

Designing business models for mobile ICT services¹

Edward Faber*, Pieter Ballon**, Harry Bouwman***, Timber Haaker,
Oscar Rietkerk, and Marc Steen****

*Telematica Instituut, Postbus 589, 7500 AN Enschede, edward.faber@telin.nl

** TNO-STB

*** Delft University of Technology

****TNO-Telecom

Introduction

The provisioning of mobile ICT services often requires firms with different resources (e.g. financial support and consumer base) and capabilities (e.g. telecommunication, payment, and security) that co-operate to create value for end users. Given the low success rate of inter-firm operations (see e.g. Levine & Byrne, 1986; Harrigan, 1988; and Bleeke & Ernst, 1993) and the risks and cost involved introducing new technological innovations, it is not surprisingly that there is much attention of practitioners and academia for the concept of business models.

We see a business model as the way a network of companies intends to create and capture value from the employment of technological opportunities. Designing business models is a complex undertaking because different requirements (e.g. technical, user, organisational and financial requirements) need to be accommodated and balanced. Design choices in one domain (e.g. technical domain) may effect those of the other domains (e.g. user domain). This interrelatedness of design choices complicates the design of viable business models for mobile services.

¹ The findings reported in this paper are based on research conducted within the B4U project. The acronym B4U stands for 'Business 4 Users'

Within the B4U research project the Technical University of Delft, TNO-Telecom, TNO STB : the Telematica Instituut are currently investigating which design variables and characteristics are important, and how these design variables are related to another. Objective of the research is to develop a business game, which provides stakeholders in the introduction and exploitation of mobile ICT services with a better understanding of the range of design choices and effects of specific design choices.

This paper starts with a brief review of the business model literature. It is concluded that a framework for designing business models for mobile ICT services is virtually absent in the business model literature. Subsequently the B4U design framework is introduced. The framework consists of four interrelated domains: user, organisation, technology and finance domain. This paper ends with some conclusions and directions for further research.

The business model concept

Despite its popularity, there is little consensus on how to define business models. Some researchers equate business models with revenue models. In this view a business model describes how to make money by spelling out where an individual firm is positioned in the value chain (see e.g. Rappa, 2001). Others reserve the concept of business models to roles that individual companies can play in value networks (see e.g. Weill & Vitale, 2001). Each of these conceptualizations provides a rather limited perspective on *cross-company* collaboration in complex value networks because they focus too much on a single company. Therefore they are insufficiently suited to address service offerings that require cross-company collaboration. In our view the business model concept is most valuable in such a setting. We see a business model as the way a network of companies intends to create and capture value from the employment of technological opportunities. So we look beyond the individual firm and consider the business model for an *enterprise*, a collaborative effort of multiple companies to offer a joint proposition to their consumers.

When comparing different definitions of business models (see e.g. Slywotsky, 1996; Timmers, 1998; Weill & Vitale, 2001; and Rappa, 2001) it is possible to distinguish some common elements however, that are network oriented or can easily be extended to be so:

- o *Service design*: a description of the value that the value network offers to a specific target group of users, in particular in terms of a service offering.

- o *Organisation design*: a description of the configuration of actors that is needed to deliver a particular service, the roles that each plays, making clear how the network creates value for end-users.
- o *Technology design*: a description of the fundamental organization of a technical system, the technical architecture, which is needed by the firms in the value network to deliver the service offering exhibited in the service design.
- o *Finance design*: a description of how a value network intends to capture monetary value from a particular service offering and how risks, investments and revenues are divided over the different actors of a value network.

A business model for a cross-company enterprise can be regarded as a set of design proposals or blueprints for each of these domains.

The balancing act of designing business models

Designing business models is a complex undertaking because of the interrelatedness of the different blueprints. Different requirements (e.g. technical, user, organisational and financial requirements) need to be accommodated and balanced. Design choices in one domain (e.g. technical domain) may affect those of the other domains (e.g. user domain). This interrelatedness of design choices complicates the design of viable business models for mobile services. For instance, what might make sense from a technical perspective (e.g. precise positioning techniques) may make no sense at all from a financial (e.g. too expensive) and user perspective (e.g. privacy concerns).

Besides the balancing of requirements, business developers also need to balance the interests of the involved actors. This is by no means a straightforward task. Actors may originate from different industries (e.g. network operators, financial institutions, and retailers) each with their own peculiar business logic. Because no single partner has formal authority over another partner every adjustment has to be discussed and jointly agreed upon (Klein-Woolthuis, 1999). Over time partners may lose interest in the collaboration, which may induce them to block important decisions and to renegotiate the business model. The success of a business model is thus dependent on the commitment of all partners involved. As Ohmae (1989) puts it “alliances are like marriages – they only work when both partners do”.

B4U project

Knowledge on how to effectively accommodate and balance requirements and interest is largely missing in the business model literature. To develop insight into how organisations can design balanced business models researchers need to go beyond identifying simple success prescriptions (critical success factors) and try to understand the dynamics of business models. To do so one needs a conceptual framework describing the most important design variables within the service organisation, finance and technology domain and the relationships between these variables (see for a comparable approach Osterwalder & Pigneur, 2002). We use the term “design variable” to denote that our framework focuses on variables that can be influenced by managers. Key for understanding business model success is to investigate how changes in one design variable (e.g. different technology) impact other design variables (e.g. customer value), and how market developments (e.g. diminishing uptake of mobile services) impact design choices. The ultimate aim of the B4U project is to build a business game based on the conceptual framework that allows stakeholders to develop insight into the consequences and robustness of design choices.

Research design

The B4U research project has four phases. First a conceptual framework is built based on the state of the art insights from the business model literature. The conceptual framework consists of four interrelated domains: service design, organization design, technology design, and finance design. Subsequently the conceptual framework has been used to describe and analyze business models in: mobile tracking and tracing, communication and community, access-to-the-back-office, and entertainment services. Here the focus is on critical design issues in the mentioned domains. A critical design issue is defined as a design variable that is perceived to be (by practitioner and/or researcher) of eminent importance to the viability and sustainability of the studied business model. These critical design issues (e.g. bundling of services) are subsequently studied for their interrelatedness with design variables within a particular domain (e.g. service domain) and of different domains (e.g. finance domain). This knowledge is then used to build causal frameworks describing the interrelatedness of design variables and their relationship with business model viability and sustainability. Finally, these causal frameworks will be used to build a business model design method and business game. In this positioning paper the focus is on the conceptual framework, which will be elaborated briefly below.

Conceptual framework

As depicted in Figure 1 the conceptual framework consists of four interrelated design domains: the service, organization, technology and finance design. The service design is put deliberately top because we believe that a business model design should start with the demand side of a service offering. Organization and technology and finance design represent the supply side of a service offering. The finance design is deliberately put below because we believe that revenues are the bottom line for all design choices. For each of these domains important design variables and their relationships have been identified, which have been summarized in so-called domain models.

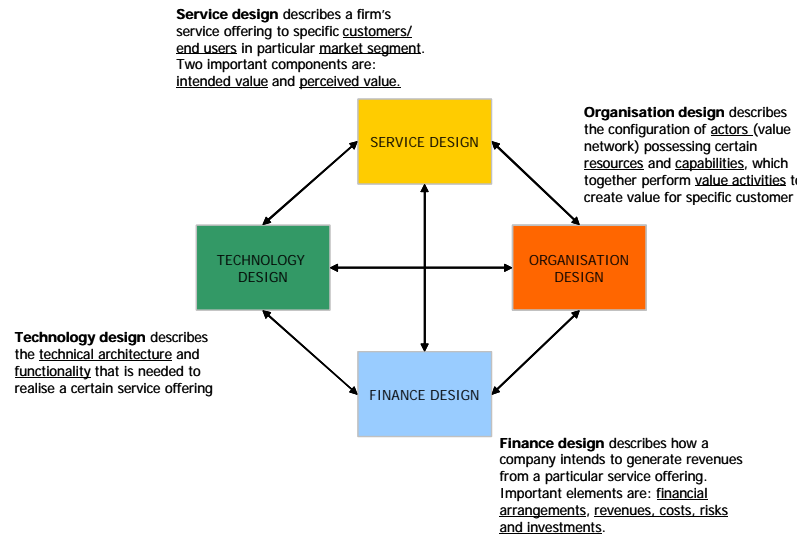


Figure 1: high level conceptual framework

Service design

The central issue in Service Design is 'value': a provider intends and delivers a certain value proposition, and a customer or end-user expects and perceives a certain value proposition. In order model this we propose four related concepts: Intended value and Delivered value on side the provider, and Expected value and Perceived value on the side of the customer or end-user. These concepts model the match or gaps between the different perspectives on 'value' – similar to Service quality (Parasuraman, Zeithaml & Berry, 1985), see Figure 2.

Another important issue in Service Design is the nature of the innovation, we propose to differentiate between two kinds of innovations: 'new version services' that take an existing service one step further (evolutionary), and 'way new services' that are new services that are in one or more aspects really new (revolutionary).

The concepts in Service Design are defined as followed:

- **Intended value** is the value that a provider intends to offer to customers or end-users with service. This ambition is the starting point for the innovation, and is often equated with 'value proposition', but in many cases there are gap between Intended value and Perceived value - and we would like to model these gaps. Intended value is translated into Functional requirements (Technology Design), like technical specifications, and into requirements for value network (Organisation Design), like roles that are necessary.
- **Delivered value** is the value that a provider actually delivers to customers or end-users with the service. Functional requirements are translated into technological functionalities (Technology Design), and these determine the Delivered value – these translations are not straightforward, and there are often gaps and mismatches. Delivered value is also determined by (non-technical) value activities (Organisation Design) like help desk, support and (physical) distribution.
- **Expected value** is the value that a customer or end-users expects from the service. This is determined by the customer's or end-user's previous experience with Previous versions (Technology Design) of the service (in the case of a 'new version service'), or with Similar services (in the case of a 'way new service'). For Previous versions, but also for Similar services, one may describe the 'backward' and 'forward' (technical) compatibility with previous and next versions or generations of services. Furthermore, Expected value is determined by resources and capabilities (Organisation Design) like branding, trust and reputation, and by financial arrangements (Finance Design) like paying for the device, paying per usage or paying flat fee, subsidized handsets or discounts.
- **Perceived value** is the value that a customer or end-user actually perceives when consuming or using the service. This perspective on value is the 'bottom line' – it's the customer or end-user who evaluates the value of the innovation. Perceived value is like the sum of Expected value and Delivered value, including functional, emotional, and process aspects. The higher Expected value, or the lower Delivered value, the lower Perceived value. There are other variables that also have a main influence on Perceived value: Customer or end-user, Context, Effort and Tariff. These concepts are defined below.

- **Customer or end-user:** We use the term 'customer' for the role of paying for the service, and 'end-user' for the role of actually using the service. For consumer services these roles coincide, but for business services, they may be separate: e.g. the 'customer' role is fulfilled by a 'decision making unit', and there may be different 'end-user' roles, e.g. the employee uses basic functions, and the manager uses basic functions plus some extra managerial functions. Within consumer and business markets we may distinguish segments, each with different needs, wishes and preferences – and these determine Perceived value. Important qualities of Customer or end-user are: size of 'installed base' (already have or use similar services or earlier versions), size of target group, size of maximum potential market. One may also describe percentages of ownership, adoption (usage), access to the service (e.g. not owning it, using it sporadic), or (cognitive or otherwise) expertise levels within specific market segments. Knowing and understanding customers and end-users is crucial for successful innovation – and must be a starting point for formulating Intended value.
- **Context:** A service is always consumed or used in a specific context, and an innovation is only successful if it offers benefits in a concrete context. This concept of Context can be described on different abstraction levels: there is the context of one concrete situation, e.g. walking on the street or sitting at home, the context of daily life, e.g. working or profession life, or private or family, and there is the wider social-cultural context, including societal trends and political drivers and constraints. Other products or services with similar function are part of Context – the frame of reference in which Perceived value is determined. Knowing and understanding Context is crucial for successful innovation – and must be a starting point for formulating Intended value.
- **Tariff and Effort:** A customer pays a Tariff to consume the service, and an end-user makes an Effort to use the service, this concept refers to all non-financial efforts the end-user must make. These two variables have a clear influence on adoption and usage, and thus the success of a service. In order to estimate realistic levels for Tariff or Efforts, one may study current tariffs or efforts of similar services, e.g. a first estimate of Tariff for a news service may be the price of one newspaper. According to Rogers (1983) there are five factors that influence adoption and usage of an innovation: Compatibility with daily life contexts and Relative advantage of the innovation over other products or services (both covered in concepts above) and by Complexity (non-user-friendliness), Visibility of the advantages of the innovation, and Try-ability of the innovation. These last three factors are included by Effort concept.

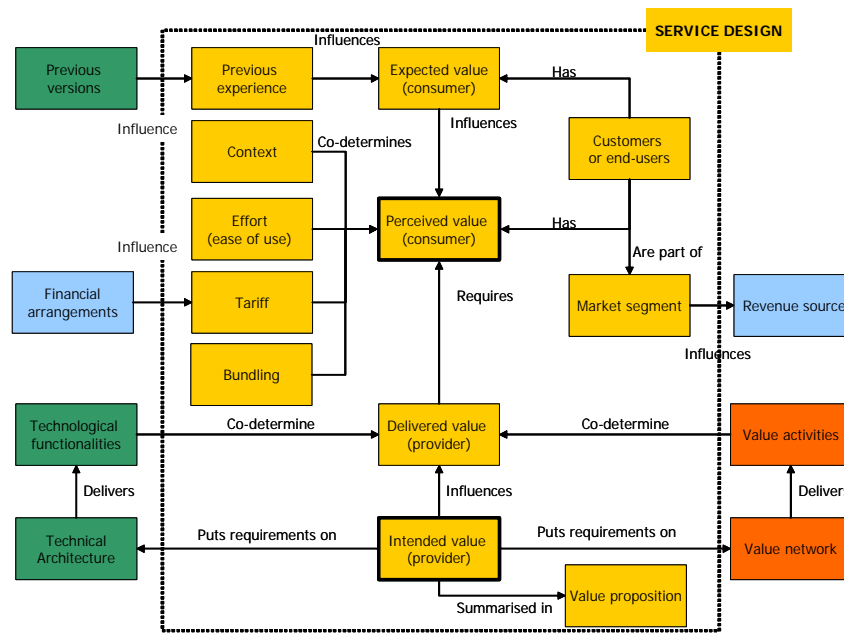


Figure 2: Service design

Organization design

Organization design describes the value network that is needed to realise a particular service offering. A value network consist of actors possessing certain resources and capabilities, which interact and together perform value activities, to create value for customers and to realise their own strategies and goals.

- **Actors** can more or less powerful in the value network depending on their **resources** and **capabilities**. Hawkins (2002) 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.
- **Value network** The number of actors and the frequency and type of interactions contributes to the complexity and density of the value network.

- **Interactions and relations** Out of reciprocal interactions relations may develop. Relations are important for a value network as they contribute to trust and commitment within the network. Multiplexity refers to how many levels the relation has, the more levels, the stronger the relation.
- **Strategy and goals** 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. Organisations may defend themselves by drawing up thick legal contracts and strictly monitoring partner's activities. However, these safeguards do not guarantee that partners will not act opportunistically. Trust between partners is thus an important condition for an open and constructive collaboration.
- **Organisational arrangements** Collaboration gives rise to complex interdependencies between organisations because no single partner has formal authority over another partner. Every adjustment has to be discussed and jointly agreed upon (Klein-Woolthuis 1999). 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.
- **Value activities** are the activities that an actor is supposed to perform in order for the value network to deliver the proposed service. A combination of value activities together with the agreements and responsibilities define the **role** an actor plays in a value network. Value activities can be seen as costs but also as investment source. If an actor performs a value activity and gets paid directly for it the activity can be seen as a cost. If the actor donates the activity in exchange of part of the revenue later it is seen as an investment. We argue that an actor that does not invest is not a structural actor.
- Besides financial, social, organisational, **resources** and **capabilities** can also be technical. The technical resources and capabilities are the components to build the technical architecture with. At the same time the existing technical resources of the actors in the value network impose requirements on the technical architecture, as it has to work with those resources. In our view there are two technical architectures, one that delivers the service (front office) and one that connects the actors to work together (back office).

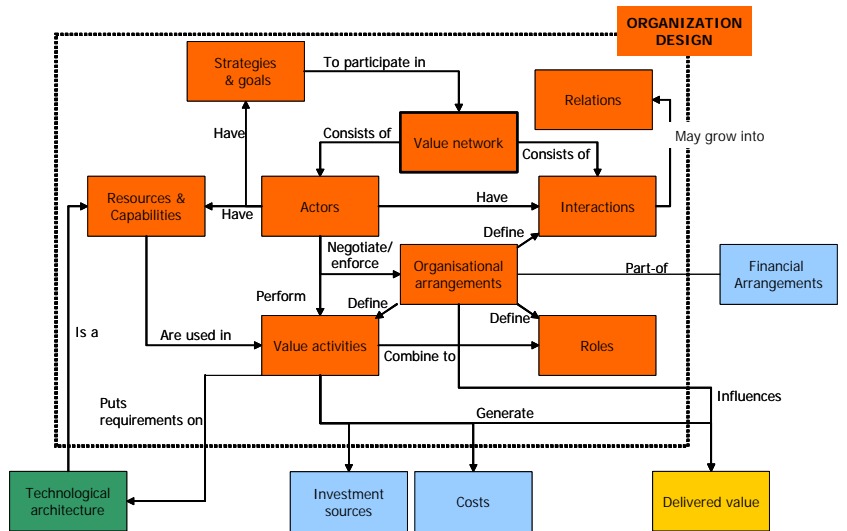


Figure 3: Organisation design

Technology design

The most important technological design variables and some of their relevant characteristics are

- The **technical Architecture** describes the overall architecture of the components listed below. Important characteristics of the technical architecture are: centralised vs. Distributed, Open vs. Closed, Interoperable vs. Non-interoperable
- The **backbone Infrastructure** refers to the long- and medium range backbone network infrastructure. Important characteristics are: High vs. Very high Bandwidth, Future-proof vs. Non-future-proof
- **Access Networks** refers to the first and second mile network infrastructure. Important characteristics are: Fixed vs. Wireless, High vs. Low Bandwidth, Universally available vs. Deployed in hotspots, Scalable vs. Non-scalable
- **Service Platforms** refers to the middleware platforms enabling different functions, a.o. Billing, Customer data management, Location information, etc. Important characteristics are: Centralised vs. Distributed, Personalised vs. Non-personalised, Secure vs. Non-secure, Legacy vs. New, Open vs. Closed
- **Devices** refer to the end-user devices providing access to services. Important characteristics are: Multi-purpose vs. single-purpose, 'Network Intelligent' vs. 'Dumb interface', Storage facilities vs. No storage facilities, Embedded software vs. Open terminal

- **Applications** refer to the user applications running on the technological system. Important characteristics are: Communication vs. Content, Always on vs. Time-critical, Personalised vs. Non-personalised, Secure vs. Non-secure
- **Data** refers to the data streams transferred over networks. Important characteristics are: Bursty vs. Real-time, High volume vs. Low volume.
- **Technical Functionality** refers to the functionality offered by the technological system. Important characteristics are: Always on vs. Time-critical, Personalised vs. Non-personalised, Secure vs. Non-secure.

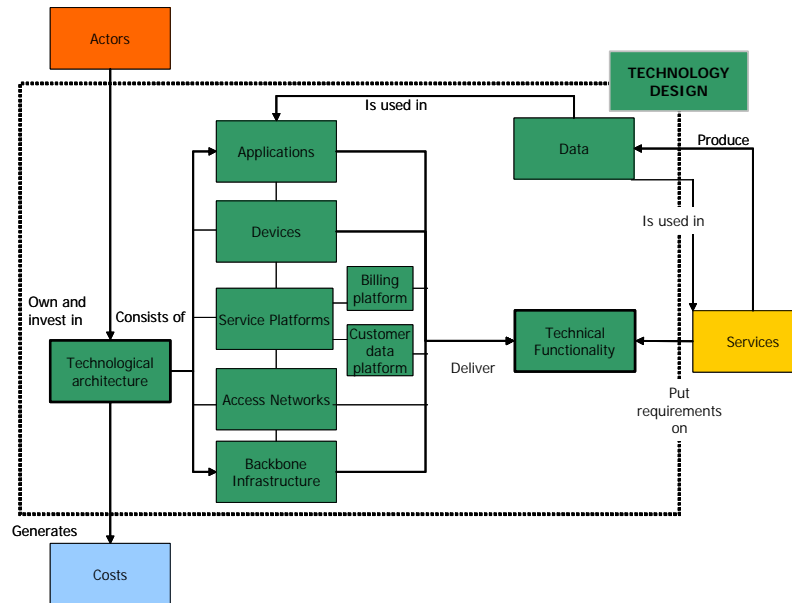


Figure 4: Technology design

Finance design

In the finance domain a design for the financial arrangements between the different actors in the value network is given. It shows how the value network intends to capture monetary value. The result of the finance design is the set of **financial arrangements** between the actors in the value network in which the profit, investment, cost, risk and revenue sharing among the actors is arranged. The tariff and the **tariff structure** is the most visible part of the arrangements for the end-user. The structure of the value network - with an archetypical configuration of actors - will

have a strong influence on the financial variables - with archetypical financial arrangements as result.

Revenues can come directly from the end-user, but also other revenue sources may exist (for example advertisement or government subsidy). The **investments and costs** are closely related to the design choices made in the technology design. However, the question of who will supply investment capital is another important design variable in the finance domain. The costs may be influenced by the coordination costs of the value network.

The **risks** that may exist in the other domains come with financial consequences. For example if the perceived customer value is much less than the assumed value, then this may have a negative impact on the revenues. The way the value network copes with the financial consequences of the various risks is part of the financial arrangements. For evaluation and management of the financial arrangements over time **performance indicators** are necessary.

Typically the arrangements and design variables are not static but change over time. So they are dynamic variables that may respond to changes in other variables, either in the finance domain or in the other domains. Also, development of a new service goes through phases, which leads to changes in the financial arrangements with each phase. Scenarios for investments, costs and revenues may be used to capture future uncertainty.

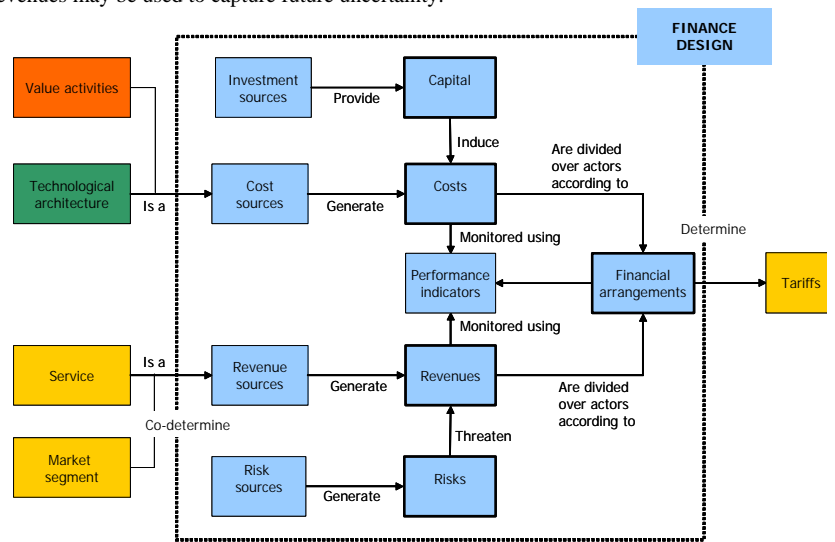


Figure 5: Finance design

Conclusion

In this paper we have introduced the B4U research approach and conceptual framework for studying business models for mobile ICT services. Clearly a lot of work still needs to be done. Currently the research team is deriving critical design issues from the studied cases. The presented parts of the conceptual framework will have to be refined to make them consistent with the empirical findings. A lot of questions still need to be answered. For instance, how to distinguish between critical and less critical design issues? How to ensure that the conceptual frameworks stay informative and comprehensible? How to relate critical design issues to business model viability and sustainability? Hopefully this workshop will provide some clues how to answer some of these questions.

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