Business Model Scenarios for Remote Management

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Abstract. Based on a cross-industrial research project[4], we describe the different business model scenarios for the introduction of remote management technologies at the end-customer's premises. While remote management is introduced to aid the digital convergence between previously dissociated islands of end-user devices, and new service opportunities are created, several dominant industry trends run counter to this attempt at centralization. We offer a critical appraisal of the business challenges posed to the existing business models. Four business model scenarios are proposed that describe the most feasible evolutions in the coming years. Strategic business requirements are identified to appreciate the viability of each business scenario.

1 Introduction

With the growing complexity of networked devices in the home premises, there is a need for a service management solution that allows for remote management of devices on the customer's side (see e.g. [1, 2]). This holds a promise of simplification and better management control for the network access providers, content providers, and software application providers. The possibility exists of adding revenue streams or cutting costs through managed services such as home security, automation, and device management.

Our research problem stems from the architectural premise that several technical islands of user-devices (such as the television, the personal computer, or the electricity meter) have to be able to deliver a variety of services such as video-on-

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demand, music-on-demand, personal video recorder (PVR), or remote metering. During the delivery of these services, a remote service platform (or auto-configuration server) guards the quality, timeliness and integrity of the services delivered, or can install entirely new functionalities.

Within the scope of this article we aim to make explicit business models that are relevant for remotely managed support services (for the end user) through the use of a home gateway, where a separate remote management layer supports service delivery and quality. This separate management layer retains the initiative of the upgrading, patching, or adding of new functionalities.

What actor will fulfill the function of *gatekeeper*—occupying a position within the service value chain through which all other services must pass if they want to keep in contact with the end-consumer—will be of strategic primary importance. All actors must realize that consumers might veer away from a closed solution where the communication between services, applications and devices is fenced off from one another..

2   Business Modeling Approach

In order to take into account the different interests, resources and competences of the different actors from these disparate technical domains, we follow the methodology of business modeling. Business modeling attains a cross-industrial view, and attempts to describe the value network that creates a set of services. Business modeling is situated on a higher level of abstraction than business process modeling, which focuses on the flow or progression of activities within a company or within one specific industry.
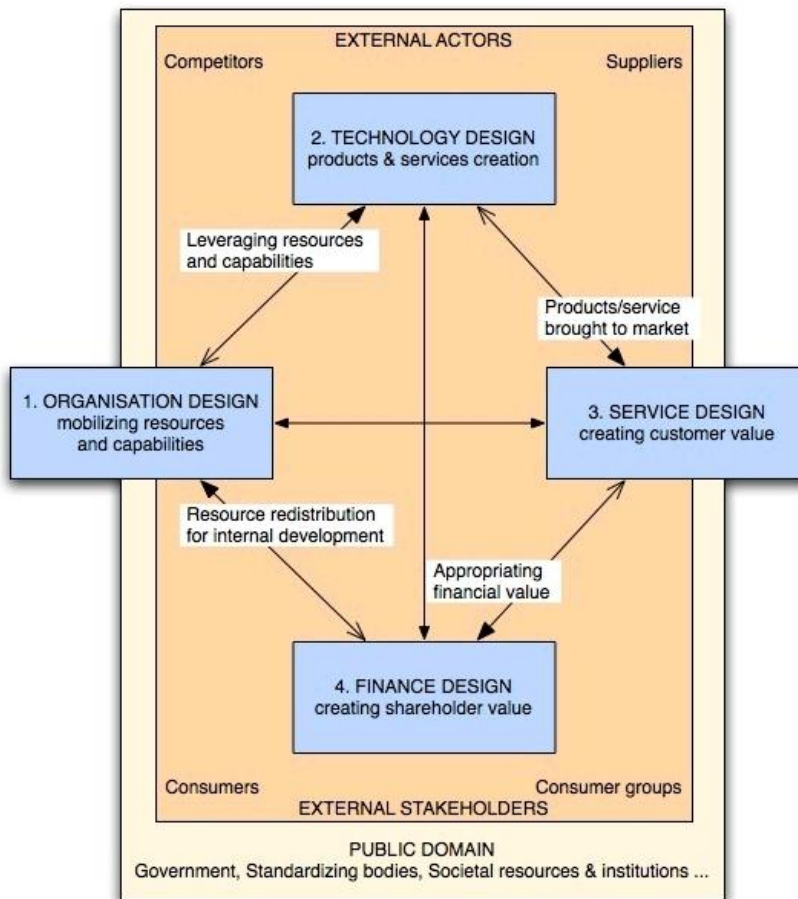
2.1 Theoretical Background

Business modeling is multidimensional and strategic in character. It incorporates the multidimensionality of Kaplan and Norton's balanced scorecard view [3], the resource-based view of Jay Barney [4,5], and the strategic management insights of Gary Hamel [6]. According to Barney, companies must first mobilize their available resources and capabilities, in order to produce and bring to market a portfolio of products and services. Next, those products/services that create customer value appropriate a certain financial value that can be reinvested back into the capabilities of the firm.

2.2 Business Modeling Cycle

The business modeling cycle presented below is based on [5] and [7]. From Barney the primary importance of resources and capabilities is retained. His 'resources and capabilities' are an instance of organizational design, his 'products and services' an

instance of 'technology design', his 'customer value' corresponds with the service design, and his 'financial value' with the finance design. The concept of 'roles' is basically synonymous with 'capabilities': roles will be defined as the bundle of business actions undertaken by corporate actors, with the aim of creating customer and shareholder value.

Fig.1. Business Modeling Cycle

The four business modeling design phases thus are:

1. <u>Organization design phase</u>. The organization design involves defining a business scope (what customers will we try to reach and how), identifying distinctive competences, and taking business governance decision (make versus buy decisions).

2. <u>Technology design phase</u>. The technology design involved defining the technology scope (what technical design are we trying to develop and how), identifying the systemic competences that will contribute to the business strategies,

and deciding on the IT governance (how will we develop or acquire the needed technical competences).

3. Service design phase. The service design involves choosing a specific value proposition towards the user, which implies choosing for a specific strategic scope.
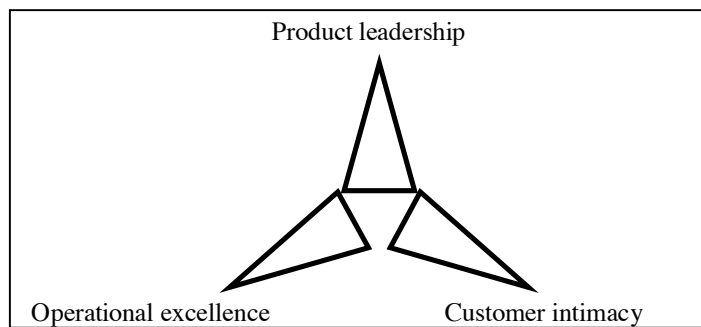
4. Financial design phase. In a final phase, the financial modalities are formalized in binding contracts that clearly describe each partner's responsibilities, and the financial or other benefits they will receive in return.

2.3 Business Modeling Building Blocks

In business modeling, three main building blocks are distinguished: business actors, business roles, and relationships. **Business actors** can be physical persons or corporations that participate in the creation of economic value, through the mobilization of tangible or intangible resources within a business value network. **Business roles** are logical groups of business processes that are fulfilled by one or more actors. Business actors provide value to or derive value from the business roles they play. Finally, **business relationships** are the contractual exchanges of products or services for financial payments or other resources.

2.4 Value Disciplines as Strategic Thrusts

When choosing how to approach its end customers, a company can choose between three basic strategic thrusts: product leadership, operational excellence, or customer intimacy [8].

Fig.2. Treacy and Wiersema's [8] Value Disciplines

These three dimensions sum up the three basic reasons why and when consumers will adopt a new product:

- When aiming for operational excellence, a company attempts to attract a critical mass of consumers through cost-advantages that make the price of the product/service drops below that of the competition's;

- When choosing for <u>product leadership</u> the service or product offered is of premium quality and innovative, and comes at a premium price;
- When adopting the <u>customer intimacy</u> strategic thrust, the consumer is shown the advantage of having a more intimate relationship with the provider of said products/services through customized products/services.

As a company it is impossible to excel in all three areas, and very difficult to excel in two areas simultaneously. Therefore, a trade-off has to be made between these dimensions.

3   Research Methodology

The conceptual framework introduced above guided the research that was undertaken. After having conducted a literature review of existing business cases that are relevant for remote management, exploratory questionnaires were provided to all company partners of the project. The answers that were supplied served as a first input in the formulation of the business requirements, critical resources, and actor interactions. Subsequently, in-depth, face-to-face interviews were organized with representatives from each company partner organization.

Next we described, based on the input acquired through the series of business case studies, the identified actors, roles and requirements, and several business scenarios that vary from closed-loop to on-demand business models [9]. The two initial phases of business modeling design, i.e. the technology and organization design phases, are treated in the section below. The four business scenarios will outline the service and financial design phases.

4   Business Modeling for Remote Management

4.1 Technology Design

The technical architecture within the scope of the Armad@ project considers three main technical domains:
- <u>Subscriber loop</u>: The integrated network access solution as provided by the Network access providers, with the aid of infrastructure providers.
- <u>Access and service gateway</u>: The home or **access gateway** contains the routing/bridging function as well as the modem function. The **service gateway** is a platform on which the provider(s) deploy services.
- <u>End user devices</u> (or 'customer premises equipment' or 'terminal devices') in the home network (LAN). The end-user device with which the user consumes the service (TV, PC, PDA, IP-Phone,…). This can be an IP-enabled device (PC, game station) or a non-IP device (TV, Telephone).

Considering the outlined architecture, the business models scenarios will have to take into account a) different models for remote and local management, b) different

models for application and content service provision and c) models that allow the execution of supporting services. More specifically, the location and functioning of the service platform as a passage point that can be controlled and exploited economically by gatekeepers, will be the focus of attention.

4.2   Organisation design

On the organisation design level, the different actors and roles that are active within a given value network are distinguished. The following categorisation of actors and roles is based on the categories of Camponovo and Pigneur [10].

a) **Technology** actors provide the hardware and software infrastructure needed to offer the remote management service to the end user.

- Network Equipment developers: Actors that develop the network equipment, necessary for the manufacturing of network equipment.
- Network Infrastructure Integrators: Actors that provide integrated network solutions to network operators.
- Content / Application Developers: Actors that develop the content or applications that will be delivered to the end-customer.
- End-user device manufacturers: These include Consumer Electronics device manufacturers, personal computers manufacturers, digital peripheral manufacturers, and telecom device manufacturers.

b) **Services** includes both content service providers and application service providers. These actors are responsible for providing value-added services.

- Content/ Application Service Providers: Sell integrated and branded packages of content / applications to specific end-customer market segments.
- Aggregators: Actors that aggregate the wide variety of applications and/or content available on the network.

c) **Communication providers** provide the end user with access to communication services, networks and the internet.

- Network operators: In the scope of our project, this term refers to all network operators that at least perform the role of network access provider.

d) Last but not least comes the **end user**, which can refer to both businesses and retail customers.

- End-users: An individual, group of people, or a company that is the final link in the service value chain, and consumes the services created and offered by the various previous links in the service value chain.

e) Camponovo and Pigneur do not consider the role of the **advertiser**, which we do include in all business model scenarios.

- Advertisers: Actors that mobilize marketing budgets in order to appear alongside content or applications.

Summarizing the above, the following figure shows a generic service value chain that delineates how the phases of production, integration, delivery / distribution and end-usage follow chronologically. This general business service value chain serves as the foundation on which a variety of feasible business scenarios can be mapped.
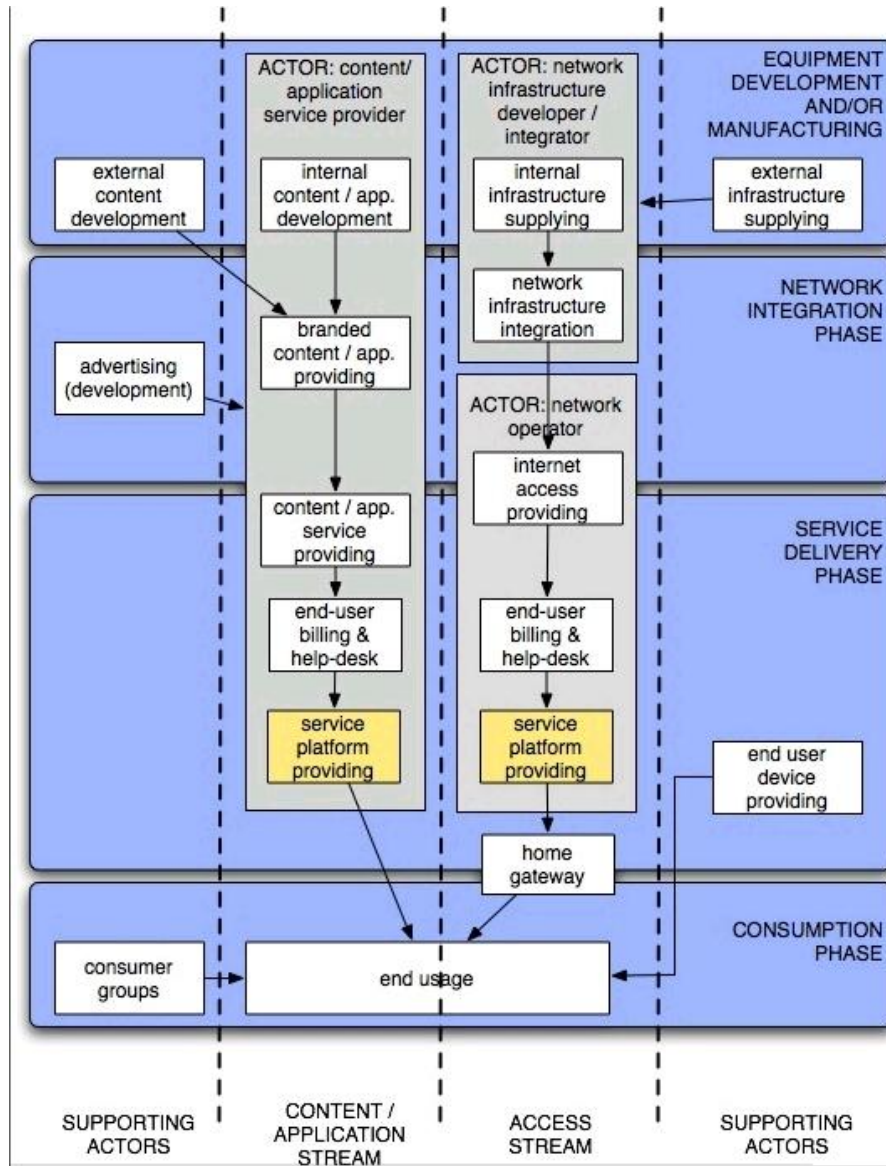
Fig.3. General Service Value Chain

5   Business Scenarios

Four potential business model scenarios are distinguished along two dimensions: whether they adopt a vertically integrated versus a modular service development approach, and whether they retain full remote management control, or delegate responsibilities to the end-user.

Table 1. Four business model scenarios

	Vertical service development	**Modular service development**
Strong remote management	NETWORK ACCESS PROVISION	PURE SERVICE PROVISION
Soft remote management	INFORMATION AGGREGATION	HYBRID SERVICE PROVISION

5.1. Business Model Scenario 1: Network Access Provision

In this scenario the network operator provides a unifying platform for external content or application providers in the form of a 'walled garden'. Users pay a one-time subscription fee, and/or a pay-per-use fee depending on the services provided and the payment formula offered. External service providers who choose to remain outside of the network operator's walled garden could experience markedly lower levels of service quality, except if they invest in their own remote management layer [11]. This solution allows the network operator to retain full control—but also: responsibility—of the quality of service of delivery, and may be most suitable for the delivery of critical high-end business software such as human resource management software, enterprise resource planning software, sales or supply chain management software [12].

Concerning revenue and service flows, there are revenue flows between the end customer and the network operator for the internet access. The consumer subscribes to content or applications via the network operator, and all consumed services appear on one telecom bill.

5.2. Business Model Scenario 2: Pure Application (or Content) Service Provision

In this business model scenario both the content and the application service provider remain completely independent from both one another, from the network operator, and from a device manufacturer.

Revenue flows exist between the consumer and the network operator concerning internet access provision and the implied remote management functionality. Because the customer buys his or her content or applications directly from the content or application providers, no advertising revenues are possible between the advertisers and the network operators. The third party content/application providers bear the responsibility of good QoS. The service providers may aim for lower quality mass-market reach through low pricing. In most cases, the third parties—if the network operator does not provide a preferred link to its subscribers—will obtain their customers through a content aggregator or through a search solutions provider (see fourth business model scenario).

5.3. Business Model Scenario 3: Hybrid Application (or Content) Service Provision

In this scenario, a service provider develops and markets an application or content service platform through alliances with content owners / application owners, and uses control of part of the delivery channel to create an attractive customer value proposition. This solution can lead to a 'content walled garden': only certified content, protected through proprietary DRM, will be consumable. In this scenario, a dominant hybrid service provider becomes—e.g. through an integrated hardware-software solution—a critical gatekeeper for content developers to deliver their content to the public.

Concerning the revenue and service flows, the access provider retains the control and management of internet access provision, and reaps the income from these services, but the content service provision and the affiliated advertising income can be captured by the content service provider.

5.4. Business Model Scenario 4: Information Aggregation

In this scenario a content aggregator or portal will attempt to position itself as the preferred partner for content and application retrieval with or without the use of a proprietary Digital Rights Management (DRM) solution. The content aggregator will only utilize a remote management layer for its DRM client software [14].

Concerning revenue and service streams, the customer only pays the network operator for internet access. Both the content and application service providers and the content aggregator capture a part of the generated advertising revenue. If the portal has sufficient critical mass, the marginal loss of the advertising income to the content aggregator at the expense of third party service providers is made up by the increase in content/application downloads.

6   Comparison and conclusion

6.1 Viability of business scenarios

Table 2 compares the strategic viability as well as the implications of the four scenarios outlined above according to the basic strategic thrust characterizing each business scenario, the degree of openness to third parties of the business model, the degree to which the remote management layer will be centralized or decentralized, and the main value proposition plus the main risk/obstacle of each business scenario.

Table 2. Strategic viability of considered business model scenarios

Gatekeeping role	Strategic thrust	Open vs. closed business model?	Centralization of remote management?	Main value proposition? — Main risk?
Scenario 1: Network Access Provision	Product leadership ++ Customer intimacy + Operational excellence -	Rather closed	Centralized within the network operator domain	Integrated service offering, aimed at premium market segment — Uncertain revenue model for mass consumption services
Scenario 2: Pure Application/ Content Service Provision	Product leadership - Customer intimacy + Operational Excellence ++	Rather open	Decentralized: Each application / service provider works independently	Fast introductions aimed at large markets; — Islands of content or applications hamper adoption; Lock-in of customers through proprietary standards
Scenario 3: Hybrid Service Provision	Product leadership ++ Customer intimacy + Operational excellence -	Rather closed	Rather centralized: Service delivery mechanism managed by content service provider	Fast adoption growth through portability — Business processes imitable by competitors
Scenario 4: Information Aggregation	Product leadership + Customer intimacy - Operational excellence ++	Very open	Decentralized: Search portal only sells ad space around search results, does not interfere with service delivery.	Transparent cost structure and self-evident customer value — Privacy concerns / secrecy concerns for customers; No control over collected data

The scenarios demonstrate that is feasible in a business sense for various stakeholders to install and manage a remote service platform. Network access operators present the primary and most obvious choice because of their traditional core business of managing and controlling network transport and service delivery, and because of their existing relationships with customers. However, several scenarios also point to a strong tendency towards decentralisation of remote management platforms. Concerning the risks of the remote management platform being bypassed, it is likely that the ability of external application and content service providers to circumvent specific internet-based platforms will persist and even increase.

It can be expected that the more business critical / professionally oriented the service offerings are, the higher the expected service quality levels will be, and the more likely a closed solution will become. Hence, while the entertainment cluster is witnessing the fastest growth, it may be the productivity cluster and the home management cluster—since they demand the highest levels of accurateness, timeliness and reliability—that will create the initial demand for a remote management layer. This forms an economic conundrum, since the slowest paths to profitability may require the highest levels of remote management functionalities, while the fastest paths to profitability are situated in a sphere of activity where the consumer has come to regard always-on connectivity and dynamic upgrading and patching functionalities as a given.

6.2 Implications for Remote Management

Given the likely decentralization of remote management functionalities towards the at least some content or application service providers**,** it can be foreseen that there will be a split in remote management functionalities between network-specific functionalities (residing in the network access provider domain) and content- or application-related functionalities (residing in either the network access provider domain, or in a variety of third party domains). Related to service gateway upgrades, the network access operator is most likely to build out a remote management layer, regardless of bypass threats or cross-selling opportunities, since it provides the network access provider with the possibility of longer hardware life cycles and lower maintenance costs.

Given the bypass scenarios by external service providers, duplication of remote management functionalities can be expected, as well as strategies by network operators to strengthen customer relationship and to aggregate and support attractive content and applications.

The remote management architecture should be sufficiently flexible in order to keep the most feasible future business options open, depending on what scenario will turn out to be dominant. One potential implication of the scenarios examined is that network operators, while offering advanced levels of remote management to selected external content providers and application providers in a 'closed', end-to-end manner, at the same time may be inclined or forced to open up the service gateway to

additional content and application providers using just a minimal set of remote management functionalities offered by the operators.

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