network

The roles are somewhat clearly defined and include:

- End user – uses the service free of charge, part of the ticket/trip or part of the journal subscription
- Content providers
- Merchants – advertise their services (shops, café, hotels etc.), pay to the service operator
- Service operator - can be telco, media house / journal or any company
- Content aggregator
- Navigation service provider (maps etc.)
- City – provides tourist information as part of its PR activity
- Airline company, travel agency
- Application developer (server software, terminal application)
- Device vendor: standard phones (large touch screen), “wellness” sensor, some special accessories
- Communication provider – standard communication

Do the roles exist on the marketplace? Service provider for mobile information for a quite dedicated segment and needs does not exist as such. There are close candidates: tourist information services (producing guides etc), baby journals, etc.

It is not trivial to map these roles on existing actors or find existing actors to cover the intended roles because of the relative complexity in setting up and deployment vs. narrow user space. One would need to have wider user space (e.g., tourist guide).

Service provider for mobile information for a quite dedicated segment and needs does not exist as such. There are close candidates: tourist information services (producing guides etc), baby journals etc.

The cooperation between parties is the service is not entirely new: it is extending cooperation between tourist information providers, media houses, advertisers and (mobile) internet services.

9.1.4 Sustainability of the Business Model and Revenue Sources

End users are to less extent seen to be willing to pay for the service.

Advertising is a good opportunity for the service (context, targeted audience, users' willingness to receive ads).

9.1.5 Key Questions

Is this a business for someone? Tourist information agencies and internet tourist information sites could probably be extend to mobile services.

Is the service offering too narrow? Should it be extended to mobile tourist info services?
9.2 Infotainer

MobiLife Multimedia Infotainer is about showing content in different, multimodal ways, depending on available devices. Devices available in mock-up are: cell phone and TV (emulated on PC). The user has full control of them, and can switch from one of them to another at any moment. Devices are synchronised, so that an action performed on one of them affects another (e.g. the user can switch presentation to TV, news displayed on it will be coherent to the last seen on mobile).

9.2.1 Target Group

The target end user and paying customer group is broad, potentially anybody, but can be argued not to be very clearly defined. It depends on the type of content, e.g., business people for consuming news content (this target group can be seen to have an average potential) and young people that like to use new devices to consume music videos, pop news etc and want to present their content to their friends (can be seen to have a high-to-average potential because of more clear benefits to this group).

The paying customers include young people themselves and their parents, service providers (e.g., helpdesk services) and advertisers.

The service meets the current customer behaviour by enabling mobility and helping to avoid configuration problems with multiple devices. The service also meets the emerging trend of media convergence.

9.2.2 Value Drivers

The main distinctive benefits are the following

- Possibility to keep viewing wherever the users is, with different devices
- A single controlling device
- Taking into account context and user preferences
- Automatic filtering, no time consuming search, minimal user interaction

The service has a clear advantage over current unimodal mobile services for content management by the use of “context aware” multimodality and user interface adaptation.

The service is relatively new to the market since there are examples of multimodality but not as complete as this. There may be a market disruption by having a single intelligent controlling device while other devices can be simple input/output devices. The service may change the consolidated structure and the competitive dynamics by using one very powerful device (and vendor of that) instead of vendors of separate single-purpose limited devices.

Despite of the added value compared to existing products and services, market adoption can be difficult since other devices need to be interoperable, and this may be challenging for deployment.

9.2.3 Value Network

The service involves many roles

- Contents providers – providing news, adds, music, games
- Brokers - providing the service to find appropriate content providers
- Service provider - using brokers
- Hardware/device providers – providing hardware infrastructure, partnering with other manufacturers to enable the Infotainer service
- Personalisation providers – providing personalization services for content provisioning and providing statistical user data
- Advertisement companies – providing context-aware advertisement space.
• Market research companies – providing market information by utilization of statistical user data
• Network/connection providers
• Application providers – making the multimodal application (browser)

The definition of roles is not very clear partly because multimodality is an abstract concept and it is not very clear if the application is the service, browser or what. Some of the roles are more clear and existing like content provider, broker, or advertising company. There is a new possible role identified: personalization provider. Mapping the roles to existing actors is somewhat clear in some cases, e.g., for news and music content provisioning. For some roles, like personalization provider and the service provider itself, this is less clear.

9.2.4 Sustainability of the Business Model and Revenue Sources
The consumer willingness to pay for the service (content) is questionable since people are used to get e.g. news information freely from TV or the Internet (according to the mock-up study). On the other hand, some current mobile news services are charged, so this service could be charged as well.

Advertising could fit to this service quite well. There is a reason to believe that at least young people would accept advertising to make this service cheaper or free. On the other hand, there is no indication that users would be specifically interested in advertisements in this context.

For a device (or software like multimodal browser) as the product, the consumers can be expected to pay for devices with this feature.

9.2.5 Key Questions
Should the focus be in the device/software enabling this feature (multimodality etc.) or a particular service/content utilizing the feature?

9.3 Wellness-Aware Gaming
Wellness-Aware Multimodal Gaming System is for sharing wellness information among designated persons or groups. It integrates fitness monitoring features and comparison capabilities into one. It supports family collaboration by sharing wellness, environment and location information during or after training including some gaming and competition aspects.

Wellness-Aware Multimodality Gaming System Mock-Up is adjusted to the sharing of wellness information between football team and family members. The system is used in a football event, practice or game, where the football teams with coaches and family members have gathered. The players wear sensors from which wellness data is collected. In this mock-up there is a heart rate measuring belt to measure the heart rate, but the concept idea would include also different kinds of data. Spectators standing beside the field (restricted only to parents and coaches for the time being) have mobile device from which they can view the data captured via sensors. This enables coaches, parents, and players who are not currently playing to view the shared wellness information.

9.3.1 Target Group
The target end user and paying customer group is well defined. The following user and customer groups are seen promising:

• Sports clubs (e.g., football) and group training (e.g., aerobics), individuals and families as paying customers
• Elderly people training groups (e.g., swimming)

The mock-up evaluation supported well the sports club case. Elderly are seen as a group in Western countries to have resources and willingness to invest in wellness and systems supporting that.
Corporations supporting wellness activities were seen less potential customers for this system the reason being that this are too far from their main activities.

The service was seen to meet the current behaviour of customers and end-users in the market and society by reflecting people’s interest in wellbeing and using more communication by electronic means.

The service meets some industry trends: virtual communities, blogging, work on wearables.

9.3.2 Value Drivers

The main distinctive benefits of the service are the following:

- Automatic. User does not need to learn how calculations are used.
- Integration to other systems. Sharing to others, friends, doctors, professional coaches, my personal trainer.
- Multimodal (e.g. voice) messages.
- Integration to music players (e.g. muting the music during a service message).
- Integration to user profile.

The (automated) service has clear benefits over manual recording of wellness data. The data sharing ability is somewhat less convincing over existing isolated systems for recording wellness data.

The service is not been seen to bring disruptiveness in the market. Instead it is an evolution of wellness applications by adding communication and sharing.

9.3.3 Value Network

The roles in the value network are quite clearly defined and include

- End users (from which data is taken from and watchers)
- Training centers (gym, clinic, ski center etc.)
- Sensor vendor
- Mobile device vendor
- Service provider

The actors for the first roles exist on the market and it can be expected to be willing to participate in this service. The service provider role – which is the most important one, however, is new and it is not clear who would be taking that role. Mobile operators have been suggested as a candidate but this is viewed as problematic. Health industry could have some potential in this.

The type of cooperation between parties and the business model – service provider collecting mobile event data (including wellness related data) – is seen to be relatively new one.

9.3.4 Sustainability of the Business Model and Revenue Sources

End users (hobby clubs, people using gyms, elderly) can be seen willing to pay for this service.

Other revenue sources (like subsidy and advertising) have not been identified.

9.3.5 Key Questions

Who would take the role of the service provider? Health industry is important focus area. What kind of competences this kind of actor/company should have?

In what direction this application could be developed further, e.g.:

- Expanding the type of mobile data to be recorded (i.e. not only wellness-related)
- Expanding the wellness functionality
9.4 Emergency Preparedness

The service Emergency Preparedness supports car owners (and passengers) and people taking care of relatives, friends, and/or patients in the case of an emergency. The service may capitalize on technological trends like the emergence of sensor technologies, monitoring services, and telematics and may profit from the emergence of a completely IP-based world in which people and objects can be connected anyplace and anytime. Emergency Preparedness consists of two subservices: CarAssistant and CareTaker.

9.4.1 Target Group

The target group for the sub service CarAssistant are car owners (and passengers). The target group for the sub service CareTaker are people taking care of relatives, friends and/or patients. Both services increase the feeling of safety and a sense of ‘emergency preparedness’. The government may enforce the usage of these types of services in the future because of their safety implications.

9.4.2 Value Drivers

For CarAssistant the following value drivers have been identified:

- Increased feeling of safety by giving alerts and status information about (changes in) car conditions
- People are ‘emergency prepared’ by making use of the configuration policy system which decides when and which emergency action should be executed
- Usage of the service may speed up getting assistance of emergency services (police, fire brigade, …)
- CarAssistant may also offer some benefits for car insurance companies: it helps them to differentiate from competitors, it may give them better, faster, and improved accident reports, and it may reduce information processing costs. Also car traceability (by using car location information) may be valuable, e.g. in case of theft

Also for CareTaker, value drivers have been identified. These value drivers are partially similar to the value drivers for CarAssistant:

- Increased feeling of safety for patients and increased peace of mind of care takers by making use of alerts and status information about (changes in) patient condition
- The CareTaker empowers the (real) care taker: it helps the care taker to assist someone in need of care location independently
- By making use of CareTaker, a patient/someone in need of care may continue living at home instead of living at, e.g., a special home for the elderly
- People are ‘emergency prepared’ by making use of the configuration policy system which decides when and which emergency action should be executed
- Usage of the service may speed up getting assistance of emergency services (police, ambulance, …)
- CareTaker may also benefit health care insurance companies: it helps them to differentiate from competitors and may also reduce healthcare costs

Compared with location aware alarm systems currently on the market (like OnStar, in home video camera systems, …) the Emergency Preparedness services can be executed semi-automatically, help people optimally preparing for emergencies (based on pre-defined policies), give people a better sense of belonging, and a better peripheral awareness of the object (car) or subject (people) to care about. In that way, the services offer added value compared with existing products (especially with respect to the peripheral awareness effect and feeling of preparedness). However, the basic functionality is already available in existing products and services (like a mobile phone in the trouser pocket of a person in need of care).
9.4.3 Value Network

For CarAssistant, the following value network actors have been identified:

- User, customer
- Network operators
- Hardware deployers (e.g., car manufacturers)
- Application developer
- Service provider (e.g., insurance company/security company)
- Platform provider
  - Reasoning services
  - Policy management
- Sensor infrastructure providers
- Hardware providers
- Investors, subsidy providers
- Emergency services providers

The value network of CareTaker resembles that of CarAssistant:

- User, customer
- Network operators
- Hardware deployers (e.g., home care provider)
- Application developer
- Service provider (e.g., insurance or health/home care provider/security company)
- Platform provider
  - Reasoning services
  - Policy management
- Sensor infrastructure providers
- Hardware providers
- Investors, subsidy providers
- Emergency services providers

The role sensor infrastructure provider may be problematic and doesn't exist (yet). A security company may play this role in the CarAssistant or CareTaker value net.

9.4.4 Sustainability of the Business Model and Revenue Sources

The user research within WP1 showed that the Emergency Preparedness applications were generally regarded as useful and some readiness to pay was observed. However, also the government as well as insurance companies and service provisioning companies may pay (a part of) the costs.

9.4.5 Key Questions

From a technical (middleware platform) perspective it seems to be reasonable to bundle the CarAssistant and CareTaker services into one service. However, from a business modelling and end user point of view it may be better to unbundle these two services and offer them as separate services as there are two rather different end users for the two subservices of Emergency Preparedness. Would this be possible from a technical point of view?
Who would be the actual service providers for the services CarAssistant and CareTaker? Insurance companies or specific service providers? Most insurance companies don’t have experience with offering these types of services. A security services company may be a good candidate. Insurance companies may then support the service financially by offering fee reductions to their customers who are making use of the CarAssistant and/or CareTaker services.

Who owns and/or is taking care of the sensor infrastructure needed for offering the emergency preparedness services? Can a security company also play this role?

9.5 MobiCar

The MobiCar application supports the formation of ad-hoc groups that allow individual users to share a car to reach close destinations (“ad-hoc carpooling”).

The car sharing service allows to semi-automatically group users into available cars so that their preferences are satisfied as closely as possible. The application takes into consideration the user necessities and preferences, to provide a car that fulfils not only destination pickup point and times (additionally, and depending on situation and profile, the tolerance of both time and pick up/drop off point may inferred), but also type of companions, car prices, toll free roads, etc.

9.5.1 Target Group

The target group is moderately well defined, mainly in terms of financial user characteristics, i.e.

Passenger: Travellers with budget constraints (e.g., students or youngsters). People that are stranded somewhere during their travel and need further transport on short term.

Driver: car owner willing to share her car with passengers for a certain destination in return for company and/or financial compensation

The service has an ad-hoc and low budget character. Passengers may not own a car and may be attracted by the low cost of ride sharing. Similarly car owners may have cost considerations with regard to ride-sharing.

As paying customers several candidates were mentioned:

- Firstly public agencies like town councils or transportation companies may offer MobiCar to their customers as a complementary service. However, there may be liability issues that prevent public organizations from doing this.
- Secondly private companies may offer it to their clients, i.e., employers may offer it to their employees, or (mobile) community providers to their members.
- Finally, end users (drivers and passengers) may take a subscription to this service.

There is currently a pilot running in the Netherlands offering a MobiCar look-a-like (called easyrider), which is offered to paying end-users via their employers.

It appears that the geography of the region in which the service is offered is important for the success potential (many potential customers, e.g., commuters and notorious congestion problems).

Trust between drivers and passengers is crucial for this service. The service may well be a service linked to an existing 'community' related to car transport. End-users then share already a membership, which creates trust and acceptance.

It may be hard to move people from existing modes of transportation to new one proposed here. The success of ride-sharing and carpooling initiatives is often limited. However, the ad hoc character of the service fits nicely with users’ perception that mobile services should be useful "out and about".

9.5.2 Value Drivers

The main distinctive benefits of the service are the following:
For the user (passenger):
- Trusted and quick ride to a destination (or close to); driver is registered
- Low cost
- Societal & environmental benefits from carpooling

For the user (driver):
- Reduce costs (get pay from passenger)
- Societal & environmental benefits from carpooling

For the customer (Public agencies):
- added value to its citizens and visitors
- image building
- reduce car traffic

For the customer (employers):
- Complementary service to existing service portfolio
- reputation and image building

Compared to other competitive solutions one can say that the Taxi provides a more easy but expensive solution (when available). Public transport may be less convenient (e.g., slower), may not run, may be more expensive and often provides no door-to-door solution. Ad hoc and trusted character may distinguish it from other ride-share solutions.

9.5.3 Value Network
The roles are somewhat clearly defined and include
- End user, Customer, Advertiser (potentially), Service provider (puts things together for the end user; offering the service to the end-user and takes care of things like marketing, customer care and billing), Application provider (develops and maintains the MobiCar application), Platform provider (takes care of platform functionality such as profile management, authentication, group management), network provider, Device manufacturer (provides mobile devices that are capable of supporting the MobiCar application).

Necessary roles exist in the current marketplace. The service could be started with existing technology, business roles and actors. Whether actors will take on the business roles is a business question (is there a paying customer?). Trigger for this service may therefore be a customer that wants to realise, offer and pay for the service. In that case other actors fairly riskless may perform the other business roles. A second approach would be a service provider creating the service and offering it as a white label service to several (paying) customers.

9.5.4 Sustainability of the Business Model and Revenue Sources
Passengers may pay for their ride. Part of the payment could go to the service provider as a compensation for arranging the match. Employers may subsidize the service.

9.5.5 Key Questions
What service elements (functionality) are necessary in the offering to realise sufficient value and trust with end-users?
Is this a separate service or should it be bundled with other services (e.g. with other MobiLife applications/services?).

9.6 MyLife Viewer
MyLife Viewer provides the user with an all-embracing view of the different aspects and activities of his life. It covers personal, family, work and hobby related activities by using group related views. It can provide context-based reminder and navigation services as well as personalised communication support within and between the groups. Through serving the individual user this application also supports different types of groups in MobiLife, ranging from closely knit groups, such as family or close friends to groups with frequent changes and varying levels of common
activities, such as hobby clubs. The trust level between different groups varies based on user perception and experience.

The different views are retrieved from other (legacy) systems and integrated and combined into a richer MyLife View. The information provided by other systems is bundled into group related information and data is formatted to support group interaction. The novelty of the MyLife Viewer is first of all in the combined view to various data and information sources through one device instead of providing different access to fixed databases.

9.6.1 Target Group

The end user target groups are somewhat well defined. Adults, normal working people and families, children starting from 16 (attending school and hobby clubs) and can be considered as potential users.

The paying customer is less clearly identifiable. Users themselves can be seen reluctant to pay for this feature directly or not very likely even when buying a related application (e.g., calendar). Corporations can be seen as customers with more potential.

The service meets the current behaviour of customers and end-users in the market and society by enabling communication, sharing, and willingness to control privacy. The service also meets the emerging trend of virtual communities, virtual presence, group formation and instant messaging (like MSN). The service also reflects problems in openness (e.g., open internet) and a possible evolution to more controlled access.

9.6.2 Value Drivers

The main distinctive benefits of the service are the following:

- Users can define access rights easier than with current applications (browser, calendar)
- Users can manage their privacy easier
- Users can build groups on permanent and ad-hoc basis, link privacy settings to groups
- Users can share, manage, and update the calendar

The benefits are clear compared to existing services like the calendar application (e.g., Outlook), sharing photos in the web protected with passwords, services offered by gaming servers and instant messaging.

The service offers added value compared to existing applications so that there can be seen a potential for market adoption. The service does not bring any disruptions or changes in the consolidated structure or competitive dynamics.

9.6.3 Value Network

The roles in the value network are quite clearly defined and include:

- User
- Application developer (develops photo editor, game, calendar)
- Trust middleware developer – develops the trust function with features like share, invite etc.
- Terminal vendor
- Messaging provider – provides messaging services (general or app specific)
- Optionally, identity/trust provider (e.g. operator can act as this)

The roles exist in the marketplace and one can believe that the existing actors would be willing to cover the roles. E.g. there are existing companies acting or willing to act as trust providers, e.g., banks, companies like Verisign, and some mobile operators.

The business model is not such a new one but the intended cooperation is somewhat new: application providers would rely more on a trust provider.
9.6.4 Sustainability of the Business Model and Revenue Sources

End users are not so likely to pay for this service even if there exist examples where end users do pay for security (e.g. firewalls, virus protection) and well-secured applications. Possibly end users would be willing to pay for the convenience of the bundling of services.

Corporations can be seen as revenue sources.

Other revenue sources (like subsidy and advertising) have not been identified.

The service does not have any new pricing models suggested.

9.6.5 Key Questions

Which kind of companies would have the right capabilities to act as trust providers for this application?

9.7 Time Gems

The application offer suggestions on how to spend leisure time, taking into account your personal profile and explicit preferences, your availability to hang out with other people and any other relevant context information.

9.7.1 Target Group

The most likely users types have been identified as people interested in socialization through online services, people interested by some well-defined, very specific interest about a certain type of movie or sport (the application would help you in finding buddies with a similar interest) and travellers, especially independent travellers.

It is worth to note that interest-based customization (including recommendations) have already a central role in many internet-based services, which could be extended to the mobile domain.

The most promising customer categories seem to be advertisers, event organizers and ticketing agencies.

Recommendations:

As for the end users, it would be useful reason about specific examples of what consumer segments could have the best potential, specifying the related context. Time Gems currently support very diverse types of users and situations; the idea per se could be realistic but still to explore it in some articulated analysis of better defined targets seems essential.

As for the customers, the recommendation is to investigate the potential of advertisers, publishers (traditional and online e.g. portals, search engines) and other actors in the value network (e.g., media agencies but also public agencies).

It would be advisable to have a clear industry focus as well, aligning the customer analysis with the parallel work regarding end-users.

9.7.2 Value Drivers

The main distinctive benefits and key features of the application are:

- It is personalised
- It can allow you to save money, receiving e.g. last-minute promotions
- It saves time, makes the setting of time schedules easier
- It offers further information than traditional fixed paper-based listings
- It is multimodal
- It overcomes language difficulties making travel plans easier
The market has been experiencing partially similar services with the Internet for almost a decade, even if the situation is not stable yet and the impact on having these services in a mobile, personalized, context-aware environment could be very big.

**Recommendation:**
Since Time Gems benefits for the end user resembles very much the ones offered by search services (e.g. of leading players as Google), it would be useful to explore in which ways the mobile context and specific MobiLife enablers can make the application really distinctive on the market, using e.g. a benchmarking approach for comparable features.

9.7.3 Value Network

Roles are mostly the ones involved in the portal value network; the main difference is the more relevant role of the network operator because of the mobile setting.

The following roles have been identified (their standard activities are described in Appendix 10.1 except for some specific clarifications related only to the current case):

- End user
- Customer (could include the end users if the application is offered as a premium service and/or any company or organization using it to promote its services)
- Content provider
- Advertiser
- Service provider and aggregator
- Subscriber/end user centre
- Payment system provider
- Network provider

Beyond these, a generic “trusted third party” role has been identified with the help of technical experts.

**Recommendation:**
The service provider role requires more clarification; which actor is most likely going to cover this role? Is it the network operator? In this case some work is needed to identify the main challenges that an operator could face to put a service like this in place.

9.7.4 Sustainability of the Business Model and Revenue Sources

The identified revenue sources are limited to business-to-business customers, as it seems unlikely that end-users would be available to pay for this service (taking into account also mock-up evaluation with end users).

**Recommendation:**
Advertising and marketing-based business models (including Internet examples as an essential term of comparison) should then be investigated and then applied or modified to make them applicable to the Time Gems case.

9.7.5 Key Questions

In which ways context and group features can be enhanced to make the application as distinctive as possible if compared to Web portals and mobile portals? How to exploit and balance personal profile histories and explicit choices?

9.8 Bus Stop

The application allows a user who is waiting for some public transport, e.g., a bus at a station, to receive updated information, automatic payment support and navigational help regarding her
travel, as well as personalized and context-based suggestions about other services, which may be of interest in the given situation.

9.8.1 Target Group

The most likely user types have been identified as commuters over local, regional buses, trains, etc. and more generally, people that occasionally use some transportation mean for moving around an area.

The most promising customer categories seem to be transportation companies (not necessarily buses; any transportation solution with a similar logic – e.g. metro, sub-urban coaches etc.) and provider of services that could be used in the same context (e.g. the TV channel mentioned as a preferred choice for having something to do in the mock-up example).

The transportation case clearly reflects the convenience driver, evident from marketplace dynamics; on the other hand it is important to remind that many users reject high-tech automation.

Content-based services are already important in the mobile business as well but their contribution to the bus stop is not yet really detailed (i.e., it is not clear the reason why they should be part of the initiative in a purely business logic).

Recommendations:

- As for the end users, potential differences in attitudes and interests from regular commuters and occasional bus travellers could be investigated, leading to a better articulation of the service features and commercial offer according to the usage situation.
- As for the customers, the effective potential interest of transportation companies should be further analyzed, taking into account some specific characteristics of the market (e.g., lack of competitiveness in public or semi-public context).

9.8.2 Value Drivers

The application main distinctive benefits and key features in the user perspective are:

- She is better informed (because she knows when the bus is actually going to arrive)
- She is relieved by the necessity to know the tariff, have cash at hand for paying
- She got some help in getting around the city (because the system provides help in finding the right buses, routes etc.)
- She is entertained (according to available time she can consume some media or other service)

The application main distinctive benefits and key features in the customer perspective are:

- Transportation companies are better in terms of customer service, which could be relevant in a competitive environment (but that is not very common in public transportation)
- Better efficiency in managing payments as there it is no possible that people using the service do not pay the fare
- Benefits in revenues
- Less need of human-based controls
- Minor expenses

The innovation is mainly in the level of service: users are freed from the necessity to pay cash the fares, even know the tariff, or search themselves something to do while waiting.

Recommendation:

Currently the service value seems to be mainly in the customer service sphere; to make it appealing some further analysis is needed either to justify that the investment would be repaid because of this some customer service improvement or some other source of revenue should be identified (combining the two approaches could be an alternative too).
9.8.3 Value Network

This case seems very much a customer service model, which is very common across all customer facing businesses; the intermediation of information is very similar to the internet portal logic. The following roles have been identified (their standard activities are described in Appendix 10.1 except for some specific clarifications related only to the current case):

- End User
- Customer (note that it has to integrate its operations with the service, so that information and payment flows go in the right way)
- Service Provider
- Service Integrator
- Connectivity provider
- Platform Provider
- Application Provider
- Application Developer
- Device Manufacturer
- Payment Provider
- Content Provider
- Information Provider
- Navigation provider
- Personalization provider
- Identity & trust provider
- Subscriber / end user centre
- Context information provider

According to marketplace dynamics, roles are already present either in the mobile or internet environment; the new one is context information provider.

Recommendation:

The context provider role would require some specific reasoning, focusing the discussion on which new or existing business player is possibly interested in this role, what would be the value created in this case and other ones.

The role of service provider requires too further investigation; e.g., is the network operator or the transportation company that it is going to cover this role? What would be the main benefits, risks, what the strategic interest?

9.8.4 Sustainability of the Business Model and Revenue Sources

End users are not supposed to pay, as they are already paying the customer (in this case, the transportation company)

On the other hand the service does not seem to bring to customers so much new value: it is more about serving end users better. So the willingness of the customers to pay seems to be dependent on how much they value the possibility of this new kind of customer service.

Less direct business benefits might be taken into account: e.g., transportation companies could collect travel data from their users for network optimisation purposes or marketing.

9.8.5 Key Questions
Is this customer service model appealing enough for the service to be adopted or it should be reinforced somehow?

Can the case possibly be considered in a business environment more competitive than public transportation?

9.9 Context Augmented Scheduler and Reminder

The application allows end users, groups and organizations to manage task reminders taking advantage from context-aware capabilities, so that alerts and suggestions on how to better complete the task are suitable for the given situation and the people involved.

9.9.1 Target group

End-users can be part of any stable group of people, i.e., a family or two or more roommates. Depending on the task nature, the type of groups and end users could vary very much, but the current application description addresses the family case.

Another category of end-users include any person working in a company or organization that may rely on the service to deliver reminders.

Recommendations:

- As for the end users, it would be sensible to specify some more usage scenarios (beyond the laundry case), so that it is possible to get a better understanding of possible target groups in a more articulated way
- Similarly, it would be beneficial to make hypothesis regarding the customers along the same lines, taking into account that it is necessary to clearly make distinction about private customers (i.e., people actually paying the service as end users) and business customers (i.e., organizations, companies actually paying the service as business users).

9.9.2 Value Drivers

The application main distinctive benefits and key features in the user perspective are:

- Better efficiency in accomplishing daily life tasks and activities
- Better coordination between family members (or member of another group) as anyone is well aware and updated regarding pending tasks

The application main distinctive benefits and key features in the customer perspective are:

- Better efficiency in customer-facing processes as the reminders improve communication
- Indirect positive side-effects on other related processes (e.g., if a customer picks up her own things from the store as soon as they are ready the space utilization also make some improvement)

Recommendations:

- The innovation is mainly due to group and context capabilities, which enable to share reminders across e.g. all the family members and deliver them according to the situation; from this point of view, there is a relevant improvement in user experience but it seems pretty unlikely that these services could displace more traditional methods, that could still fit for many people (or could be combined with them); the benefits against those methods should be clearly demonstrated with end-users.
  - Multimodality features could possibly be considered to improve the service unique benefits against other conventional solutions (e.g., if you are able to input a reminder just with your voice then it would be difficult to object that this solution is more complicated than just scribbling a note on a piece of paper).
- This solution could enhance the customer service of a number of businesses or organizations; as such its market adoption could be pushed thanks to a distributed strategy.
bringing maybe some "network effect" so that once a certain critical mass of customers is reached an exponential increase could possibly start.

9.9.3 Value Network

According to marketplace dynamics, roles are already present either in the mobile or internet environment; the new one is the context information provider.

The following roles have been identified (their standard activities are described in Appendix 10.1 except for some specific clarifications related only to the current case):

- **End User** (referring to end user from the consumer side, she accomplishes tasks and routines associated with the reminders; from the companies or other organizations side, she sets reminders mechanisms so that they are part of the standard processes)
- **Customer** (from the consumer side, it is the same as the end user, plus sets reminders and use any other feature provided by the application; companies or other organization select the service providers of the reminder service, sign a contract, make sure that the service is integrated into standard processes)
- **Service Provider**
- **Context information provider**
- **Connectivity provider**
- **Application Developer**
- **Device Manufacturer**
- **Payment Provider**

**Recommendations:**

- The context provider role would require some specific reasoning, focusing the discussion on which new or existing business player is possibly interested in this role, what would be the value created in this case and other ones.
- The role of service provider requires too further investigation; e.g., is the network operator or the transportation company that it is going to cover this role? What would be the main benefits, risks, what the strategic interest?
- Taking also into account user feedback from mock-up evaluation, it does not seem easy to ask end user to pay for the service. Companies and organizations using it would just consider part of their IT and customer service investments.

9.9.4 Sustainability of the Business Model and Revenue Sources

Taking also into account user feedback from mock-up evaluation, it does not seem easy to ask end user to pay for the service. Companies and organizations using may consider it part of their IT and customer service investments.

Other sources of revenues are possible but not really evident at this stage at least. Intermediation of commercial offers proposed according to context information could generate some extra revenue in the form of referral fees, according to a portal logic.

Advertising has been mentioned by some end users participating to mock-up evaluation.

9.9.5 Key Questions

The application seems one of the best suited to represent benefits for “the mobile user and worker” (see MobiLife Technical Annex), meaning that both roles (end user in private life and end user in a business organization) are essential; some more detailed considerations would be useful to articulate the application design in a realistic setting.
From this point of view, a key question is how to push the application with businesses and organizations in general so that this reminder is really something more than a family calendar. And another one is how to articulate the specific advantage of context information in some specific industry setting.

9.10 Context-aware Interpersonal Communicator

The Context-aware Interpersonal Communicator supports light-hearted, effortless interpersonal communication and helps people to stay in touch and maintain peripheral awareness of each other’s whereabouts and activities over extended periods of time. It capitalizes on trends like being always in touch with your friends, continuous communication between friends and technical trends like the emergence of presence awareness technologies. Besides, it shows the importance of asynchronous (IP-based) digital communication and the service may actually also trigger synchronous communication traffic (as a form of conversational content).

9.10.1 Target Group

For determining the target group of the Context-aware Interpersonal Communicator a distinction has been made between customers (the people who pay for the service) and end users (the people who actually use the service). These groups may or may not be mutually exclusive.

The following customers have been identified:

- Companies that would like the service for marketing purposes (e.g., branding) by offering the service for free to end users
- End users or the parents of end users (youngsters)
- Associations/hobby groups
- Owners of common interests (e.g., for specific events, sponsored by organisers)
- Operators
- Cities/states

The following possible end users have been identified:

- Individual people/users, especially youngsters (current SMS users)
- Groups/communities, e.g. of friends or people with the same interests (art, sports, …)
- Families (contacts within family), not only youngsters
- Couples in love
- Business colleagues

Based on the current value proposition, youngsters seem to be the most interesting target group. However, the service may also be valuable in business context by making communication more effective and/or efficient (with a more businesslike user interface and value proposition).

9.10.2 Value Drivers

A diverse set of value drivers have been identified for the Context-aware Interpersonal Communicator. Helping people getting in touch and having fun is an important one. The service also enables communication without disturbing people and makes sharing someone’s emotional status or feelings to (a group of) people easier. The service could also be used for sharing other information/media or for planning activities/social events. The feeling of belonging to a group and having peripheral awareness of buddies have been identified as specifically important value drivers.

The service can be seen as an addition to synchronous communication channels like instant messaging, SMS, phone, etc. Unlike these communication channels, the Context-aware
Interpersonal Communicator is specifically aimed at emotional status sharing and asynchronous communication.

9.10.3 Value Network
The following actors for the Context-aware Interpersonal Communicator have been identified:

- User
- Customer
- Device manufacturers: producers of devices (terminals, sensors, …)
- Service developer/application provider (e.g. software company that writes the software)
- Co-creators (e.g. people who build (and sell) new types of emotional information icons)
- Content providers like media or music companies
- (Additional) context information providers (e.g. location information providers)
- A service provider in general (may be one of the other roles)
- Telecom operator
- Advertisers
- Group organizers/professional users (moderators for, e.g., discussions and help)

9.10.4 Sustainability of the Business Model and Revenue Sources
As said before, youngsters seem to be the most interesting target group. However, the user research results about willingness to pay is contradicting: it is not yet known if youngsters would like to pay for the generated data traffic and/or pay a monthly subscription fee for using this service.

Operators may also offer the service for free to end users because the service may, as a form of conversational content, lead to increasing synchronous communication traffic. However, the service may also lead to (partial) cannibalization of current communication services as SMS. Advertising or businesses that would like a business edition of the Context-aware Interpersonal Communicator may be interesting alternative revenue sources.

9.10.5 Key Questions
Are the end users likely to pay for the service?
Do people want to be connected anyplace and anytime? According to the user research interviewees in Finland agreed that they don't want to be seen or available all the time.
Are people willing to share their private information via the Context-aware Interpersonal Communicator?

9.11 Tourist Info System
The application support the users in going around and enjoying at best a tourist visit, exploiting context information for navigational help, selection of available transportation, hotels, restaurants, etc., offer of entertainment activities and itineraries.

9.11.1 Target Group
The most likely user types are people travelling for leisure and people travelling for other purposes (study or work).

The most promising customer categories seem to be public agencies dealing with tourists, publishers and navigational services.

Recommendations:
As for the end users, it could be sensible to explore more usage situations, other than people travelling for leisure; e.g. the application could possibly be more interesting for time-strained other work or study travellers (avoiding the business executive cliché on the other hand).

As for the customers, potential examples can be found but the application idea does not have characteristics that make it a clear match for the needs of a specific type of actor in the tourism business.

9.11.2 Value Drivers

The application main distinctive benefits and key features in the user perspective are:

- She get some help in getting around the city (because the system provides help in finding transportations, know tariff in advance, etc.)
- She get personalized itineraries suitable for the specific context (e.g., sunny vs. rainy day) and the group at hand (e.g., family with children, young couple etc.)
- She is better informed in general about the destination
- She is aware of unexpected or extraordinary events having on impact on the day schedule or on the itinerary (e.g., places occasionally closed or other unpredictable events)

The application main distinctive benefits and key features in the customer perspective are:

- Intermediaries in the tourist information supply chain (public agencies, publishers, navigational services) can benefit from the availability of an integrated platform
- Providers of tourist services (transportation companies in relevant areas, museums, special attractions sites, hotels, restaurants etc.) can benefit from increased sales due to improved visibility
- Better efficiency in the process could possibly lead also to cost reductions

Recommendation:

- Intermediation of travel information and services or direct providing of it through online or mixed channels is already a market reality; there could be some evolution, but disruption phenomena seem unlikely. The specific benefits promised by the service (e.g., portability, personalization, pro-active delivery of information, etc.) should be further developed as premium and unique features of this service.
- Check back the distinctive benefits of Tourist Info against other mobile travel solution like the ones provided through so-called “podcasting” channel (e.g., Soundwalk, http://www.soundwalk.com)

9.11.3 Value Network

According to marketplace dynamics, the business model is not that new but its declination in the mobile environment seems to imply some innovation in the cooperation between network operators and other players, assuming that network operators will be actually leading in this space (which is not necessarily the case).

The following roles have been identified (their standard activities are described in Appendix 10.1 except for some specific clarifications related only to the current case):

- End user
- Customer (Include end users if the application is offered as a premium service; as such, pay the service – see below; any company or organization using it to promote its services, e.g. intermediaries in the tourist information supply chain and/or providers of tourist services).
- Content provider
• Advertiser
• Service provider and aggregator
• Subscriber/end user centre
• Payment system provider
• Network provider

Recommendation:
• The roles are mostly the ones involved in the portal value network; the main difference is the more relevant role of the network operator because of the mobile setting; its potential interest as provider of this service should be investigated. Other alternatives (e.g., publisher, local public bodies or private-public bodies in charge of tourism promotion) should be considered as well.

9.11.4 Sustainability of the Business Model and Revenue Sources

End users availability to pay seems limited but taking into account also the results of mock-up evaluation the case of extraordinary events and related premium features could provide some room for direct revenues from them.

Advertising has been identified as the most likely revenue source; the service could also be funded by public bodies as it could positively impact all the tourist business of an area. This last option should be further discussed and analyzed.

9.11.5 Key Questions

Since the service model is not really new, the specific implementation could make a difference. How the service will be finalized to make it really attractive against other competing solutions? How context information and group capabilities will provide unique features to this service?
10 Appendix 3: Expert Interview Description

The interviews with experts focused on domains relevant from the MobiLife perspective. The most important topics are related to opportunities and threats in changing the business models towards future mobile services, possible new perspectives on the business models of MobiLife type of applications and services and the most critical points in modelling the business in mobile context.

Interviews has been performed as part of the research work planned in WP1-T1.3, with special regard to D1.5 deliverable “Business Models for new mobile Services and Applications” (due by end of 2005) and D1.7 deliverable “Report on Market-Place Dynamics and socioeconomic Implications” (due by July 2006).

Objectives for the interviews

The main objective for the interview was to obtain general remarks about ideas, concepts and functionalities already defined or under discussion in MobiLife, as a sort of relevance assessment.

- Focus on the interfaces between different actors (not only technical but also identification of related organisational/financial issues) from the technology/R&D phase, via the implementation/roll-out phase, to the market phase;
- Key issues related to MobiLife ideas business modelling results.

Finally, interviews contribute to reinforce a vision coming external to the project, not only in relation to technology advancements but also in terms of business and market developments, giving more strength to what has been already done with D1.2 on marketplace dynamics.

Data, methods and setting

Interviews were conducted as semi-structured conversations, i.e. a list of topics and/or questions were used as a common track across all the work but some freedom were allowed in order to get out the most interesting results from each specific meeting, according to the expert profile. The discussions were interactive. The approach was qualitative and adds the understanding of MobiLife research results.

The interviews focused on

- Business people, entrepreneurs – 12 interviews
- Academics and scholars – 8 interviews

Interviews were conducted in three locations:

- Finland  (Ulla Killström-Elisa, Heli Virola-Elisa,Olli Immonen-Nokia)
- The Netherlands (Björn Kijl-Telin)
- Italy (Luca Galli-Neos)
- Brussels - EU/ICT environment (Olli Pitkänen- Hiit)

Interviews were completed during weeks 41 - 47. Practical modalities were decided by the different experts according to each case. The interviews began with a short introduction of the MobiLife project based on a standard PowerPoint presentation. This was in order to have a common understanding of what we meant by B3G application services and MobiLife project. The project presentation was completed in the first 10 minutes. The time needed for an interview was about two hours but it varied.

The questions used are presented in the table below. More than order, coverage has been regarded as important in completing the interviews. Interviews have to be tape recorded and complete transcripts of the interviews have been written. Personal notes made by the interviewer were only instrumental to get back in an easier across the recorded material.

The questions are grouped in three ‘question areas:

A) Opportunities and threats in changing the business models towards future mobile services
These questions cover general remarks about and wireless 3G and B3G systems and solutions marketplace dynamics and business models, independently of what is generated by the MobiLife as a project or any MobiLife application specific discussion.

B) Possible new perspectives on the business models of MobiLife type of applications and services.

These questions give possible new perspectives on the business models of MobiLife type of applications and services.

C) The most critical points in modelling the business in mobile context.

These questions wrap up the most critical points in modelling the business in mobile context (including both general and MobiLife specific aspects)

The question groups A and C provided input to the socio-economic implications and will be included in the Deliverable D1.7. The questions presented in group C are included in D1.5.

<table>
<thead>
<tr>
<th>#</th>
<th>A) Opportunities and threats in changing the business models towards future mobile services</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>Mobilife addresses B3G-4G markets, which in the industry are expected to be really going at full steam possibly around 2010. What are your expectations about the most successfull mobile services in that timeframe?</td>
</tr>
<tr>
<td></td>
<td>• How will the value propositions of these mobile services look like compared with current mobile services (gradual transition or a break with existing services)?</td>
</tr>
<tr>
<td></td>
<td>• What is their market potential?</td>
</tr>
<tr>
<td>1.2</td>
<td>Challenges, opportunities etc. in the perspective of geographies i.e. starting with your own country and then making comparison with other European countries and if relevant other macro-areas like advanced Asian countries or the US.</td>
</tr>
<tr>
<td>1.3</td>
<td>Challenges, opportunities etc. in the perspective of the company or organization where the interviewee is working (operator, manufacturer, application/service/solution developer/providers, consumer electronics, publishing, internet/IT leaders such as Google, Microsoft, etc.)</td>
</tr>
<tr>
<td>1.4</td>
<td>Convergence trend: how are industry structures evolving, which kind of companies, what kind of roles (e.g. Industries like telecom, IT, content, and consumer electronics) are really changing</td>
</tr>
<tr>
<td>1.5</td>
<td>How is digitisation e.g. open delivery models changing the business landscape [open model (cf. ‘fixed’ Internet) versus closed model/walled garden (cf. I-mode)]. Which logic will prevail with the emergence of future mobile services?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#</th>
<th>B) Possible new perspectives on the business models of MobiLife type of applications and services</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>Which roles are needed or even crucial in new types of mobile services?</td>
</tr>
<tr>
<td></td>
<td>• Are there new roles needed (context provider, personalisation provider, trust provider, payment provider, sensor infrastructure provider etc.) compared with the current industry structure?</td>
</tr>
<tr>
<td></td>
<td>• Which type of companies could play this role in the value network?</td>
</tr>
<tr>
<td></td>
<td>o Are there missing roles?</td>
</tr>
<tr>
<td>2.2</td>
<td>Where is the money in this type of services? How will the earnings logic behind mobile services look like (subscription based, transaction based, advertisement based, …)?</td>
</tr>
<tr>
<td></td>
<td>• What will be the most important revenue source for future mobile services? Advertising?</td>
</tr>
<tr>
<td>Section</td>
<td>Description</td>
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<tr>
<td>2.3</td>
<td>Future mobile services include the characteristic of <strong>personalization</strong>. What kind of impact this will have from:</td>
</tr>
<tr>
<td></td>
<td>• business point of view</td>
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<tr>
<td></td>
<td>• social point of view</td>
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<tr>
<td></td>
<td>• technology point of view</td>
</tr>
<tr>
<td></td>
<td><strong>Definition:</strong> <strong>personalisation</strong> is the appliance of adaptation based on profiles and preferences in order to make usage easier and the perception of information services more pleasant to users and groups.</td>
</tr>
<tr>
<td>2.4</td>
<td>Future mobile services include the characteristic of <strong>group awareness</strong>. What kind of impact this will have from:</td>
</tr>
<tr>
<td></td>
<td>• business point of view</td>
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<td></td>
<td>• social point of view</td>
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<td></td>
<td>• technology point of view</td>
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<td></td>
<td><strong>Definition:</strong> <strong>group-awareness</strong> is context awareness for and about the group.</td>
</tr>
<tr>
<td>2.5</td>
<td>Future mobile services include the characteristic of <strong>context awareness</strong>. What kind of impact this will have from:</td>
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<tr>
<td></td>
<td>• business point of view</td>
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<tr>
<td></td>
<td>• social point of view</td>
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<tr>
<td></td>
<td>• technology point of view</td>
</tr>
<tr>
<td></td>
<td><strong>Definition:</strong> a system is <strong>context aware</strong> if in its operation it uses context information other than explicit application logic related input. Examples of context information: time, location, current role, working/freetime, at-office/at-meeting, indoors/outdoors, used network, used device.</td>
</tr>
<tr>
<td>2.6</td>
<td>Future mobile services include the characteristic of supporting <strong>trust and privacy</strong>. What kind of impact this will have from:</td>
</tr>
<tr>
<td></td>
<td>• business point of view</td>
</tr>
<tr>
<td></td>
<td>• social point of view</td>
</tr>
<tr>
<td></td>
<td>• technology point of view</td>
</tr>
<tr>
<td></td>
<td><strong>Definitions:</strong> <strong>privacy</strong> is the requirement of an entity to determine the degree with which it interacts with its environment, including willingness to share information about itself with others; <strong>trust</strong> is a firm belief in the competence of an entity to act dependably, securely and reliably within a specified context.</td>
</tr>
<tr>
<td>2.7</td>
<td>Future mobile services include the characteristic of supporting <strong>multimodality</strong>. What kind of impact this will have from:</td>
</tr>
<tr>
<td></td>
<td>• business point of view</td>
</tr>
<tr>
<td></td>
<td>• social point of view</td>
</tr>
<tr>
<td></td>
<td>• technology point of view</td>
</tr>
<tr>
<td></td>
<td><strong>Definition:</strong> a <strong>multimodal</strong> user interface provides the user with more than a single mode of interaction. The most common such interface combines a visual modality (e.g., a display, keyboard, and mouse) with a voice modality (speech recognition for input, speech synthesis and recorded audio for output). However other modalities, such as pen-based input or haptic input/output, may be used.</td>
</tr>
</tbody>
</table>

## C) The most critical points in modelling the business in mobile context

### 3.1. What are the most important **technological and market drivers and hurdles** for future mobile services?

### 3.2. What would be the **most critical points** in modelling the business in a mobile context?
## 11 Appendix 4: Term Definitions

In this section common terms are defined to provide a common view of the terms used in this deliverable. The definition is based on terms included in D5.2. and D1.1. It has been adjusted further to fit the business modelling focus area.

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>actor</td>
<td>An organisation that plays one or more roles</td>
</tr>
<tr>
<td>adaptation</td>
<td>Adaptation is the process of changing the content, behaviour and/or appearance of an application or service towards a convenient user experience in reaction to a change of context.</td>
</tr>
</tbody>
</table>
| application                   | An application is a program or a group of programs (program=function implementation by software) designed to perform specific task(s). Applications can use other components in the system.  
  - Applications can provide some functionalities for users  
  - Services can provide functionalities for other components |
| application/service profile   | Persistent set of data, describing the properties, settings and capabilities of an application/service.                                       |
| authorisation                 | A process by which it is verified that an entity (person, software, etc.) is allowed to take part in an activity. The different realisations are referred to as authorisation mechanisms. |
| blog                          | A blog is a type of website for which an individual or a group frequently (e.g. daily) generates messages or "posts" in the form of textual or other media contributions, either for personal or professional reasons or both. |
| business case                 | A description of a situation within a business model where business roles, their relations as well as other components needed in the business model are included. |
| business model                | A business model is a description of how an entity or a set of entities intend to create value with a product or service. The basic components will be the user/customer, product/service offering, earnings logic, resources (technology, capability, and knowledge), supply, organisation and processes. |
| business role                 | A group of functions enabling an actor or entity taking on the role to provide a set of services to its environment. Examples include end-user, customer, network operator, service provider, service integrator, content provider, content producers etc. |
| capability                    | Capabilities refer to the firm's ability to exploit and combine resources through organisational routines in order to produce a certain value activity. |
| community                     | Also known as "interest groups," communities are groups of people who share a common interest and communicate with each other about that interest. |
| component                     | A component encapsulates a well-defined piece of the overall application functionality.                                                       |
| concept                       | An abstract idea or notion that serves to designate a category or...                                                                          |
class of entities.

<table>
<thead>
<tr>
<th>content provider</th>
<th>Content provider provides content such as video and audio to the users via the service provider services.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Elementary content provider</td>
</tr>
<tr>
<td></td>
<td>• Content aggregator</td>
</tr>
</tbody>
</table>

| context          | Any information that can be used to characterise the situation of an entity. An entity is a person, place, or object that is considered relevant to the interaction between a user and an application, including the user and applications themselves. |

| context adaptation | Context adaptation is about adapting capability (of a service, device or the communication network) and information to elements of context information including location, situation, personal role, task and environment. |

| context awareness | A system is context aware if in its operation it uses context information other than explicit application logic related input. |

<table>
<thead>
<tr>
<th>convergence</th>
<th>Refers to several processes originally caused by digitalisation, but running fairly autonomously now:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. Convergence of technologies: whereas voice, text, pictures, graphics, video etc formerly were handled by different infrastructures for transportation, storage, processing and presentation, digital techniques permit the use of common infrastructures, which also has an increasing economic advantage. Thus network convergence (e.g. internet), terminal convergence (e.g. PC, PDA), and storage convergence (e.g. CD, DVD) may be found.</td>
</tr>
<tr>
<td></td>
<td>2. Media convergence: the technical convergence makes mixing of content types for presentation cheaper and simpler. This leads to the appearance of multimedia productions, and to the re-use of content in several contexts.</td>
</tr>
<tr>
<td></td>
<td>3. Actor and industry convergence: As it becomes technically, practically and economically feasible to mix and present content in multiple contexts, actors in traditional industries, e.g. book publishing, magazine publishing, newspaper publishing expand into “neighbouring” industries – e.g. TIME (magazines) and Warner (film) joining and extending into TV (CNN) and again merging with an Internet Service provider (AOL). SONY consumer electronics buys into US gramophone and film industry, contracts with computer makers for PCs and telephone equipment makers for mobile phones. Vivendi, with roots in water supply and disposal, moves into cable TV and further into content provisioning.</td>
</tr>
</tbody>
</table>

| co-opetition      | Term used to denote the situation where companies co-operate in some respects whilst competing in others. Coined by combining the words co-operation and competition. |

| core competence   | Core competencies of a company or organisation are the skills in business processes and enabling technologies, that are central to the business. A core competence is competitively unique or not easily imitated by competitors. |

<p>| domain            | A domain is a substructure in the environment that is related by a characterising relationship to a controlling object. Consequently, |</p>
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>every domain</td>
<td>every domain has a controlling object associated with it. For example, it includes business roles engaged in the focal business.</td>
</tr>
<tr>
<td>earnings logic</td>
<td>One of the six components of the business model framework. The earnings logic-component of the business model spells out how the value network creates revenues, and how the network partners share costs and revenues among themselves.</td>
</tr>
<tr>
<td>economies of scale and scope</td>
<td><strong>Economies of scope</strong> exist when reductions in cost arise from producing a number of different products together. <strong>Economies of scale</strong> exist when the more you produce of a product, the lower your average cost of production.</td>
</tr>
<tr>
<td>entity</td>
<td>In general, an entity is an existing or real thing. The word root is from the Latin, <em>ens</em>, or being, and makes a distinction between a thing's existence and its qualities. An entity exists and that's all it needs to do to be an entity. The fact that something exists also seems to connote separateness from other existences or entities.</td>
</tr>
<tr>
<td>group-awareness</td>
<td>Group-awareness is context awareness for and about the group.</td>
</tr>
<tr>
<td>group context</td>
<td>Any information that can be used to characterise the situation of a group.</td>
</tr>
<tr>
<td>group profile</td>
<td>Persistent set of data (including the combination of the groups characterisation).</td>
</tr>
<tr>
<td>hierarchy</td>
<td>A partial ordering of entities according to some relation.</td>
</tr>
<tr>
<td>innovation</td>
<td>An innovation is an idea, practice or object that is perceived as new by an individual or other unit of adoption. Innovation can be mainly supply-pushed (based on new technological possibilities) or demand-led (based on social needs and market requirements).</td>
</tr>
<tr>
<td>Intangible benefits</td>
<td>Non-monetary benefits that service providers (or other value network partners) may have from providing services.</td>
</tr>
<tr>
<td>Intellectual property rights (IPR)</td>
<td>Intellectual property rights protect intangible valuables. It is possible to own physical objects, but one cannot own nor have title to intangible objects like software, multimedia, or inventions. Those are objects of intellectual property rights: copyright, patent, trademark, etc. They can be used to prevent some unauthorised gaining of intangible objects, that is, to exclude free-riders.</td>
</tr>
<tr>
<td>interaction point</td>
<td>A point between two entities where information is exchanged. Different types are recognised depending on the type of information exchanged at the point.</td>
</tr>
<tr>
<td>interface</td>
<td>A logical boundary between two entities: it is specialised in a set of interaction points.</td>
</tr>
<tr>
<td>interoperability</td>
<td>Interoperability is the ability of a system or a product to work with other systems or products without special effort on the part of the customer.</td>
</tr>
<tr>
<td>Lisbon Strategy</td>
<td>10-year plan (defined in 2000) to “to make the EU the world's most dynamic and competitive economy” (European Commission 2004)</td>
</tr>
<tr>
<td>market</td>
<td>A group of people who, either as individuals or as representatives of firms/organisations, need specific products and who have the ability, will and authority to buy these products. There is a wide-spread notion that all things connected to market and marketing is competitive. This is not so, although the line may</td>
</tr>
<tr>
<td>term</td>
<td>definition</td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>market segmentation</td>
<td>The act of dividing an overall market into groups of consumers with similar needs, where each of the groups differs from others in the market in some way that is important to the design or marketing of the product. Widely used bases for segmenting include geographic differences, personality differences, demographic differences, use of product differences, and psychographic differences.</td>
</tr>
<tr>
<td>mobility</td>
<td></td>
</tr>
<tr>
<td>network mobility</td>
<td>Ability of a network to change physical location while maintaining service availability or service session for the user of the network capabilities.</td>
</tr>
<tr>
<td>service mobility</td>
<td>Service mobility refers to the end user ability to maintain current sessions and obtain services in a transparent manner. The service mobility includes the ability of the service provider to maintain control of the services it provides to the user.</td>
</tr>
<tr>
<td>service session mobility (synonym: service continuity)</td>
<td>Service session mobility is a specialisation of service mobility where the session is not terminated due to the used terminal or network provider has changed.</td>
</tr>
<tr>
<td>user mobility</td>
<td>User mobility refers to the ability of end users to originate and receive services and access current network services on any terminal in any location, and the ability of the network to identify end users as they move across administrative domains.</td>
</tr>
<tr>
<td>terminal mobility (host mobility)</td>
<td>Terminal mobility refers to the capability allowing a mobile terminal to change its point of attachment to the network, without interrupting data delivery to/from that terminal.</td>
</tr>
<tr>
<td>multidisciplinary</td>
<td>Distinguishing feature of projects that take into account different perspectives from different academic disciplines.</td>
</tr>
<tr>
<td>multi-modal user interface</td>
<td>Multi-modal user interface supports multiple ways of interaction between the user and the system in terms of communication channels that correspond to human senses. Depending on the implementation, a multi-modal user interface can utilise these channels as various input and output modalities in sequential and/or parallel manner. In addition, biomedical data (passively) available from the user can also be part of a multi-modal user interface. The term multi-modality is preferred to be used for technical implementations whereas human-human communication is multi-modal by nature since it inherently utilises all available modalities, i.e. senses.</td>
</tr>
<tr>
<td>operability</td>
<td>All system functionalities and processes which create the ability to operate a defined specific system elements and services based on the common business model. Operability is closely related to the management of communication systems.</td>
</tr>
<tr>
<td>orchestration</td>
<td>The capability to mobilise and integrate resources for the purpose of providing an offering to a customer and simultaneously create...</td>
</tr>
<tr>
<td><strong>value for the customer, the value net orchestrator (or nodal company) and the subordinates (or network members) involved</strong></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td></td>
</tr>
<tr>
<td><strong>organisational arrangements</strong></td>
<td>Arrangements between actors in a value net needed for the orchestration of collective action</td>
</tr>
<tr>
<td><strong>performance indicators</strong></td>
<td>Performance indicators are a set of metrics to measure the performance of a service (e.g. market share, customer satisfaction, quality of service), or the performance of the provisioning network (e.g. resource utilisation, efficiency).</td>
</tr>
<tr>
<td><strong>personalisation</strong></td>
<td>Personalisation is the appliance of adaptation based on profiles and preferences in order to make usage easier and the perception of information services more pleasant to users and groups.</td>
</tr>
<tr>
<td><strong>policy</strong></td>
<td>Policy is a formal set of statements defining a choice in the behaviour of a system.</td>
</tr>
</tbody>
</table>
| **pricing** | **Cost based pricing**
Setting a price such that costs are covered with an acceptable margin.  
**Value based pricing**
Setting a price based on the consumer’s perception of the service’s value. |
| **privacy & trust** | Privacy is the requirement of an entity to determine the degree with which it interacts with its environment, including willingness to share information about itself with others. Privacy is related to authorisation. Trust is a firm belief in the competence of an entity to act dependably, securely and reliably within a specified context. Privacy and trust concepts are strictly linked to enable service providers to maintain and manage their customer relationships and proactively promote their services without third-party participation. |
| **proactive service provisioning** | Selection, combination and execution of services without an explicit user request. |
| **profile** | A persistent set of data about an entity. |
| **prosumer** | One who both produces and consumes (e.g. records and distributes multimedia content as well as watching it). |
| **reasoning** | Reasoning is the process of drawing conclusions from facts. |
| **reconfigurability** | All the capabilities of a service/application to “react and adapt” accordingly to changes in its surrounding (i.e. change of bandwidth, QoS etc.). The reconfigurability functionalities should be distributed all over the network and capabilities to monitor different OSI layers should be enabled. |
| **relationship** | A connection between two business roles where the information is flowing Two main types are recognised:  
- Technical; flow of technical information, including user data,
<table>
<thead>
<tr>
<th>Concept</th>
<th>Definition</th>
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<tr>
<td>control and management, and charging flows.</td>
<td>- Business: flow of business information, including contractual, customer and money flows.</td>
</tr>
<tr>
<td>resource</td>
<td>There are human, technological and financial resources. Resources can also be divided both into tangible ones like human assets, equipment, technologies, and cash, and into less tangible ones like product designs, information, brands and relationships with suppliers, distributors, and customers.</td>
</tr>
<tr>
<td>revenue model</td>
<td>The revenue model lays-out the process by which a company actually makes money by specifying how it is going to for the services provided.</td>
</tr>
<tr>
<td>revenue sharing</td>
<td>Revenue sharing describes how cooperating actors share the revenues (and benefits) from provisioning a service.</td>
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<tr>
<td>scenario</td>
<td>A scenario is a description of a person's interaction with a system. Scenarios help focus design efforts on the user's requirements, which are distinct from technical or business requirements. Scenarios may be related to 'use cases', which describe interactions at a technical level. Unlike use cases, however, scenarios can be understood by people who do not have a technical background; they are therefore suitable for use during participatory design activities and are appropriate whenever the need is to describe a system interaction from the user's perspective. Scenarios can help confine complexity to the technology layer, and prevent it from becoming manifest within the user interface. Scenarios can mean different things to different disciplines taking part in product development. Jarke et al. (1998, p. 155) – when looking at scenarios from interdisciplinary point of view - have defined a scenario as &quot;a description of a possible set of events that might reasonably take place&quot;, and the main purpose of scenarios as &quot;to stimulate thinking about possible occurrences, assumptions relating these occurrences, possible opportunities and risks, and courses of action&quot;. In user-centered design a scenario is understood as a narrative description of what the user does and experiences when using a computing system (Carroll, 1995). Kuutti (1995) identifies two levels of scenarios: rich context scenarios and systematic application scenarios. Hackos and Redish (1998) have also noticed this dichotomy when discussing storyboards that are a kind of visualised scenarios. According to them high-level storyboards correspond to use scenarios and workflow diagrams that show the overall flow of actions by an individual or group of people. Detail-level storyboards include rough sketches of screen layouts and designs that correspond to the use sequences. They describe step by step what actions the user performs, what decisions he/she makes, and what actions the system performs for the user.</td>
</tr>
<tr>
<td>security</td>
<td>Measures and controls that ensure confidentiality, integrity, and availability of the information processed and stored by automated information systems.</td>
</tr>
<tr>
<td>self-awareness</td>
<td>Self-awareness is context awareness for and about the user.</td>
</tr>
<tr>
<td>service</td>
<td>A service is an added value which is provided / offered and can be used.</td>
</tr>
</tbody>
</table>
- Is something provided by a service provider to a user.
- Is something provided by a component and used by other entities.
- Is performed by someone and is used by someone.

A telecommunication service is a set of independent functions that are an integral part of one or more business processes. This functional set consists of the hardware and software components as well as the underlying communications medium. It can represent functionality that is directly visible to the customer as well as functionality that the customer is not aware of (e.g., internal to the network). A service can also be a service component of another service.

<table>
<thead>
<tr>
<th><strong>service adaptation</strong></th>
<th>Service adaptation is a means to dynamically adapt an active service to any change in the environment in which it operates.</th>
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<tbody>
<tr>
<td><strong>service chaining</strong></td>
<td>A method in which services can be assembled into complex and powerful sequences and aggregations to fulfill a task.</td>
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<tr>
<td><strong>service component</strong></td>
<td>A Service Component is a single service logic element (or service building block) which performs a defined functionality and which can be composed with other Service Components in order to create a new service/application. Service components run in a Service Execution Environment.</td>
</tr>
<tr>
<td><strong>service deployment</strong></td>
<td>Service deployment encompasses all processes of getting a service up and running in its environment, including installation, configuration, running, testing, and making necessary changes.</td>
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<tr>
<td><strong>service design</strong></td>
<td>Service design is a process where new service is generated according to business requirements. The requirements may or may not be based on known needs of end-customers.</td>
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<tr>
<td><strong>service discovery</strong></td>
<td>Service discovery refers to the act of (1) discovering hardware components or software entities (resources, data or computation components) on peer devices; (2) determining how to invoke or utilise the services.</td>
</tr>
<tr>
<td><strong>service execution environment</strong></td>
<td>The service execution environment is the environment, which allows the execution of services and service components locally and remotely.</td>
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<tr>
<td><strong>service framework</strong></td>
<td>A service framework covers all non-functional aspects, which support the service creation environment and the service execution environment. A service framework provides the tools and instruments for provisioning, deployment, accounting, logging, security, advertising, load balancing, etc.</td>
</tr>
<tr>
<td><strong>service level agreement</strong></td>
<td>A service level agreement permits the parties involved in it to establish the minimum performance criteria for service provision and the actions that will take effect if the service does not meet these criteria.</td>
</tr>
<tr>
<td><strong>service lifecycle</strong></td>
<td>Service lifecycle is the different stages of a service from its designing phase to its retirement. The essential service lifecycle stages can be partitioned into six segments: Design, negotiation, provisioning, operation, operational management, and retirement. It is about defining a service concept, creation of that service, launching, and making it available for users, operations related to management of the service and the retirement of the service.</td>
</tr>
<tr>
<td><strong>service management</strong></td>
<td>Service management is the set of processes that manages services to meet customers' requirements whether the customer has explicit knowledge of these services, including any delivery objectives, or not. It has authority to make decisions about the delivery of the entire portfolio of services.</td>
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<td>------------------------</td>
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<tr>
<td><strong>service platform</strong></td>
<td>A service platform, in a telecommunications context, is the set of elements, which are necessary for the creation, the deployment and the execution of advanced services. Applications reside in the service platform.</td>
</tr>
<tr>
<td><strong>service provisioning</strong></td>
<td>Service provisioning relates to making service available to the customer. It includes service deployment, service operational management and service retirement.</td>
</tr>
<tr>
<td><strong>service retirement</strong></td>
<td>Service retirement is the termination of the Service License Agreement (SLA) of a user for the service and the removal of the customer's account on this particular service. Service retirement includes also the processes related to disabling and running down a service.</td>
</tr>
<tr>
<td><strong>service operational management</strong></td>
<td>This is a part of service provisioning and is responsible of managing the process of running the service. This includes service assurance, accounting and authorisation.</td>
</tr>
<tr>
<td><strong>service oriented architecture (SOA)</strong></td>
<td>Service oriented architecture is an architectural model, which consists of a group of principals, which define how autonomic systems co-operate and a set of meta-architectural principles and metadata (or model) for ICT interoperability. Given its emphasis on interoperable identifiers (namespace metadata), formats (information models), and protocols (process models), SOA is the sound base for composite applications which integrate principles of dynamic, extensible, federated interoperability and are enabled by XML-based technologies such as Web services.</td>
</tr>
<tr>
<td><strong>supply chain</strong></td>
<td>A supply chain is a network of facilities and distribution options that performs the functions of procurement of materials; transformation of these materials into intermediate and finished products; and distribution of these finished products to customers. A supply chain has three main parts, the supply, manufacturing and distribution.</td>
</tr>
<tr>
<td><strong>system architecture</strong></td>
<td>The fundamental organisation of a system embodied in its components, their relationships to each other, and to the environment, and the principles guiding its design and evolution.</td>
</tr>
<tr>
<td><strong>terminology</strong></td>
<td>A vocabulary used in a particular discipline.</td>
</tr>
<tr>
<td><strong>user centred design</strong></td>
<td>User-centred design (UCD), also known as human-centred design (ISO 13407), is a research and product development orientation that utilises end user or customer information for making better (efficient, usable, enjoyable, etc.) and thus commercially successful products.</td>
</tr>
<tr>
<td><strong>user context</strong></td>
<td>Any information that can be used to characterise the situation of a user / an individual. This includes, but is not limited to, terminal device profile, user profile, users location, action or recommendations.</td>
</tr>
<tr>
<td><strong>user experience</strong></td>
<td>User experience encompasses all aspects of the end-user's interaction with the company, its services, and its products. The first requirement for an exemplary user experience is to meet the exact needs of the customer, without fuss or bother. Next comes</td>
</tr>
</tbody>
</table>
simplicity and elegance that produce products that are a joy to own, a joy to use. True user experience goes far beyond giving customers what they say they want, or providing checklist features. In order to achieve high-quality user experience in a company's offerings there must be a seamless merging of the services of multiple disciplines, including engineering, marketing, graphical and industrial design, and interface design.

<table>
<thead>
<tr>
<th>user interface</th>
<th>User interface is the means by which information is transmitted from the user into the machine and vice versa. Mostly, this is software running on the machine. During the process of information exchange, the looks and behaviour of this interface changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>user-profile</td>
<td>Persistent set of data (including the combination of the users characterisation) that includes, but is not limited to the users identity and preferences that may be facts and rules.</td>
</tr>
</tbody>
</table>
| value                   | A company's main principle is to create value to customers, owners, and other stakeholders. This can be defined to mean  
  • for customer: value by satisfaction of customer needs or as price the customer is ready to pay for using the service.  
  • for company: value by cost reduction (efficiency, productivity), by growth and by exploitation of business opportunities  
  • stakeholders: earnings for invested money |
| value chain             | The value chain categorises the generic value-adding activities of an organisation: inbound logistics, production, outbound logistics, sales and marketing, maintenance. These activities are supported by: administrative infrastructure management, human resources management, R&D, and procurement. The costs and value drivers are identified for each value activity. |
| value creation system   | A set of activities that should create value for all actors in the network: consumers as well as producers of services. |
| value net               | A process of value creation between a group of actors. |
| value net governance    | Organising collective action of a group of actors. |
| vocabulary              | A vocabulary is a list of terms. |
| Wiki                    | A wiki is a type of website that allow its users to add and edit content according to a strongly horizontal and collaborative authoring logic, thanks to a dedicated software engine (called generically "wiki" too) that allows the website to operate in this way. Wikipedia is the most famous example of what wikis are. |
## 12 References

<table>
<thead>
<tr>
<th>Bookmark</th>
<th>Description</th>
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<tbody>
<tr>
<td>[EBS05]</td>
<td><a href="http://www.ebstrategy.com/mobile/revenue_models/carriers.html">http://www.ebstrategy.com/mobile/revenue_models/carriers.html</a></td>
</tr>
<tr>
<td>[Jonasson02]</td>
<td>Pricing for profits on the Mobile Internet, paper p&quot;</td>
</tr>
</tbody>
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[Klein00] Klein, R. (1999) Sleeping with the enemy, Trust and Dependence in Inter Organisational relationships, doctoral thesis, University of Twente, Enschede, the Netherlands.


[TeleManagement Forum05] TeleManagement Forum 2005
