



VOIce-based Community-cEntric mobile Services for social development



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Business Modelling and Adoption Methodologies State-of-the-Art DELIVERABLE D1.2 (resubmission)

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VU University Amsterdam	VUA	Netherlands
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1 Executive Summary

The goal of the VOICES project is to facilitate diffusion and exploitation of European ICT research results by helping to unleash the potential of mobile ICT services for the Base of the Pyramid. The Base of the Pyramid (BoP) refers to the 2.6 billion people that have less than \$2 (2002 PPP) a day to spend. The success of VOICES not only depends on the technical potential of the service, but also on its economical and social viability. The goal in this deliverable is to propose an approach that enables the design of economically viable ICT services for the BoP that reach impact to the targeted population.

The overall research question therefore is:

Which approach should be followed to design viable and sustainable ICT enabled services for the BoP?

By means of desk research the State of the Art (SotA) on business modelling and adoption methodologies is mapped on a business modelling framework, the Business Model Canvas. This framework is used to map critical success factors (CSFs) and the inherent trade-offs these factors assume. CSFs can be identified as a limited set of crucial design parameters that need to be addressed when designing a business model for new or improved ICT products or services.

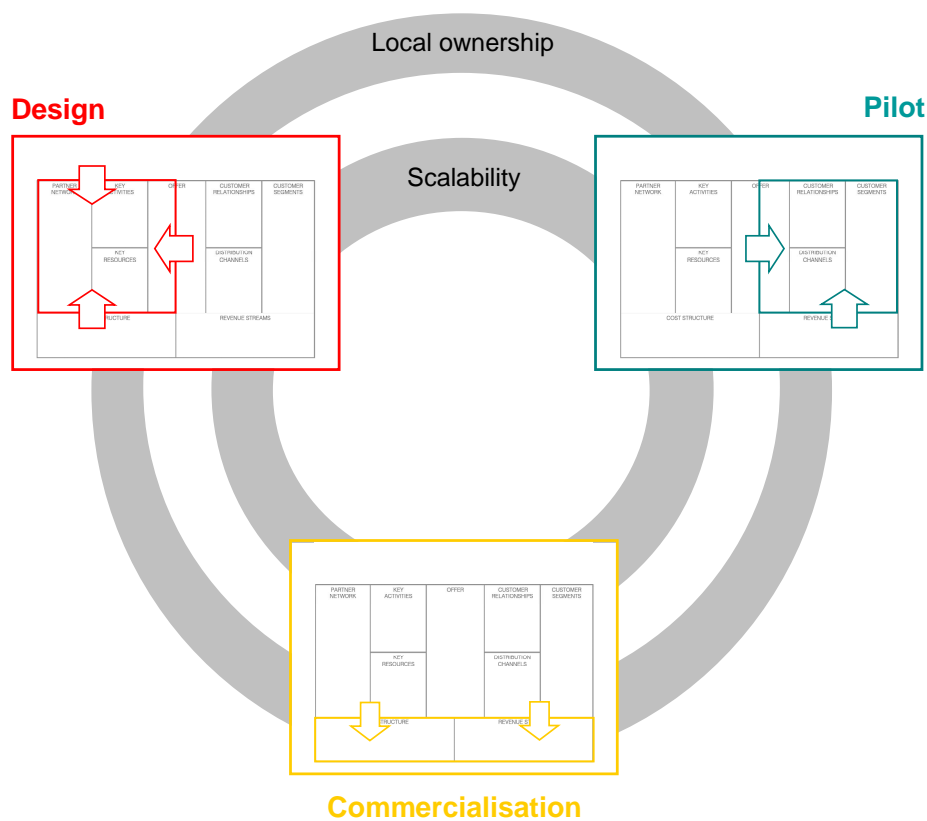
Key Partnerships	Key Activities	Value Proposition	Customer Relationships	Customers Segments
	Manufacturing		Capacity building	
Content / service portfolio development		Added value	Customer relationship building	Nature of demand
	Organisation learning		User interaction	
	Governance		Customer lock-in	
Organise end-to-end value chain	Key Resources	Open value proposition	Channels	Market entry strategy
	Inter-operability		Local awareness creation	
	Distribution of functionality	Positioning	Local service delivery	
Scalability	Human resources		Service management	Nature of customer segment
Cost Structure		Revenue Streams		
Cost pooling		Revenue model		
Economics of scale/ scope		Revenue mix		

CSFs mapped on Business Model Canvas



In this report, the Business Model Canvas is also used as a basis for the different choices that are specific for a particular phase of the product development cycle. Throughout the different phases of the product development cycle, decision makers will have to face a dilemma: they need balance the need to 'go local', build social relationships and trust, thereby ensuring local ownership. On the other hand, working towards a viable and sustainable business model calls for strategies of scaling, or at least a scalable business model. Therefore, a consistent organisation of a feedback loop between working on the two opposites is required.

Dealing with this dilemma becomes more manageable by focusing on specific design choices of the business model canvas at the different phases of the product development cycle. Broadly speaking we distinguish three main phases in product development cycle; the design phase, the pilot phase and the commercialization phase.



Product Development Cycle Approach

In the design phase, design of the value creation (left part of the business model canvas) is critical. A requirement is that this value creation process is enabled by financial and non-financial investment of resources. To be able to do this, input on how the organisation intends to deliver this value in the future is necessary (right part of the business model canvas). In the pilot phase, design of the delivery of value is critical (right part of the canvas). A requirement to do this is an implemented design of the value creation process (left part of the canvas). To be able to make these decisions in an



informed manner, input on how revenues can be generated (value can be captured, bottom part of canvas) is needed. In the commercialisation phase, design of how revenues can outweigh costs is critical. A requirement to do this is a design of the value creation as well as value delivery process. To be able to do this, input on how revenues can be increased and costs can be lowered is necessary. This phase takes the cost and revenues of exploiting as a starting point to make choices. Results from this phase can be used to either guide (re)design the business model (left arrow) or service concept (right arrow) to ensuring local ownership.

This deliverable will serve as the basis for developing a *business modelling toolkit* to support decision making as the starting point for further research into business models for ICT services targeting the BoP. Furthermore, it also serves as the basis for supporting Work Package 4 (and m-Health service in Senegal) and Work Package 5 (m-Agro service in Mali) of the VOICES project in developing sustainable ICT services. The Business Modelling and Adoption Methodology approach will consequently be contextualized for both work packages.



2 Introduction

The goal of the VOICES project is to facilitate diffusion and exploitation of European ICT research results by helping to unleash the potential of mobile ICT services for developing economies and resolving existing content and access barriers for such services, through its voice service development toolbox. Furthermore, VOICES will demonstrate how mobile ICT services are adaptable to the local context both by providing mechanisms for local adaptation (integrating rural community radio into Web content management, and by providing novel speech technology suited for African languages) as well as by on-the-ground demonstration of the adequacy of its solutions through its local pilots in different countries with a wide range of African partners.

This deliverable is part of Work package 1, task 2 which deals with identifying, analysing and transferring knowledge on appropriate business models for voice based services in a BOP context.

2.1 Goal and central research question

The success of VOICES depends on economical and social viability of the services developed. To create ownership of the solution and ensure a long lasting impact that will be monitored, developing and using adoption methodologies and business models is key to develop VOICES enabled services that have a good chance to outlive the project. The goal in this deliverable is to propose an approach that enables the design of viable services for the BoP that are able to outlive the projects and trajectories in which they are developed and designed and reach impact to the targeted population. The overall research question therefore is:

Which approach should be followed to design viable and sustainable ICT enabled services for the BoP?

This central question can be broken down into a number of subquestions:

- How to conceptualise the BoP?
- What specific characteristics of the BoP should be taken into account in designing services for this market place?
- What is the overarching dilemma decision makers and designers of services for the BoP are faced with?
- What service development cycles are best suited to follow in designing ICT services for the BoP?
- What are the critical design decisions in designing ICT services for the BoP?
- How should the key decisions that need to be made be mapped and organised into a consistent set of options?
- How should the process of making these choices be organised
- How to make the decisions?



2.2 Approach

An overview of generic business model aspects common to Western voice user input services is provided as a starting point. By means of desk research the State of the Art (SotA) on business modelling and adoption methodologies is mapped, focusing on those aspects that are crucial to business models for a BoP context. This is the basis for a translation or application into tooling and support for decision makers dealing with designing, piloting and commercializing ICT services for the BoP. We use a business modelling framework as proposed by Osterwalder and Pigneur (2003) to structure and group these design decisions. This structured set of design decisions is then confronted with the different phases of innovation usually associated with designing ICT services: we aim to identify what choices stand out and are specific for that particular phase.

Although grounded in literature, this approach lacks validation, both in terms of empirical evidence or practical usefulness and usability. Therefore, the conclusions take the shape of working hypotheses as formulated in the previous paragraph. As a consequence, a major part of future research needs to be devoted to validating this hypothesis through the VOICES pilot.

2.3 Reading Guide

In Chapter 3, a brief discussion of the body of literature on BoP business models and services is discussed. It serves as a basis to formulate the proposed approach in the remainder of the chapter. Chapter 4 identifies generic business model aspects for Western voice user interface services. Chapter 5 contains a structured discussion of the SotA literature by means of an integrative business model framework. This framework allows us to map an (almost) inclusive set of critical design choices necessary to design, pilot and commercialize services for the BoP. In Chapter 6 the adoption methodology is discussed. It describes how these design decisions differ per innovation phase, and maps ways to find out how these choices can be made in an informed manner. Chapter 7 contains conclusions and an agenda for future research.



3 Approach

3.1 BoP as a market place

The Base of the Pyramid (BoP) refers to 'the poor', or those people who form the economical 'underclass' of society and are prone to marginalisation (Klein, 2008, Prahalad, 2005). A lack of sufficient income is one of the most important measures to define this group, although the full range of socio-economic conditions that affects a person's quality of life should be considered (e.g., living in informal economy) (Hart, 2005).

The amount of people that make up the BoP is generally calculated based on purchasing power parity (PPP). 2.6 billion people have less than \$2 (2002 PPP) a day to spend (Klein, 2008). The phrase BoP is often used in conjunction with the notion that the poorest people should not (only) be seen as victims, but as price-conscious consumers (Prahalad, 2002), business partners (Simanis & Hart, 2008) or sources of innovation (Immelt et al, 2009). The philosophy of this approach is best summarized by the often heard phrase of: "Doing well by doing good". This view of using business as a tool for poverty alleviation in developing countries coincides with a recent focus on sustainability and shared value creation in Western economies. Although some businesses are viewed as a major cause of social, environmental and economic problems, capitalism represents an "unparalleled vehicle for meeting human needs, improving efficiency, creating jobs and building wealth" as long as its focus is on solving societal needs rather than individual profit maximization (Porter, 2011).

3.1.1 How is it different from western markets?

The difference is nicely captured by London and Hart (2011) in the phrase: "Needs, needs, needs, but no market". Research indicates that innovation strategies effective in serving or entering existing consumer markets are ineffective in creating new consumer markets. Conventional marketing wisdom leads managers toward value closed messaging (explicitly defining the products value). Both the characteristics of the poor as well as the challenging environments in which to operate pose business challenges that are specific to the BoP-context (Hammond et al., 2007). This means that success in a BoP-context requires simultaneous and radical innovation on multiple aspects of the way firms do business, such as price-performance, value chains, workflows, payment schemes, customer education, human resource management etc. (Klein, 2008).

At this point, nonconsumption of products and services is the defining condition of the BoP. As a result, entrepreneurs in the BoP context have to think in terms of market creation. Market creation, it turns out, poses an entirely different kind of innovation



challenge from that of market entry. It means that a value proposition has to be open-ended and does not define specifically a product's value.

BoP markets differ from Top of the Pyramid (ToP) markets in important ways and thus require unique solutions. The five key factors according to London and Hart (2011):

- There are many unaddressed needs at the BoP. These range from services where the government does not meet its mandate (clean water, sanitation and so on) to needs that are neglected because people are perceived as being too poor to buy (health care, housing)
- BoP markets are beset by poor infrastructure (roads, water, power) and inadequate distribution networks. As a result, firms cannot count on the basics – connectivity, roads, water, power – when setting up a factory, warehouse, bank, branch, or sales office. Poor infrastructure also means that the low-income customer generally has poor access to education and information – which makes marketing and service delivery different from a company's approach to ToP customers.
- Corruption is common, sapping economic value from the system and adversely affecting those who follow the rules.
- Low purchasing power which makes it difficult for new products and service to enter the market. A 2007 study indicates that there are more than 4 billion people living in conditions where they are subject to a 'poverty penalty' whereby the poor pay significantly more for products and services than their middle income counterparts (in some cases, up to 40 times more)
- A lack of equity capital. Traditional capital providers typically bypass BoP entrepreneurs, including those who are trying to solve tough problems in healthcare, water, sanitation and alternative energy because they are perceived as highly risky.

3.2 The challenge at the BoP in terms of service design

Given these characteristics of the BoP (non) market place, organizations with the ambition to structurally cater to this market face a dilemma: they need balance the need to 'go local', build social relationships and trust, thereby ensuring local ownership. On the other hand, working towards a viable and sustainable business model calls for strategies of scaling, or at least a scalable business model. This dilemma is the cornerstone for our approach.

In general, several authors note that there is a gap between the design of a service and the 'actuality' in which it is used (Heeks, 2002) on different levels (see figure 1). This "design-actuality gap" model seeks to explain the high rates of failure of information systems failing in developing countries. It describes the match or mismatch between information system designs and local user actuality. For each of seven dimensions: information, technology, processes, objectives and values, staffing and skills, management systems and structures, and other resources.



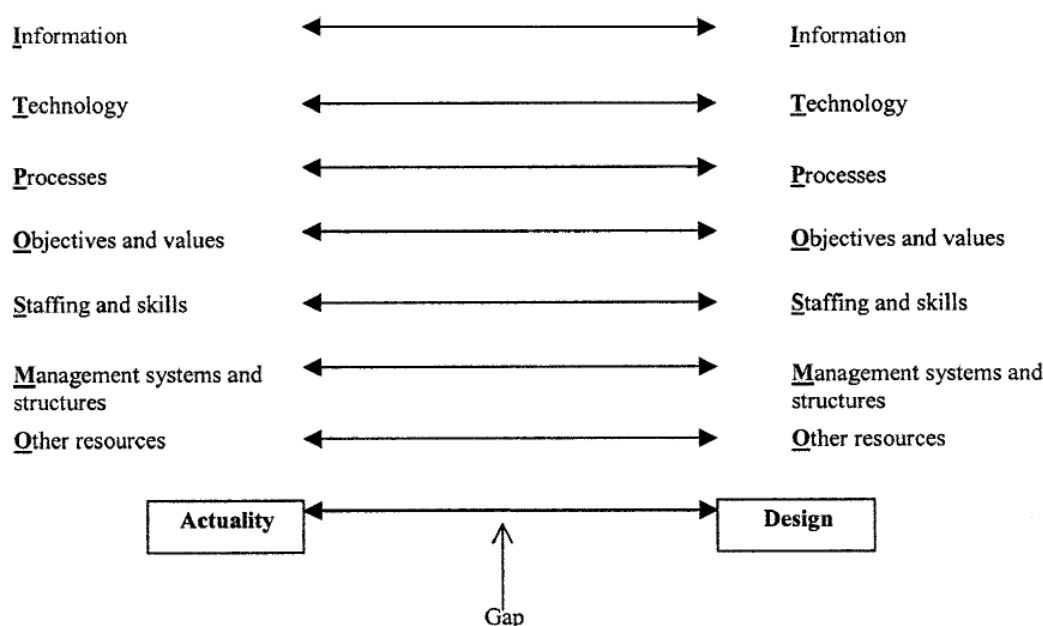


Figure 1: from (Heeks, 2002) – design-actuality gap

Up until recently, this gap was used to stress the need for local activity and ownership. An article by Lyer quotes several others that point to a similar focus on local ownership: “firms will do better and learn more if they tailor their operations to the unique conditions of developing markets” and “firms will be better off if they exploit the differences between countries rather than utilizing a more homogenous strategy.” (Prahalad and Liebethal, 2003). In fact, many authors stress it is more than a focal point; given the unstructured character of this market place, it is the absolute basis. BoP markets have to be understood at the ground level— from the bottom up—if a venture is to succeed in those marketplaces. In the one-to-one interactional marketplaces of the BoP, the boundaries between “human” and “economic” issues tend to get blurred, long-term relationships tend to trump short-term ones, “rich networks” make up for resource constraints, and consumption and entrepreneurship can be two sides of the same coin. BoP entrepreneurs, therefore, have to concretize, localize, and “socialize” their products and services. (London and Hart, 2010)

More recently, the attention for local ownership has been accompanied by a call for more attention to scalability. To serve the poor sustainably, it is often necessary to target a broader segment (London and Hart, 2010). Many enterprises achieved viability by adopting an expanded view of low-income consumers or business associates, engaging those both at the base of the pyramid, but also those in adjacent income groups. By so doing, the organizations providing the service can buffer the volatility and risk inherent in dealing with the very poor. The already seminal report by the Monitor Group (Karamchandani et al, 2011) reveals that the majority of successful enterprises are able to survive by selling “push” products and services. Yet to do so, companies must engage in large-scale demand stimulation to educate their target customers about the benefits of their offerings. While this may be expensive, companies in sectors as diverse as mobile-enabled services and agriculture inputs successfully incorporate this cost into an



economically viable business model, although it often requires higher gross margin to afford the “push”.

In sum, we are left with a dilemma: to ensure local adoption, heavy investment in local resources such as people, infrastructure and social ties is necessary. On the other hand, no business model will be viable unless a level of scale is achieved that transcends those local contexts.

3.3 Dealing with the local ownership/scaling dilemma

A way of dealing with a dilemma is to ‘unwind’ the two opposing forces through time. Dealing with a dilemma requires the consistent organisation of a feedback loop between working on the two opposites. Not to reach total synergy or a compromise, but instead a process of social learning. This section deals with articulating such a cycle.

A well known overarching methodology for cyclical development in base of pyramid populations is described in “The Base of the Pyramid Protocol: Toward Next Generation BoP Strategy” (Simanis, 2008). This approach seeks to close gaps between design and actuality (in the words of Heeks) by promoting a “Business Co-Venturing” strategy, as opposed to the currently dominant “Selling to the Poor” approach (Simanis, 2008). Central principles in the Protocol are “mutual value” and “co-creation.” By mutual value it is meant that each stage of the process creates value for all partners in terms important to each. The “co-”component of “co-creation” describes the need for companies to work in equal partnership with base of pyramid communities to create a sustainable business.

The Protocol also identifies a number of phases that are not limited to conceptualization, design, and experimental projects, but also include business expansion. The phases that are identified:

- Pre-field-phase: 1) the selection of appropriate BoP project site(s); 2) the formation and training of a multidisciplinary corporate “field” team; and 3) the selection of local community partners; 4) the creation of an enabling environment or “R&D White Space”.
- In-field-phase: 1) opening up – build rapport and a base of trust with local communities; 2) building the ecosystem – forming project team of company representatives and committed and motivated community members; 3) enterprise creation - creates the full business model using small-scale tests and continued action learning.
- Scaling-out phase: 1) reach out to new communities using business ambassadors to localize the core concept; 2) formalize linkages between the parent business and the new Project Team; 3) re-embed the original business model within the unique context of the new community. (Simanis, 2008)

As a report mainly structured around how to successfully set up and run projects, this phasing has an intrinsic bias towards the field trial. In other development cycles, the need to create a level playing field with ‘western’ partners as well as local partners is part of the development chain. In the innovation cycle of the BoP innovation centre for example



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(BoPinc.org), ‘Preparing the ground’ and ‘learning from each other’ precede steps like co-creation and market introduction.

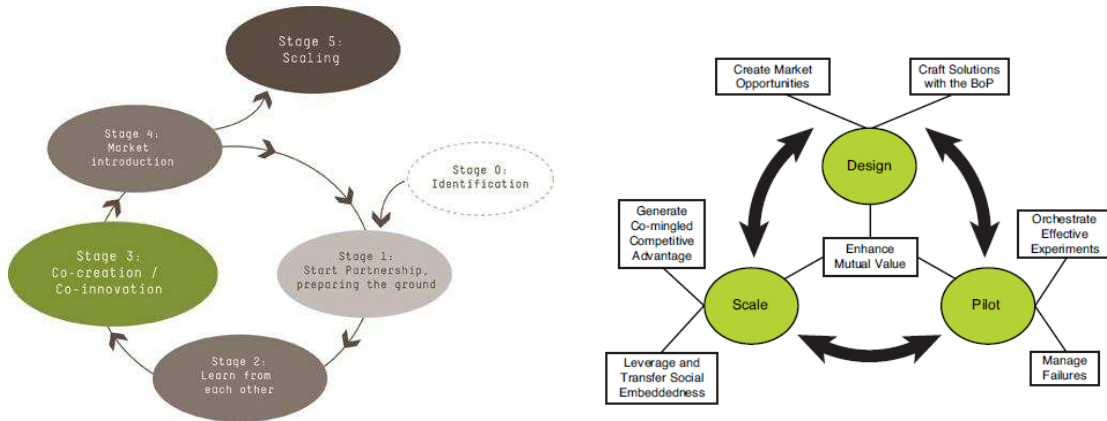


Figure 2: the development cycle of the BoP Innovation Centre and London and Hart (2011)

We choose to adapt our business modelling and adoption methodologies approach to the three phases as proposed by London and Hart (2011) that form an iterative process. London and Hart (ibid) set as a requirement that in every phase, there is a need to deal with business as well as adoption issues (see figure 3). Based on the local ownership/scale dilemma, the approach proposed here can be summarized using a matrix of the business goals (the dilemma) and their implications in each phase.

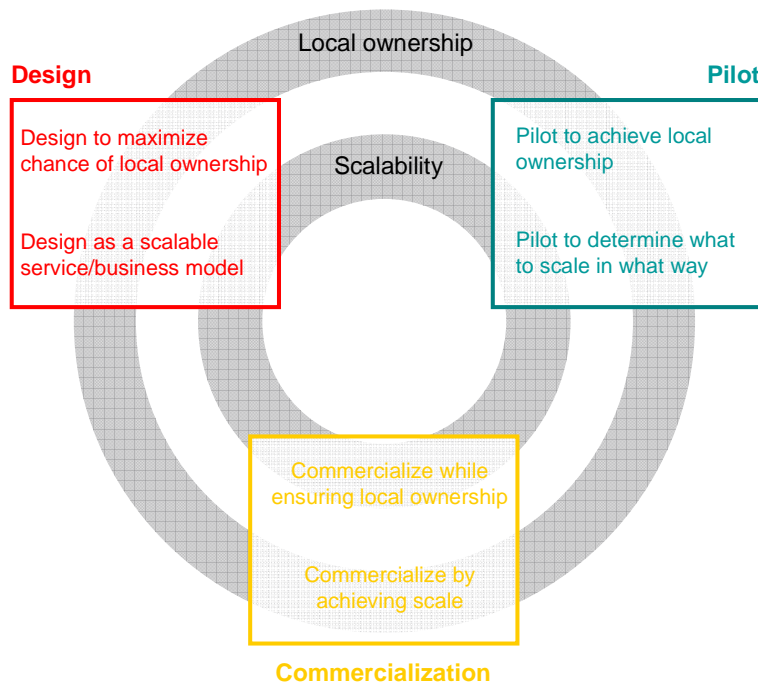


Figure 3: The approach



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The difference with the frameworks discussed earlier is that we make an explicit distinction between the *business goals* and the *phases*: as also indicated in figure 4, a business goal is either achieving local ownership or scale; the phase refers to the level of maturity of the service: is in the design or redesign phase (infancy), is in the piloting phase (adolescence; market adaptation) or is a fully commercial service (mature, growth and consolidation). In each phase, an organisation should make a decision on which business goal to focus.

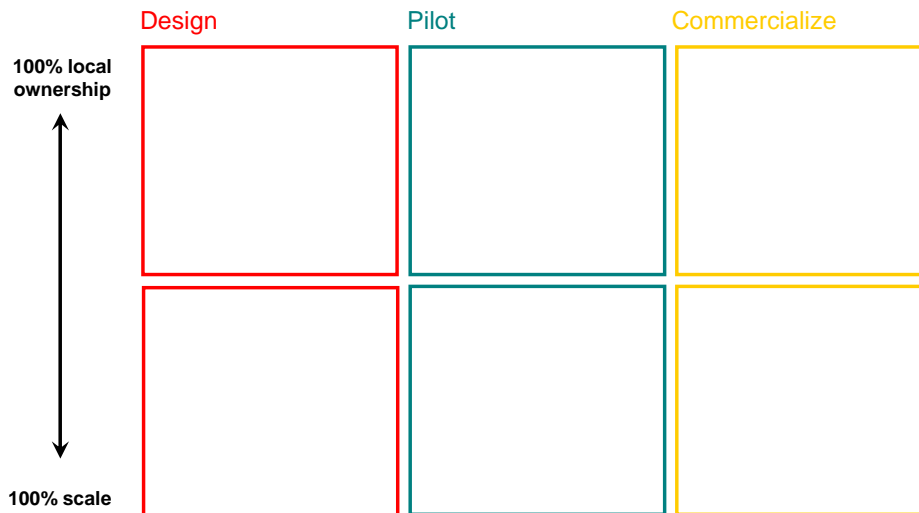


Figure 4: Business goals and phases

By making use of the proposed approach, the methodology becomes suitable for both multinationals as starting entrepreneurs. A multinational, for example, might have a proven ICT service which has reached large scale in the Western world and which the company would like to introduce in a BoP context. In figure 5, an example route is drawn of the situation. In the case of the proven ICT service, the starting point would be a 100% scaled product (#1). The challenge for this company would be to find solutions to create local ownership in the BoP in this phase (#2) and how to design a pilot in this context (#3). Consequently, the company might want to implement the pilot in various regions to test a certain scaling strategy that works locally (#4).

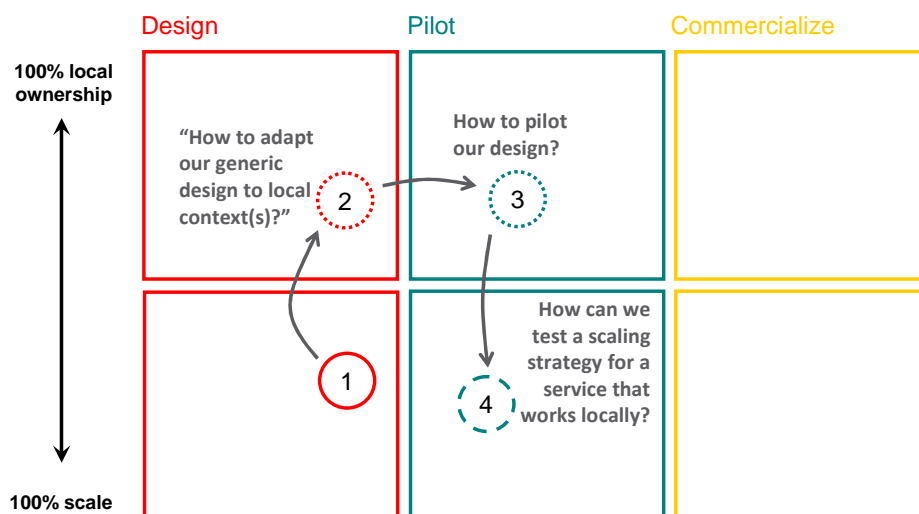


Figure 5: Example route 1



In the case of a local entrepreneur, the route may look different (figure 6). The local entrepreneur may for example have developed a successful pilot of a mobile based voice service in a local context (#1). Consequently the local entrepreneur may wish to develop a scalable service. Therefore he or she will have a go back to the original design of the service and adapt it to make it suitable (e.g. in speed, infrastructure) for expansion, while keeping in mind local ownership (#2). Consequently he or she will have to test the service on the scalability (#3). Lastly, the entrepreneur will have to work on the commercialization phase (#4).

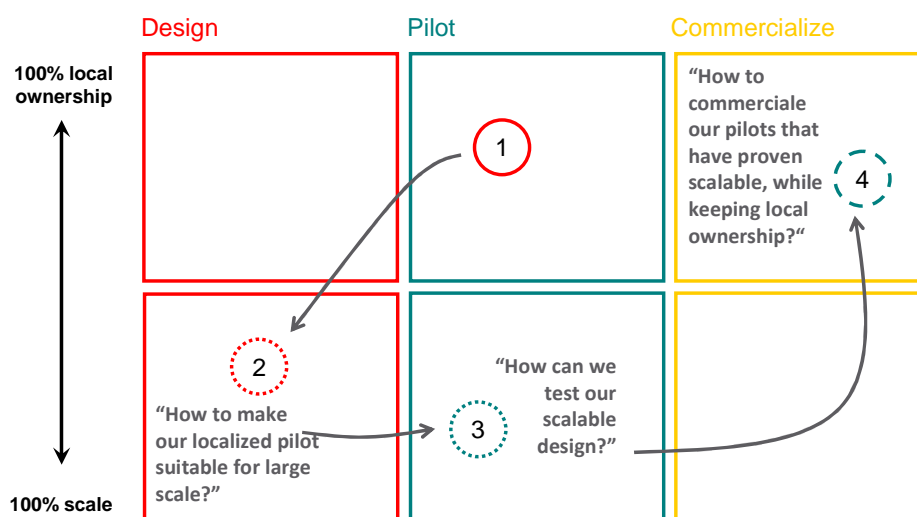


Figure 6: Example route 2

As may be concluded from the examples, throughout the development phases, both business goals should be taken into consideration. For instance, although the piloting is usually geared towards achieving local ownership, it is critical that in the design and especially in the commercialization phase, local ownership is an integral part of the design and decision making process. The other way round, it is equally critical to include (learning what to) scale as a requirement in the piloting phase. Further, it is important to note that the phases are not linear but iterative.

3.4 Conclusion

In this chapter we developed a framework to organize the process towards the development of services that serve the BoP. The basis for this framework is the dilemma between local ownership, i.e. the local consumer market as well as the local business ecosystem, and the requirement of scalability, i.e. reaching critical mass of customers or products sold to ensure viability of the business model behind the service.

This framework enables us to dive into the choices that need to be made. The body of literature in this field offers a vast offer of useful insights for decision makers. This framework enables the translation of these insights into critical success factors (CSFs) and trade-offs (Chapter 5), as well as a way to organize the decision making process along these CSFs and trade-offs (Chapter 6).



4 Western Business Models for ICT-Services using Voice User Interfaces

In this chapter, we explore Western business models that are or have been in use for ICT services that use Voice User Interfaces. We first classify what we mean exactly by Voice User Interface technology, then group different broad roles of that technology in services, then describe eight case studies of the business rationale behind those services, and finally generalize lessons from those examples. These findings can be used as input and inspiration for the BoP business models that are developed in work package 2, 4 and 5.

4.1 Overview Voice User Interface Technology

Voice User Interface technology, also referred to as (Automated) Speech technology or Human Language Processing technology, can be broken down into two distinct technologies that can be used separately or combined: the synthesis of human (sounding) speech by a machine or the recognition of human speech by a machine.

Synthesis of human (sounding) speech is used to allow information from a computer to be communicated to a user by using audio. Recognition of human speech can serve three basic goals: to determine what is being said, who is saying it, and how is it said.

- **WHAT:** Words and sentences are recognized from patterns in the human voice. These words or sentences are used as text input for a computer system.
- **WHO:** The identity of the speaker is recognized from patterns in the human voice. This is used for identification and verification purposes.
- **HOW:** The status of the speaker is recognized from patterns in the human voice. This is used to determine if a user is under stress, is angry, is happy, and take that as input for a computer system.

The WHAT-category is often referred to as Speech-To-Text (STT) or Automated Speech Recognition technology (ASR). Text-to-Speech (TTS) is synonymous for speech synthesis technology. In this chapter we focus on systems that either use voice synthesis technology (TTS) or Automated Speech Recognition technology (ASR/STT), or both, because these are used to act as an interface between the user and services. The technologies that are related to the WHO and WHAT questions are used to fulfil secondary functions in the interaction between the user and the service (is the user allowed to use the service, what way of interaction is preferred given the users status) and are out of scope.



4.2 Business Models for services that use Voice User Interface Technology

On a general level, three types of organisational roles are involved in delivering services that use Voice User Interface technology: technology providers, integrators and service providers. Technology providers create and deliver the components (both software and hardware) that are necessary to construct a service, integrators design and implement services using these technologies, while service providers provide the actual services to the end-users. For some services, external content is sourced from a content provider. The diagram in figure 7 depicts these general roles.

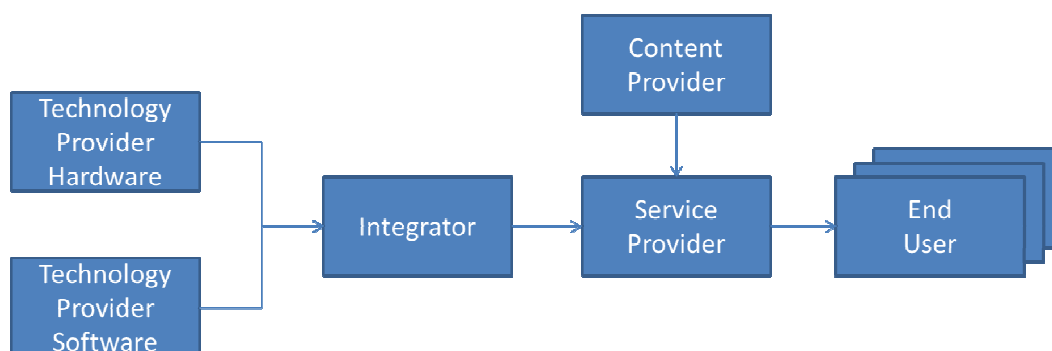


Figure 7: General organisational roles of service delivery

Companies can combine multiple of these roles within their organisation. The most obvious example is a company that develops its own hardware and software, builds its own services based on its own content and provides these services to its customers. In this document we aim to create an approach to design viable ICT-services for the BoP. Therefore, we focus on business models for service providers (who actually serve the BoP) rather than business models for suppliers to those service providers.

Voice User Interface technology can be applied to various services. Based on conversations with industry experts, we have chosen several services that provide relevant examples.

Information services: Services where a user, by means of speech requests, receives context-specific information from a (web) server. We have chosen three case studies for travel information that all slightly differ in setup. Other related information services that are common are weather information, stock market information or telephone number information. We chose travel services because a common use context is for users to be behind the steering wheel of a vehicle, making a Voice User Interface a logical design choice.

Navigation services: Services where a user interacts by means of speech with a helpdesk menu, to either get answers to his/her basic or frequently asked questions or be directed



to the correct department, where a human call center agent will answer his/her questions.

Assistance services: Services where a user by means of speech is able to perform a certain task, such as finding and being connected to another telephone number. Often, assistance services include some form of information services or navigation services.

Process optimisation: Services with voice user interfaces that are used to optimise (internal) processes. These services are often observed in environments where operators get many stimuli at the same time, and/or do not have their hand free to operate a manual input device.

This categorisation is by no means exhaustive, many other ICT services exist that use Voice User Interface technology in some way or the other, but these categories represent broad groups of services that make up a large fraction of the market. For each of these services, one or more case studies have been worked out and are presented in the appendix.

4.3 Generic conclusions from the case studies

In table 1 below an overview is given of the different case studies, and indicates the type of service, as well as focus and the major driver for economic sustainability.

name	service type	service	focus	economic sustainability
OV9292	information	public transport information	external	revenue share
TFL	information	public transport information	external	subsidy
1.800.Flights	information	flight information	external	advertisements
American Airlines	navigation	helpdesk menu routing	internal	cost savings
Wixi	assistance	telephone connect	external	revenue share / advertisement
TNO Connect	assistance	telephone connect	internal	cost savings
Apple Siri	assistance	automated personal assistant	external	personal information / advertisement
Flora Holland	process optimisation	orderpicking	internal	cost savings

Table 1: Overview of case studies

We found that the use of Voice User Interfaces technology is either externally or internally focused. By externally focused we mean that the reasoning to install the Voice User Input system is mostly driven by a desire to offer added value to end users, while internally focused systems aim to increase efficiency. This directly influences the way organisations judge the economic sustainability.

Internally focused systems are deemed sustainable if they provide a cost saving. In most cases this means limiting the use of personnel, and having as much of the service delivered automatically. This means that less personnel can be used, or personnel can focus their effort on the most relevant issues (external calls rather than internal calls in the TNO Connect case).



Externally focused services are considered sustainable if they provide sufficient income to cover their costs. The revenue models for externally focused systems show several general directions:

- **Airtime revenue sharing:** For commercial services, airtime revenue sharing with telephone operators (0,70 EURO a minute phone call in the OV9292 case) provides enough revenues to support the cost of running the system. In these cases, contact with a human operator is often completely removed from the service.
- **Subsidisation:** Some services use a toll-free number to stimulate use, but require subsidies to cover expenses. One way of subsidisation can be government funds, another category of subsidisation is a multi-channel business model, where the voice service is seen as an add-on to the regular (web)services. Income from the main service (in most cases: advertisement) is used to subsidize the niche system, to increase the attractiveness of the overall system.
- **Advertisement:** Advertisement is used in two forms: commercial messages that are played before, during or after interaction with the service, or companies paying to have their information given higher priority. Keeping a fair balance between the most relevant information and the sponsored information is crucial for information services.
- **Personal information:** Some business models also revolve around gathering and selling (or using for another service) personal information based on individual usage of the service. This model is still in its infancy when voice-services are concerned, because of the huge critical mass of users and the extremely low marginal cost of the service that are required to make this model work.

In terms of lowering costs, several general models can be identified:

- **Scale:** Most externally oriented services focus on mass markets. Running a service requires investment in programming, hardware and scaling license fees, meaning that the more users the service can attract, the lower the cost per user.
- **Automation:** Most externally oriented services offer no or little interaction with its personnel, but rather have all interaction automated.
- **Data/content aggregation:** The content that is offered through services is in general not gathered by the organisation offering the service itself, but rather collected from several sources, saving the cost to build a proprietary database.
- **Open Source Software:** Especially smaller organisations tend to apply open source software as a way to cut the cost of purchasing software. Open source software



does not mean that no Service Level Agreements are or can be purchased, as this is one of the models that open source software companies use to attract revenues.

- **Centralisation/mutualisation of software/hardware:** Although not clearly apparent from the case studies, using ASR technology allows a single infrastructure (voice services connected via IP) which reduces the cost for both hardware and software that would otherwise be associated with a multi-channel service offering.

The above mentioned revenue models and cost models offer a very generic overview of the common business models that companies operate to be able to offer sustainable Voice User Interface services in a Western context.

4.4 Relevance of business models from a Western context for a BoP context

In a Western context, Voice User Interface services and associated business models are only a fraction of the overall market for information services. Of this fraction, most services have an internal focus, where businesses implement voice services in for example their customer call centre to save on labour costs, putting added usability or customer experience second. Externally focused voice services are -and have been- primarily used to provide tailored information on demand for example providing travel information, telephone numbers, the weather forecast etc. This market is however fairly small in a media dominated environment such as Europe is; the on-going developments of the internet and devices connected to it (smartphones, tablets) provide for an easy to use and low cost¹ information access that in addition offers much more user options than most voice services do. Voice services remain to exist where characteristics of the 'context of use' dictate that voice operation is most suiting. Examples include call centres where the primary means of interaction was already voice contact, and operating devices in stimuli rich and potentially dangerous environments e.g. in traffic.

Voice User Interface services, especially externally focused ones, are or have become a niche product in Western markets due the fact that most users are knowledgeable to operate a web browser user interface and high availability of internet access, either fixed or mobile. This strongly differs from the (potential of) Voice User Interface Services for the BoP market.

For BoP markets, affordability is a major concern. However, the next major difference between the Western and the Bop context for the viability of Voice User Interface services is that the latter is relatively poor in infrastructure when compared to the European environment (e.g. London and Hart, 2011). This lack of infrastructure dictates

¹ Although internet bundles are not cheap per se, the total costs can be divided over all the internet based services used, keeping the costs for the use of one service relatively low.



that for people living in the Bop the means to access tailored information on demand is limited. In the absence of existing infrastructures, the developments of ICT services, for example mobile telephony, have been able to take on a staggering pace. Today over 500 million Africans (Mobile Africa Report, 2011) have access to mobile telephony, with only a fraction having access to internet connectivity, and thus this specific voice network offers an important means of serving information needs of people in the BOP. There is a widespread agreement that ICT services, especially mobile ones, have the potential to play a major role in furthering social and rural development in developing economies such as Africa. Market penetration and rural community adoption of basic mobile telephony and services has been extremely rapid in recent years. As these mobile ICT services are developing in the context of the BOP, one may be tempted to think that Mobile Internet would be the most likely and convenient means to information. The BoP context can however also be characterized by high illiteracy or literacy in marginal languages, lack of broadband infrastructure, and low technical capabilities. The development of voice based services with relatively robust, available and easy to use technology therefore offers more potential on the short term.

The fairly fundamental differences between the 'Western' and the BOP context, dictate that knowledge on business and service development that has primarily originated in a 'Western' context, cannot be applied directly in the BOP context. However, the relatively generic lessons from business models from a Western context do provide a starting point and inspiration for designing BoP specific business models.



5 WHAT are business design choices

In this chapter we turn to the identifying and mapping the critical design choices decision makers and designers face in a BoP context. As literature on this subject offers a wide range of insights influencing a vast range of decisions to be made, we choose to frame this work by means of a business model framework (section 4.1). This framework is used to map critical success factors (CSFs) and the inherent trade-offs these factors assume (section 4.2). By not only mapping the CSFs but also grouping them in a coherent framework that covers all components that need to be taken into account to be able to offer a service, we hope to not only provide an inclusive but also comprehensible set of design choices.

5.1 Introduction of business model framework and CSFs

As stated before, we use a business model framework to organize the mapping of design choices and Critical success factors (CSFs).

5.1.1 Business Model framework

Despite the widespread interest in the concept of business models, there is still no clear definition of the term. Different definitions emphasize different aspects, such as the architecture for a product or service, a description of roles and relations of a company, the way to do business, how a company goes to market, how value is added, how to make a business viable, etc. The definition used in this report captures the main elements of the definitions mentioned above. It defines a business model as:

A description of how a company or a set of companies intend to create and capture value with a product or service. A business model defines the architecture of the product or service, the roles and relations of the company, its customers, partners and suppliers, and the physical, virtual and financial flows between them.

This definition implies that the success of a BUSINESS MODEL is dependent of it finding a 'fit' between different interests, on different levels (Bouwman, 2003). Not only the fit between the firm's business model and the end customer is important in this respect, but also the fit between the business models of the different actors involved in manufacturing a product or producing a service.



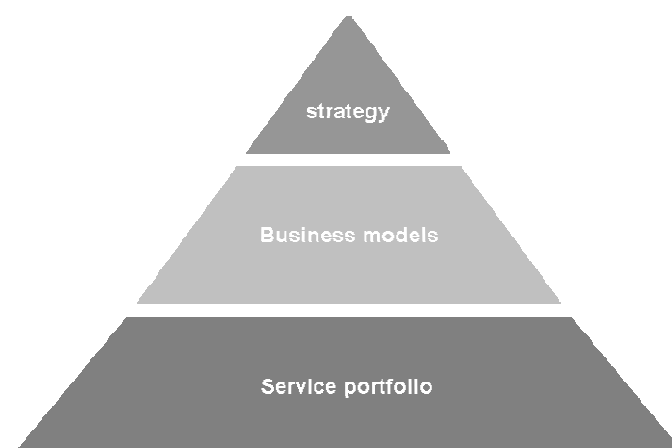


Figure 8: Positioning business models as a layer in decision making processes

A business model is a way for strategists, managers and business analysts to deal with innovation processes that take place in complex and networked environments characterised by many, often only loosely coupled, organisations, and by a rapid and largely unpredictable pace of technological development. It is in this context that business models acquire their strategic importance, functioning not just as cognitive models eliciting the way organisations do business under such circumstances, but as key management concepts guiding and shaping the objectives, plans and routines of organisations and even of entire ecosystems of organisations (Ballon & Arbanowski, 2005; Osterwalder, 2004). Positioning business models in this way allows for identifying results to be used in defining strategies as well as service portfolio's (see figure 8).

Usually, depending on its specific purpose, a business model can describe business processes in several domains. The purpose can be to articulate the value proposition, to define the position of the firm within the value network, to identify the market segment, to estimate the cost structure of a product or service, to formulate a competitive strategy and so on (Timmers, 1998).



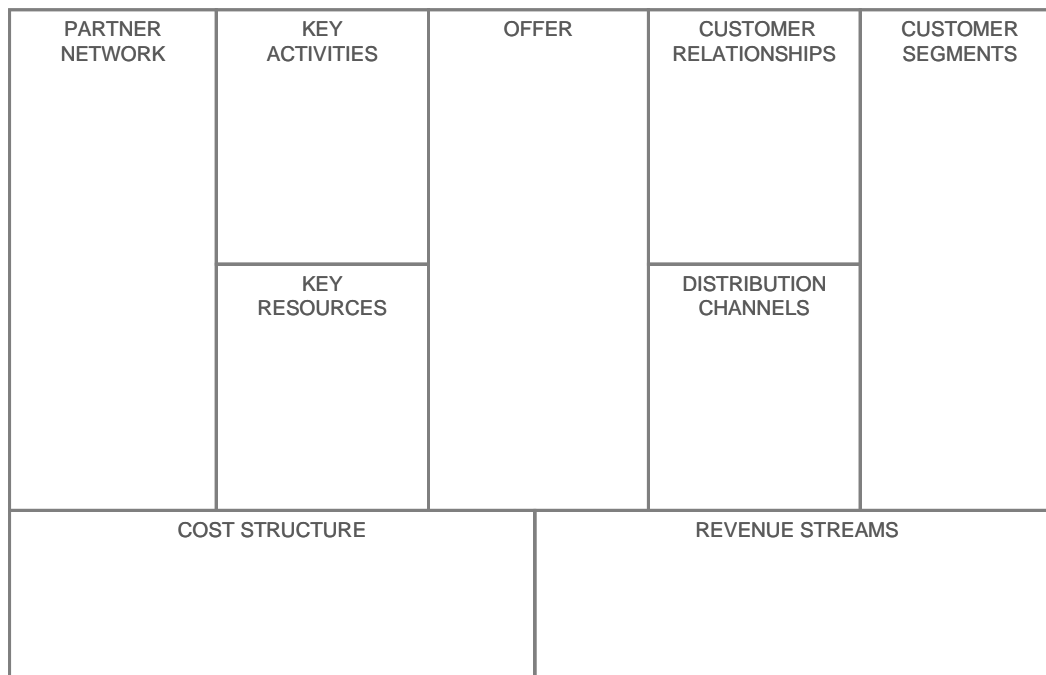


Figure 9: Business Model canvas as a heuristic framework

Because of its integrative character, we propose use a business model framework as a heuristic framework in which existing concepts and tools are integrated. As we aim to specify an approach that allows to design sustainable ICT based services for the BoP, we will use the Business Model Canvas as proposed by Osterwalder & Pigneur (2002, 2010) as we feel it meets the requirement to act as a heuristic framework best. Although it lacks the explicit link with technology and is usually used from a single firm perspective instead of a networked business ecosystem, it provides sufficient flexibility and extension possibilities to incorporate these elements. With its focus on the service concept next to organisational and financial element, it allows to integrate the business model, technical as well as creative design elements we seek to unite in one framework. In table 2, the business model building blocks of the business model canvas are presented.

Value Proposition	an overall view of a company's bundle of products and services that are of value to the customer
Customer Segment	a segment of customers a company wants to offer value t. Fin this methodology
Distribution Channel	a means of getting in touch with the customer, describes marketing and distribution plan
Customer relationship	the manner in which the relationship with the customer or customer segment is managed
Key Resources	Most critical resources required to perform activities and deliver the value proposition. For our purposes, this category is reduced to technological components or systems.
Key activities	Most critical activities required to be able to the value proposition



Partner network:	Partnerships that influence the success of the business model. This category is extended here into a description of the business ecosystem relevant to the consortium to scope the work in the FFE
Cost structure	The monetary consequences of the means employed in the business model. For this methodology deemed out of scope.
Revenue model	The manner in which the creation of value is leveraged into financial revenue. For this methodology deemed out of scope.

Table 2: The building blocks in the business model canvas, adapted from Osterwalder (2010)

5.1.2 Critical Success Factors

We treat business modelling here as a means to design and evaluate the design of ICT services for the BoP. The proposed business modelling approach should help scope, specify and map a comprehensive set of design options. On the one hand, this implies facilitating design with stakeholders. On the other hand, in line with March and Smith (1995), we see building and evaluating as the two activities that are particular to design science. Building refers to the construction of concepts, models, methods and artefacts in view of a certain task. Evaluating refers to the development of criteria and the assessment of the output's performance against those criteria.

In view of our task - designing and evaluating BoP services - we choose to set up our business model approach along the lines of critical success factors (CSFs). CSFs can be identified as a limited set of crucial design parameters that need to be addressed when designing a business model for new or improved ICT products or services. Or: as Wikipedia states ("Critical Success Factor", 2011):

Critical success factors are elements that are vital for a strategy to be successful. A critical success factor drives the strategy forward; it makes or breaks the success of the strategy, (hence "critical"). Strategists should ask themselves 'Why would customers choose us?' The answer is typically a critical success factor.

As we see a business model as an integrative framework to be used to align different stakeholders, the analytical value of investigating CSFs lies in the extent to which there is a strategic and operational consensus between partners in the value network in all the fields as defined above (Bouwman, 2003).

Our selection of most relevant criteria is based on the following preconditions:

- Problematic and uncertain: The impact of the choice needs to be uncertain but potentially high. For instance, a criterion related to the functional architecture such as efficiency, while crucial for the viability of any service or product, is not included, because the choice to make a system, service or product operate as efficiently as possible can be expected to be common to all business model designs. In contrast,



design choices in the field of scalability are highly problematic as both the option to design dedicated systems as well as the option to design SOAs may be part of a valid business strategy.

- Generic within the purpose of the research aim: the design choices needs to be generically applicable to all ICT enabled service for the BoP, and needs to be structurally related to the value creation and capturing processes for these kinds of services. For instance, a choice for a certain level of security, while very important in many cases, cannot be deemed generic or structurally important enough to figure among the main business model criteria, as in many cases it may not have a direct effect on value creation, capturing or control. In contrast, a criterion such as the organisation of the supply chain is included, because it is generic to practically all ICT services and products and because it is directly related to the issue of control over the business model.

5.2 The critical design choices and their trade-offs

In this section, the most critical criteria are described. This is certainly not to say that the ones listed are the only design choices to be made. Others choices can also be critical, depending upon the particular market context, background of supplier and other characteristics of a specific business model. Here, only the generic choices are identified that apply to be critical throughout all business models for the BoP. They leave room for elaboration and adjustment to specific cases, something that should be part of any business modelling process.

5.2.1 Value proposition

The *value proposition* concerns the products and services a business offers. For businesses it is important to consider which customer problems it is helping to solve and hereby which value is being delivered to the customer by the product or service.

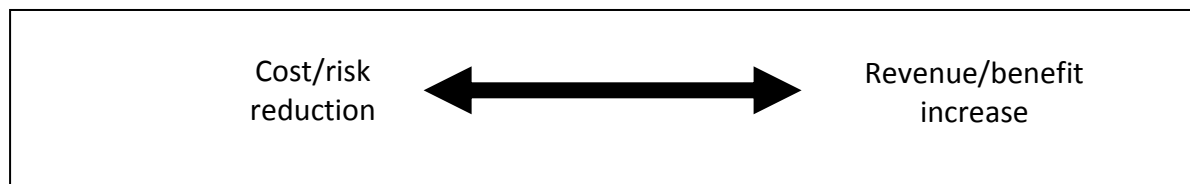
5.2.1.1 Added Value

A Value Proposition creates value for a Customer Segment through a distinct mix of elements catering to that segment's needs. Values may be quantitative (e.g. price, speed of service) or qualitative (e.g. design, customer experience).

As will be further explained in later paragraphs, the BoP has his own needs and wants. The products and services meeting these needs and wants are however, not always available (London and Hart, 2010). At one side of the spectrum, we identify unmet needs at the BoP that concern reducing risks or costs. The IFAD (2011) has identified a number of the key risks for poor rural people today; 1) Personal and household-level risks: ill-health and ceremonial costs, 2) Natural resource-related risks, 3) Market-related risks: food price volatility, 4) The state as a source of risk. Risk reducing value propositions or



cost reducing value propositions can therefore offer added value for the BoP. At the other side of the spectrum, we identify needs at the BoP that concern a need for an increase in revenue or benefits (WBCSD, 2008). These revenue enhancing or benefit increasing value propositions can range from an increase in personal benefits (e.g. TV) to product or service enhancing value propositions (e.g. crop advice increasing crop quality). Some of these value propositions may meet an entirely new set of needs that customers previously didn't perceive because there was no similar offering. Other value propositions are new in that they are made available to customers who previously lacked access to them.



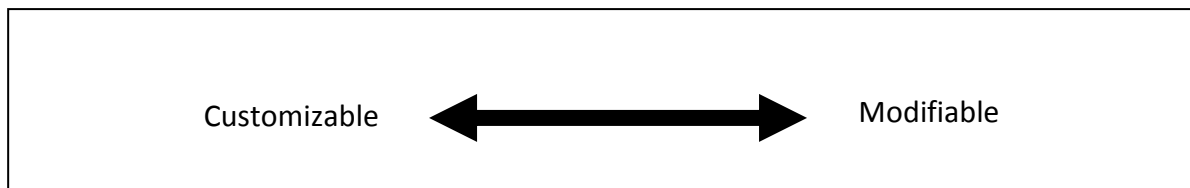
5.2.1.2 Open ended value proposition

In the previous paragraph it has become clear that many of the unaddressed needs indicated are related to basic needs or the physiological needs of people, such as food, shelter etc. In other words: 'nonconsumption of products and services is the defining condition of the BoP' (London and Hart, 2010). Further, the economic activity concerning the trade of these basic needs is often informal and the practice of paying money for a value proposition may not always be the trading standard (ibid). As both the needs of the BoP as the organisation of the market for these needs are very different than for the ToP, a very different approach is required for defining the value proposition. Conventional marketing wisdom leads to marketing a product by explicitly defining the product's value or value closed messaging. Value closed messaging removes customers' uncertainty, thereby enabling them to make informed choices. But until a product is embedded in the community base, precise messaging of a product's value can create a "take-it-or-leave-it" decision framework that blocks sense-making. According to London and Hart (2011), entrepreneurs in the BoP context should think in terms of market creation. For market creation, an initial value proposition should be what London and Hart (ibid) call "value open". 'Value open means that a value proposition is open-ended and does not define specifically a product's value'. By encouraging a consumer to define the value proposition by himself, personal commitment can be created leading to behavioural change and a broader potential product uptake. Furthermore, it expands the range of people that would find relevance in the offering.

In developing and marketing products and services, companies should make a trade-off on the 'openness' of the value proposition. This trade-off in openness can range from offering customizable till modifiable products or services. Customizable products or services provide potential customers the opportunity to adapt it to its own personal needs in terms of e.g. colour, language, style or financial situation. Modifiable products are more extreme in terms of openness and can actually be changed in form or character



and thereby applied in different contexts. An example would be the numerous of applications that the modifiable products of IKEA offer.



Case study: RML

Started in 2006, Reuters Market Light (RML) provides individual farmers with **customized, localized and personalized** weather forecasts, local crop prices, agricultural news and relevant information (e.g. information influencing market prices) – in the form of SMS messages sent to their mobile phones in their local language.

RML understands the different needs of the customer. At the same time, in order to create a financial sustainable service, RML needs to focus on creating large scale use of its service. Therefore RML developed a **customizable service**, allowing customers to choose at which time they wish to receive information, at which place and which type of information (e.g. grains, vegetables, fruits) and in which language. The advanced and flexible IT system behind the service allows RML to meet customer needs and scaling up.

www.reutersmarketlight.com
Hvstra (2011)

5.2.1.3 Positioning

Usually, the positioning of products and services refers to marketing. The design challenge is to identifying relevant attributes of the product or service in question that set the product apart from the competition by means of identifying market segments, establishing consumer trust and identifying competing products or services.

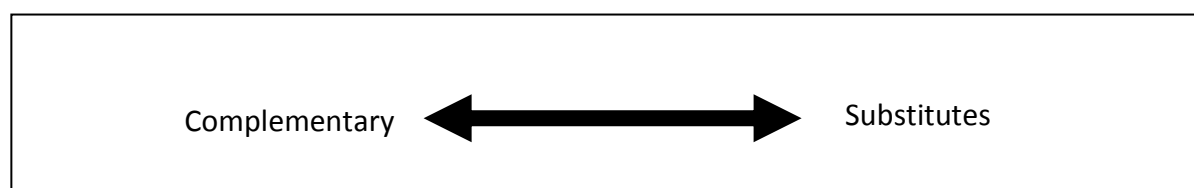
Complementary goods can be defined as goods whose value depends on their being used together. Substitutes can be defined as goods whose value depends on their position towards the alternatives in the market place (Varian, 2003). Usually, literature takes the complementarity and substitutability between products and services as a given. However, especially in the BoP, where the market needs to be (at least partially) created, it can be argued that there is often considerable choice involved (London and Hart, 2010). In terms of complementarity, the BoP is different as in many cases there is a limited installed base of technology as well as skill level of users to build upon. In terms of substitutability, several sources (e.g. Karamchandani et al, 2009; London and Hart, 2010; WBCSD, 2008)



argue that it is hard to determine the value of a substitute as there is only a limited set of (low tech) market alternative, especially in remote areas (WBCSD, 2005; Klein, 2010). In this case, the substitute could be a process (the old way of doing things), e.g. acquiring information by word-of-mouth.

Another interpretation of this issue is related to design for ICT products and services and convergence between markets. Convergence literature highlights that ICT goods and services emanating from different industries and communities are becoming ever-closer substitutes. This means that service providers increasingly need to make choices about complementarity and substitutability between the ICT products and services on the market by adding features or creating synergies early on in the design phase. Although relevant, we deem this perspective out of scope for this report as the BoP lacks an abundant offer of alternatives. The most critical choice in the BoP is more fundamental: how to create or enrich a market place for ICT products and services given the local context.

The main challenge for service and business model design therefore is to find the right mix between building on the expectations, skills and installed base of technology in the local market and providing surplus value to the existing offer, thereby creating competitive edge.



5.2.2 Customer segment

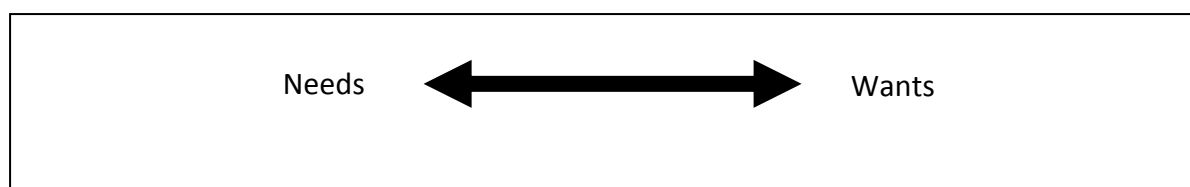
The *customer segment* box includes the decisions to be made on the target audience for a business' products and services. As opposed to well developed western market places, a customer segment at the BoP is not just 'there': it needs to be specifically targeted, empowered by technology and nurtured in terms of skills to come into existence.

5.2.2.1 Nature of demand

When reviewing the literature on the needs of the BoP a lot is written on the differences of BoP needs (see e.g. London and Hart; 2010). In this section we do not aim to focus on the differences between the needs of customers at the BoP and of the ToP. Nevertheless, one general conclusion when reviewing the literature is that the customer problems or needs of these target groups are significantly different. For poor households, the main needs they have are related to mitigating the risks that can move them out of poverty (IFAD, 2011). London and Hart (2011) also indicate that there are many unaddressed needs at the BoP. According to them 'these [unaddressed needs] range from services where the government does not meet its mandate (clean water, sanitation and so on) to



needs that are neglected because people are perceived as being too poor to buy (health care, housing)'. Some of the risks mentioned by the IFAD (2011) and London and Hart (2011) can be difficult to manage by products or services, as they are out of the direct control of the customer/businesses. Nevertheless, it is important to realise that managing these is central to the livelihood strategies of customers at the BoP. A value proposition that focuses on reducing these types of risks could help to solve customer problems at the BoP. However, in determining the value proposition it is important to consider the difference between customer needs and customer wants, or as Karamchandani et al (2009) indicates, "just because they need it doesn't mean they want it". This means that 'people living at the base of the economic pyramid should be seen as customers and not beneficiaries; they will spend money, or switch livelihoods, or invest valuable time, only if they calculate the transaction will be worth their while' (ibid). In developing a value proposition a trade-off should be made on products or services meeting a need or a want of the BoP customer. Needs can be seen as more universal; they especially concern basic living requirements, such as food, water and shelter. Wants can be seen less universal as they address a specific need of a certain target group. Wants are therefore more personal.

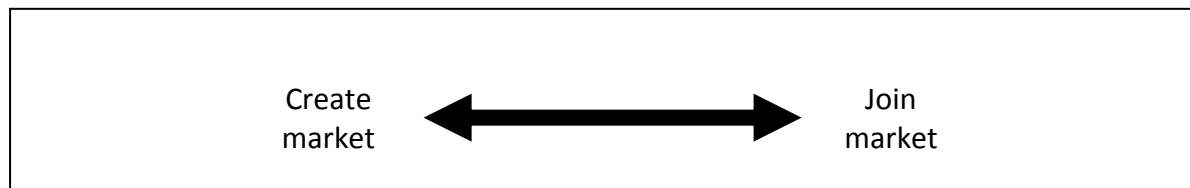


5.2.2.2 Market entry strategy

An important choice to be made in terms of segmentation as well as market approach is the extent to which a market needs cultivation, i.e. needs to be created. An example of a company creating markets is Apple. With the introduction of the iPad a whole new market was created for what is now known as the market for tablets. The other side of the coin would be joining a market for existing products. Joining a market means that a company enters an existing market place and introduces better or substitute versions of 'proven' technology, products or services.

In the saturated markets in developed countries, the market place is organized in such a way that it is pretty clear in what situation it is viable to either enter or create a market. Creation of a market requires superior competencies in terms of product development, branding, whereas market entry requires business intelligence, positioning vis-à-vis the competition and more focus on customer acquisition and retention. However, at the BoP market are the opposite of saturated; for example markets for information services are just not there. The question is how to approach potential customer segments.





The Monitor group (Karamchandani et al, 2009) found that achieving scale occurs more rapidly for “market joiners” than for “market makers”. As in India, companies that pioneer new products and services for low-income customers typically take a decade or more to attain scale. However, companies that pursue proven business models and do not try to attempt market creation may scale in just three or four years. The upside of making a market usually is that revenues do not have to be shared with the owners of the proven technology, products or services. In the case of adopting and exploiting proven technology products or services, this is inevitable. Another way of formulating the trade-off is the level of risk a company is willing to take: high risk, high gain, or low risk, low gain?

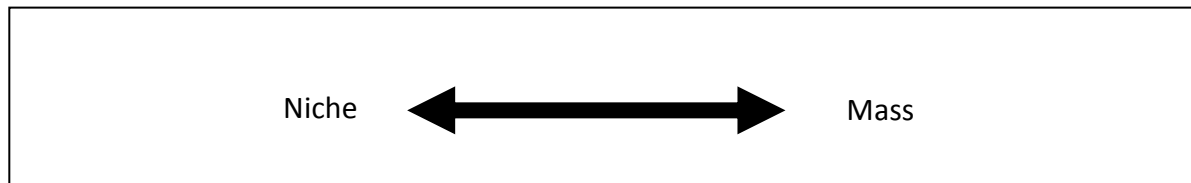
5.2.2.3 Heterogeneity of demand

Generally, an organisation focuses on a particular part of a market to sell its products and services, also called a market segment. ‘A market segment is a sub-set of a market made up of people or organizations with one or more characteristics that cause them to demand similar product and/or services based on qualities of those products such as price or function’ (“Market Segmentation”, 2011). In some way, the BoP can be seen as a market segment. The BoP ‘market’ is defined by the number of people having less than \$2 a day to spend, meaning we focus on the 4.0 billion poorest people worldwide (Hammond, 2007). This makes a low purchasing power an important characteristic of the target group (London and Hart, 2010). However, though the lack of sufficient income is one of the most important measures to define this group, the full range of socio-economic conditions that affects a person’s quality of life should be considered (Hart, 2005). For example, the BoP generally has poor access to education, leading to high rates of (ICT) illiteracy in low income countries. Low literacy has been associated with difficulties in making abstractions, leading to thinking styles that tend to be both distinctive and often counterproductive (London and Hart, 2010). Another important socio-economic characteristic of the BoP is that the occupation of BoP customers is, in rural areas, over 80% related to the agricultural sector (International Fund for Agricultural Development, 2010).

Nevertheless, though the above mentioned segmentation does provide specific BoP characteristics, a true market segment meets all of the following criteria: ‘it is distinct from other segments (different segments have different needs), it is homogeneous within the segment (exhibits common needs); it responds similarly to a market stimulus, and it can be reached by a market intervention’ (“Market Segmentation”, 2011). This definition fully changes the idea of taking the BoP as one consumer segment. Though some of characteristics of the BoP are similar, the BoP is not at all a homogeneous group. Firstly,



there are a large number of local languages and dialects in BoP countries. Furthermore, social structures may vary by state, region, district, and even neighbourhood (Hellstrom, 2010; London and Hart, 2010). Further also within regions, differentiation between occupation, age groups and gender should be made. This makes the BoP market heterogeneous across multiple dimensions.



Case study: Esoko

Esoko, set up in 2008, is a **mobile-enabled web trade platform** for agri products. Esoko is the first organization to offer parties across the African agricultural value chain the ability to push or pull sector-specific data in a simple way via mobile phones or computers. Esoko improves small African farmers bargaining power by bringing them relevant market data on their mobile phone.

The real differentiating aspect of Esoko is that they offer agricultural information demanded by the **homogeneous needs** of the customer. Content, for example is specifically adapted to measurements utilized by the end-user (e.g. bags, kg, cups, etc). Though Esoko focuses on a mass market, the needs of different end users are taken into consideration. Customer-needs research and product design have been the focus of Esoko from inception.

www.esoko.com

Hystra (2011)

5.2.3 Distribution channels

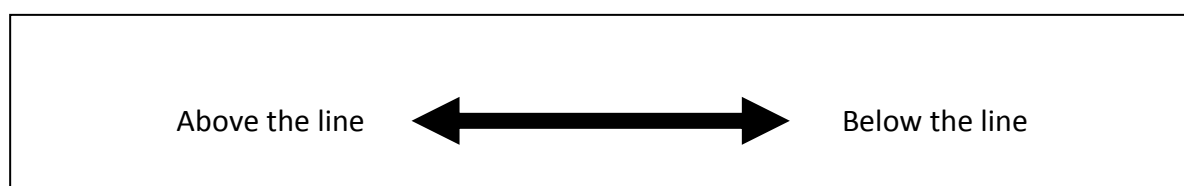
Distribution channels concern which means are used to get in touch with the customer in each phase of the sales process, from Awareness creation (marketing), Evaluation (information provision), Purchase (where can the product be bought), Delivery (logistics) to After sales (customer relationship management).

5.2.3.1 Local awareness creation

Low-income customer generally has poor access to conventional information sources. Though the use of mobile phones is increasing rapidly, the penetration of mobile phones and Internet subscriptions is still significantly lower than in the western world (International Telecommunication Union, 2010). The BoP lives primarily in an informal



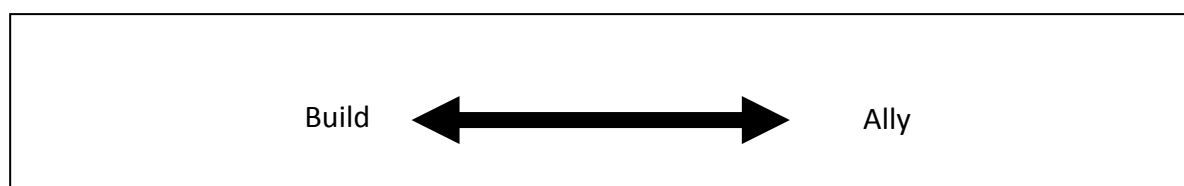
economy, where information provision and marketing activities are mainly below the line (word-to-mouth, demonstrations) and trade is highly based on relationships. Furthermore, cultural differences, high rates of illiteracy and other socioeconomic differences lead to having a very different decision making process in buying products. This makes it difficult to transmit market signals down the chain. As a result, marketing and information provision will be very different from a company's approach to ToP customers (Jenkins; London and Hart, 2010; Klein, 2008). Local awareness creation is key in developing marketing activities for the BoP.



In this process a trade-off should be made between above the line and below the line marketing channels. Above the line channels could involve using existing local media and marketing channels, such as TV, local radio or mobile phones. Below the line marketing involves local social networking, such as local sales presence and word of mouth marketing.

5.2.3.2 Local service delivery

A poor infrastructure also concerns a limit in distribution networks (such as shops). As a result, firms often cannot count on existing high quality real estate when setting up a branch or sales offices (London and Hart, 2010). Furthermore, customers may not always have direct access to conventional distribution networks, as remote rural areas and conventional selling points are usually not within close distance. A poor physical infrastructure (roads, water, power, connectivity) is a main barrier in terms of logistics towards selling points or the end customer (London and Hart, 2010). Specifically in ICT, a limited network coverage or actual network quality is an important barrier (Hellstrom, 2010). Nevertheless, local service delivery is an important factor in reaching customers. A trade-off for companies in this aspect should therefore be in either building a local infrastructure or in partnering in local service delivery. Partnership can help companies to get access to channels that were previously not within reach (London and Hart, 2010).



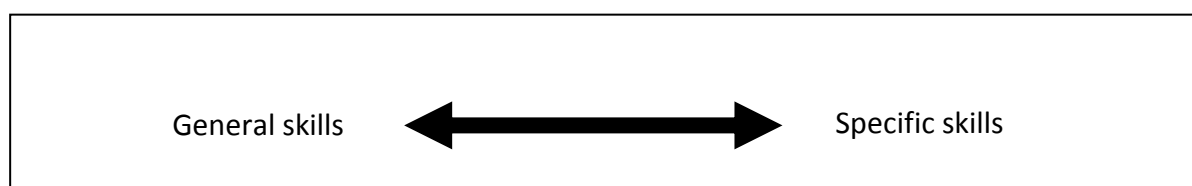
5.2.4 Customer relationship

Customer relationship concerns the manner in which the relationship with the customer or customer segment is managed. ‘The overall goal of customer relationship management is to find, attract, and win new clients, nurture and retain those the company already has, entice former clients back into the fold, and reduce the costs of marketing and client service’ (“Customer Relationship Management”, 2011).

In customer relationship communication is one of the key elements. At the BoP, however, a poor physical infrastructure leads to a limited number of communication channels that can be used by companies to work on the customer relationship. Furthermore, the poor access to education is important to take into consideration when developing a customer relationship strategy for the BoP (Monitor, 2009; Hellstrom, 2010; Banerjee & Duflo, 2007a; Narayan et al., 2000). This leads to the following key success in customer relationship management;

5.2.4.1 Capacity building

Chaskin et al (2001) define local capacity at the community level as the ‘interaction of human capital, organizational resources, and social capital existing within a given community that can be leveraged to solve collective problems and improve and maintain the well-being of that community’. Local capacity building can help to improve the economic environment of the BoP and augments people’s capacity to engage in economic activities. Klein (2008) distinguishes between three dimensions of local capacity: the human resources, the enabling environment and the market-based ecosystem. The first one, human resources focuses on skill development and is especially relevant in customer relationship. According to Silvius (2009), organisations tend to have unrealistic (under- or overestimated) expectations about local skills and knowledge. Therefore, developing appropriate training is an important element in capacity building. The main trade-off we identify in developing training programs is between more general skills development and specific ICT skills training.



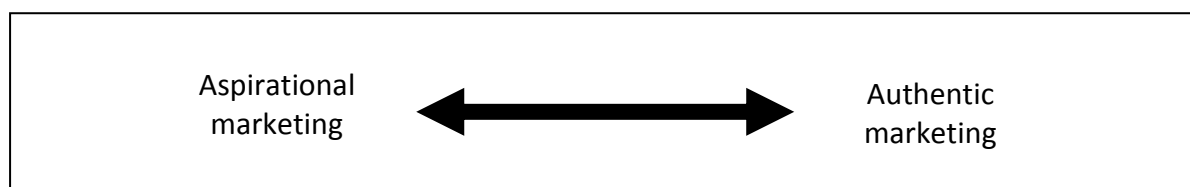
5.2.4.2 Building customer relationship

The BoP’s willingness or desire to purchase a product depends on the firm’s value proposition, which must hold sufficient value for the BoP. An enabling economic environment and sufficient amount of skills will help to activate people in engaging in economic activities, but capacity alone is not sufficient to attract and win customers. For this the business must become firmly embedded in the local communities (Klein, 2008).



Klein (2008) defines the embeddedness of a firm as ‘the extent to which the business is an integrated part of the lives of those at the BoP’. In order to embed a product or service at a target group, the underlying business model should be built upon local customs and conditions. Only then will people accept the business and see the product or service an option for them (ibid). In order to actually integrate a product or service within the life of people customer relationship management is important. At the ToP, there are numerous applications that enhance customer relationship management (CRM), such as the use of databases for managing customer related information or the offering of toll- free numbers connected to call centres (Ballon, 2009). At the BoP, these types of CRM tools can hardly be applied and in BoP literature, little information can be found on the topic of CRM. Nevertheless, as at the ToP, we believe that CRM should be taken into consideration throughout the customer buying cycle when doing business at the BoP.

In the awareness phase, the company tries to reach its target customer segments by means of advertising, promotions, public relations and partnerships. Once a customer has identified a specific firm as a potential solution provider to his problem or his needs he will want to learn more about the organization and the bundle of products and services it offers (Ballon, 2009). Attracting customers at the BoP in this sense has a lot to do with aspirational marketing to attract customers by framing the value proposition around prevailing social and cultural ideals. Activities, such as value demonstration, that visualise the application of products and services, can also help to create awareness among customers and provide customers the opportunity to learn about the specific product or service. Furthermore, being active in community network can trigger word-of-mouth endorsement through relationships of trust (London and Hart, 2010). These types of activities enhance the embeddedness of a firm in the customers’ life (London and Hart, 2010). In this, we distinguish a trade-off between Aspirational marketing (presenting the product as a premium) or Authentic marketing (presenting the product ‘as it is’).



5.2.4.3 User interaction

The after sales phase of the buying cycle has the potential to create loyal customers by focusing on nurturing and retaining customers. After sales services enormously contribute to a customer's satisfaction by helping him maximize profiting from the value proposition and by assisting him in case of problems. It can embrace implementation, use, training, maintenance, monitoring, troubleshooting and reverse logistics (i.e. disposal). In managing customer relationship management, we distinguish a trade-off between personal versus automated. Personal CRM could be done through community networks or local agents. When considering automated CRM activities, local ICT networks and devices should be taken into consideration.



Personalized  Automated

Case study: eKutir

eKutir is a Rural Social Enterprise and has been operating since 2008. In 2009, eKutir launched **franchised, local e-kiosks** (“hubs”), supporting local farmers with expert and individualized agro advice and trade information by means of different technologies (internet-connected computer, camera, etc.).

The business model of eKutir is focused around **local entrepreneurs** who act as the interface between technologies and end-users. eKutir entrepreneurs provide, amongst other services, advice on agro-practices via internet searches, direct conference calls or broadcasting. This more **personalized approach**, compared to automated customer relationship management, has the advantage of personalizing and offer more depth to the services delivered.

www.eKutir.net
Hystra (2011)

5.2.4.4 Customer lock-in

To keep a business model viable, service providers have the tendency to ensure that their current customers will continue to use their services in the future. There are different strategies to retain customers. Next to optimise the customer experience; strategies to lock-in customers are a common way to do this. There is extensive literature on the potential of ICT to deepen the customer relationship and increase customer lock-in (see e.g. Chen & Ching, 2004) and more in particular on switching costs and network externalities in ICT (see e.g. Farrell & Klemperer, 2006). For our purposes we can make a distinction between ‘hard’ and ‘soft’ customer lock-in (Ballon, 2009).

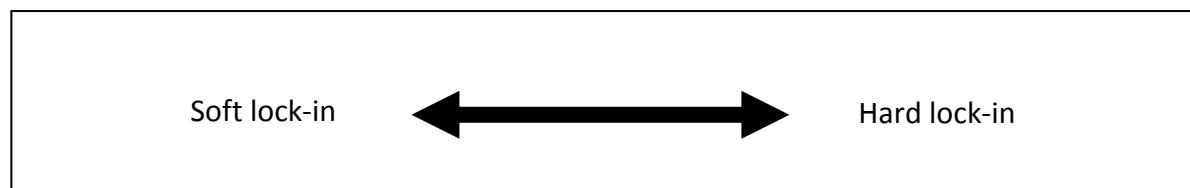
Hard lock in refers to technological ways to increase the dependency of customers to a certain service offer, for example by offering proprietary devices or systems that can only be used in combination with technology from the same service provider. Once a customer purchases such a good or service, the costs to switch towards another service has increased. As Varian (2003) states, it is common in high-technology industries to see products that are useless unless they are combined into a system with other products: hardware is useless without software, DVD players are useless without content, and operating systems are useless without applications.

Soft lock in on the other hand refers to ways of providing economic or social incentives to customers. Loyalty programs are an example of an economic incentive for customers: cost



reduction is linked to the loyalty of the customer. The razor and blade model (Rappa, 2001) is another example of economic incentives. Social incentives to lock in customers are usually referred to as network effects: the more customers make use of a service, the more valuable it becomes: a fax machine is most useful if there are other fax machines, an online social network becomes valuable once it reaches a critical mass of users. In both cases, switching costs are high.

Although lock-in is perceived as an integral part of business modelling, literature covering business models for the BoP seems to lack an extensive discussion of this topic. We aim to fill this gap by proposing customer lock-in as a critical factor for BoP ICT driven business models. The main trade-off we identify is soft vs. hard lock-in.



5.2.5 Partners

The previous sections were concerned with the business elements that had a direct relation to the customer or market. Partnering is the first business model category that is concerned with the 'back-end' of the business model, the elements that do not necessarily bare a direct relationship to the customer. The *partners* section includes the choices in terms of types of partners and partnerships that are necessary to involve the resources and activities that cannot be mobilised/performed by the company itself. This section is devoted to partners that are part of the value creation process. Partnering strategies and choices in terms of value delivery are discussed in the section on channel mix.

5.2.5.1 Develop an end-to-end organisation

At the BoP one of the main challenges is related to the undeveloped ecosystem that exists in many industries in developing countries (Karamchandani, 2009; Harvard Business Review, 2011; Jenkins, 2009). At the previous sections, several challenges are noted that in fact are a consequence of an undeveloped ecosystem. Therefore, as Jenkins (2009) writes; 'companies have to think proactively about the systems in which their BOP suppliers, distributors, and customers are embedded'. By analysing the ecosystem, entrepreneurs will get a better understanding with regard to the local situation and system gaps can be identified. In order to optimize the ecosystem, firms can either fill in the pieces of the system themselves, called insourcing, or reach out to partnerships, outsourcing (Karamchandani, 2009; Harvard Business Review, 2011; Jenkins, 2009; IFAD, 2011). In effect, this strategy is more than just focussing on the business itself, but on developing a so called 'end-to-end organisation' (London and Hart, 2010).



Insource ←→ Outsource

Case study: Drishtee

Started in 2001, Drishtee is a for profit organization founded by Shailesh Thakur, Nitin Gachhayat and Satyan Mishra to enable the emergence of a rural network of franchises and partnerships capable of providing **access to basic services and goods** to the rural population of India. Drishtee provides access to **web-based services** through a network of 2,000 village kiosks. In addition, Drishtee distributes **Fast Moving Consumer Goods (FMCGs)** to 13,000 rural shops, the Drishtee Rural Retail Points (DRRPs).

Drishtee's uniqueness lies in its original use of ICT to foster development in remote communities by combining access to ICT-based services and the physical availability of essential goods. In each District, Drishtee identifies "milkman routes" that connect 20 to 25 villages. It then establishes "rural routes" with kiosks at the nodes that support the **development of an ecosystem** of micro-enterprises in the route villages, for both services and products. By means of **insourcing** retail points and **partnering** with suppliers of goods and services (e.g. Nestle/Danone for FMCG products) and local e-services providers, Drishtee has reached about 10-15m villagers in 2011 and demonstrated economic sustainability by breaking even in 2006.

www.drishtee.com
Hvstra (2011)

5.2.5.2 Scalability

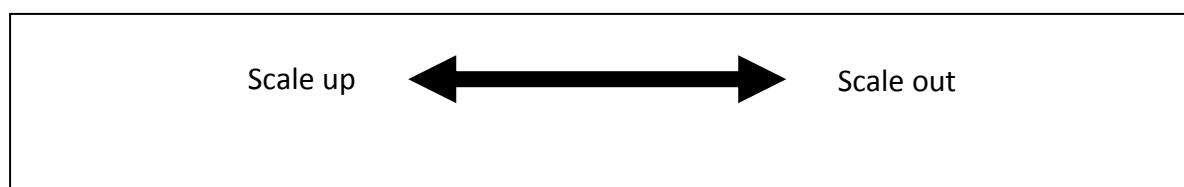
In addition to streamlining the value chain, partnering can support organisations in developing a scalable business model. The scalability of a company implies that 'the underlying business model offers the potential for economic growth within the company'. A prerequisite for scaling is that the business model can handle additional sales (volume), without the need to invest in additional resources. We make a distinction between two types of scaling: scaling up and scaling out.

Scaling up, or to scale vertically, means that scaling is enabled by working towards a reusable service/system/business model that to a certain extent transcends specific user contexts. Translated to ICT terminology, it means to add resources to a single node in a system, typically involving the addition of CPUs or memory to a single computer. The effort of designing and redesigning, piloting and commercialization is geared towards fuelling the development of a generic service platform and accompanying business model.



As London and Hart (2011) note, this type of scaling aims to construct a venture in which the “genes for scale” at the formation of the enterprise. Important activities in this type of scaling include the formation and management of a generic platform, organizing the link between the global and local business structures and funding and technology sourcing, as this is where the larger part of the capital expenditures will occur.

Scaling out, or to scale horizontally, is concerned with adding more nodes to a system. Again according to London and Hart (2011), this scaling strategy aims to build an entire ecosystem to support scale, rather than just a standalone venture. In effect, this strategy is about expanding the scope of the venture creation activity beyond traditional the boundaries of the organization into a business ecosystem. The implication of this strategy is that efforts to scale are focused on gaining allies, supporters, access to but not necessarily ownership of innovations, and new solution modes and thus better cope with the difficulties of BoP venture creation. Important activities thus include managing the link between business and non-business structures, partnerships, networks and aggregating funding sources.

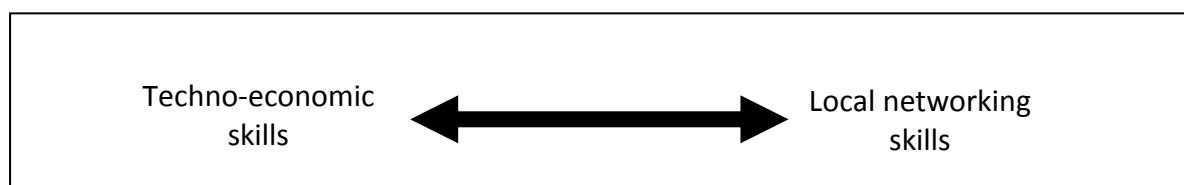


5.2.6 Key Resources

This section on key Resources refers to the choices which assets to leverage in the business model in what way. As we are dealing with business models for ICT related services at the BoP, we perceive choices on ICT architecture as well as choices on human resources as most critical.

5.2.6.1 Human Resources Skill Mix

Every enterprise requires human resources, but people are particularly prominent in certain business models. For example, human resources are crucial in knowledge-intensive and creative industries. Also when operating at the BoP, human resources are important. In choosing personnel with the right combination of skills, a trade-off should be made between people with technical skills and people with local networking skills.



The reason behind this is that on the one hand, innovative and technical solutions have to be found to overcome infrastructural ICT barriers. On the other hand, the BoP market consists of an informal economy in which relationships are key. Therefore deep knowledge of local conditions and trust from local communities are precious assets, especially when working with local agents to sell your products or services. As London and Hart (2011) note, building a BoP-centric management team is key, and should constantly rebalancing the social impulse (that is, the will to serve the poor) with the more traditional business skills needed to build a successful business. The right trade-off between technical skilled personnel and personnel with networking skills is therefore important.

Case study: RML

Started in 2006, Reuters Market Light (RML) provides individual farmers with **customized, localized and personalized** weather forecasts, local crop prices, agricultural news and relevant information (e.g. information influencing market prices) – in the form of SMS messages sent to their mobile phones in their local language.

The main strength of RML lays its flexible and comprehensive system enabling the company to deliver high quality information services to several hundred thousand farmers in India. Setting up such a system, meeting exact customer demand requires a **strong technical team**. At the same time, the right team focusing on marketing and sales is important to scale up the system. Currently, the marketing and sales team of RML focuses on developing new relationships with distributors throughout the country and deepening existing relationships with partners to sell its services. According to RML it is very important, but **challenging** to recruit the right people to develop an innovative marketing and sales model.

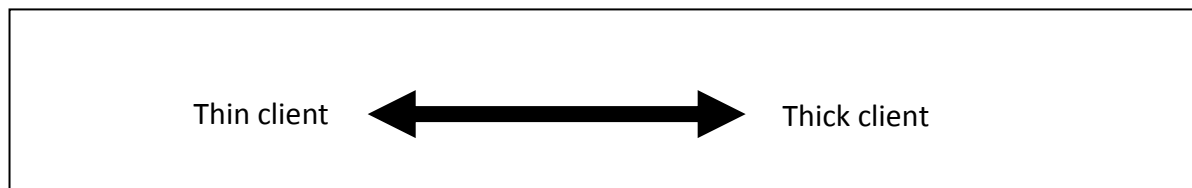
www.reutersmarketlight.com

Hvstra (2011)

5.2.6.2 Distribution of intelligence

In Telecommunications, the distribution of intelligence is a vital architectural concept influencing functional design but at the same time impacting business and organisational design. A centralised intelligence network architecture, or thick client, is a computer (client) in client–server architecture or networks that typically provides rich functionality independent of the central server (Baecker, 2001). The name is contrasted to thin client, which describes a computer heavily dependent on a server's applications to fulfil its traditional computational roles.





In designing a client–server application, a decision is to be made as to which parts of the task should be executed on the client, and which on the server. This decision can crucially affect the cost of clients and servers, the robustness and security of the application as a whole, and the flexibility of the design to later modification or porting (Mansell, 1993). For instance, a drawing package could choose to download an initial image from a server and allow all edits to be made locally, returning the revised drawing to the server upon completion. This would require a thick client and might be characterised by a long time to start and stop (while a whole complex drawing was transferred) but quick to edit. Conversely, a thin client could download just the visible parts of the drawing at the beginning and send each change back to the server to update the drawing. This might be characterised by a short start-up time, but a tediously slow editing process (Wikipedia, 2011).

5.2.6.3 Interoperability

Interoperability refers to the ability of systems to directly exchange information and services with other systems, and to the interworking of services and products originating from different sources.

Open architectures breed network externalities but yield very little control to one player, unless it can control the standards defining the open architecture and innovate faster than the competition (Garud and Kumaraswamy, 1995). An example is open source software such as Linux. Architecture is proprietary if it is restricted to a small group of companies, typically comprising a central company and its suppliers. With proprietary architectures, a firm or a network of firms does not derive benefits from network externalities but it does, however, retain complete control over the architecture, which can give it more control over service delivery and revenue model. The soft- and hardware combination of Apple is an example of this type of architecture. Hybrid variations can also be successful. When organisations open up their proprietary platform or standards to build a networked business ecosystem, as is the case with some software packages from Microsoft

Generally speaking, the discussion between proprietary and open, fully interoperable systems refers to the already mentioned distinctions between a focus on, respectively, achieving consumer lock-in versus creating network effects, on appropriation of benefits versus building large business eco-systems, and on maintaining control versus increasing range.

Turning to the issue of interoperability, this can be achieved, according to economic literature, by using compatible standards in the sense as described above, but also by



developing gateways between technologies (Blind, 2005), leading to an ecosystem of “compatible heterogeneity”. In this case, interoperability is achieved by being able to convert or translate or embed components of one system into the other. Synchronizing an Apple iPod with iTunes on a PC is an example of this kind of compatibility.

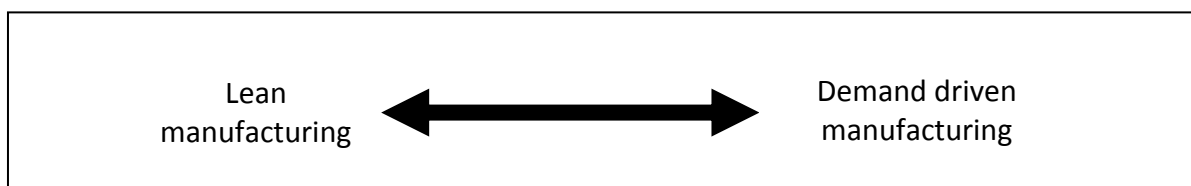


One trade-off that was identified relates to interoperable versus non-interoperable (or stand-alone) architectures. Usually, however, some kind of interoperability is opted for. In that case, there is a secondary choice to be made, which we made the main trade-off here: standardisation and compatible heterogeneity. A strongly related trade-off is the one between open (i.e. publicly available) or closed (i.e. proprietary) solutions.

5.2.7 Key activities

5.2.7.1 Manufacturing (value creation)

Manufacturing itself relates to designing, making, and delivering a product in substantial quantities and/or of superior quality. The production activity dominates the business models of manufacturing firms. In manufacturing, a trade-off can be made between lean manufacturing and demand driven manufacturing.



Lean manufacturing is based on optimizing flow; it focused on increasing efficiency and decreasing waste. Demand-driven manufacturing, on the other hand, is an approach to manufacturing where production is based on actual orders and producing customised products. Lean manufacturing especially focuses on cost reduction and economies of scale, while demand-driven manufacturing focuses on customer value and economies of choice.

In terms of voice-based services, a company could choose to produce a particular mobile service in a limited number of languages and focus on the lowest costs of production. On the other hand, a company could also customize the product to the language requested by the customer and focus on creating a flexible production organisation.



Case study: Narayana Hrudayalaya Hospitals

The Narayana Hrudayalaya Group (NH) is a private group of hospitals with 25 hospitals and two main campuses in India. NH was founded in 2001 by Dr. Devi Shetty with the objective of **providing cardiac care to a diverse patient base at affordable prices.**

In the case of NH, value creation is especially delivered by providing low costs services. In order to do so, NH has a strong focus on **lean** 'manufacturing' (or in this case **service delivery**). Thanks to the **use of ICT** at all levels and an innovative focus on **minimizing administrative roles** for operational staff, it serves more patients at **lower costs** than other cardiac institutes while high volume also allows bargaining for low prices of supplies.

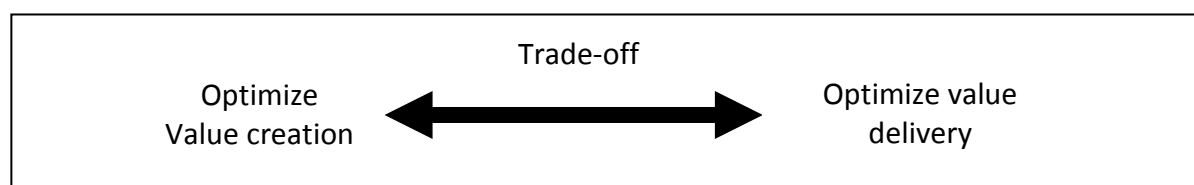
www.narayanahospitals.com

Hystra (2011)

5.2.7.2 Organisational Learning and problem solving

Key activities of this type relate to organisational capacity building: research and development, training and processing feedback into information and knowledge that helps management to improve the organisational design as well as optimize results.

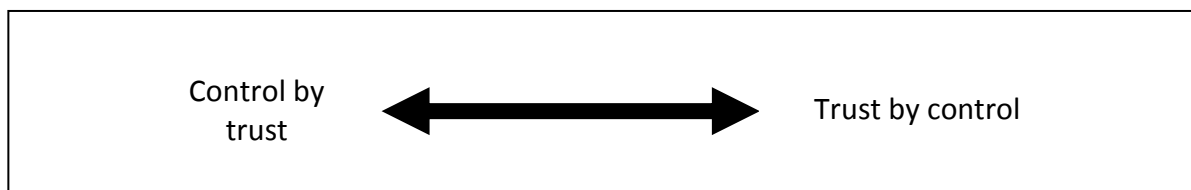
In the same fashion as finding the right balance in skills, this choice concerns finding the right balance in how to put these skills to work. Organisational learning could be geared into two directions: firstly, towards the optimization of the *value creation* part, focussing on optimization and standardization of managing and operating the service platform. These activities could include working towards a robust and scalable technical architecture and efficient day-to-day operation, but also towards standardizing training modules and developing best practice guidelines. Another goal could be working towards *value delivery*: social learning together with the local population and local organisations. Here, activities could include optimizing local service delivery by adapting it to the local context, setting up enterprise centres or more intangible learning by embedding the organisational operation in the local context by ongoing coaching and peer networking (London and Hart, 2010).



5.2.7.3 Network governance

Choices on governance can be defined as the way how to run and manage the organisational operation. The main rationale to 'govern' a network of partners is to mitigate risks. Two types of risks can be identified: relational and performance risk. The relational risk can be described as the chance that a partner will behave opportunistic and will damage the collaboration or even the company. Performance risk on the other hand can be described as the risk that the outcome of the collaboration will not be successful, with or without 'sound' collaboration. Organisations have a choice in what governance mechanism to choose, with control and trust as the extreme opposites.

The key element in the control approach is ensuring the interest of the organisation is guarded and opportunistic behaviour of partners is minimized. This must be done by strict rules and detailed contracts between partners. The trust approach on the other hand is based on the idea that when partners have an intrinsic motivation to turn the cooperation into a success, control is less needed, because partners will automatically act in the interest of the network (De Man and Roijackers, 2009). In practice, the two approaches will always be combined. The big question is how: trust by control, or control by trust?



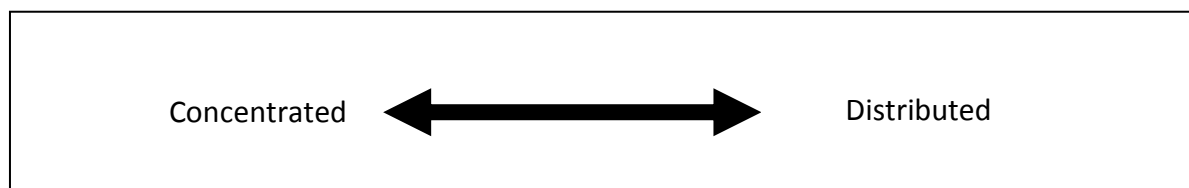
Trust or control based governance mechanism can take various shapes. The large body of literature on this subject identifies three fundamentally different governance modes: To organize the activities within a firm there is hierarchy governance: the coordination that takes place via authority and employment contacts. If executed well, this bureaucratic mode can be very efficient, but requires specific internal coordination. Secondly, there is market governance (De Reuver, 2009) which has clear advantages in terms of coordination, as the 'invisible hand' of the market takes a large part of coordination out of the hands of companies. On the other hand, this involves considerable extra transaction costs as it involves extra legal, financial and physical activities to complete a transaction to mitigate the risks involved. Critics of transactional cost economics claim that limiting oneself to these two modes underestimates the fact that transitions are embedded in social networks (Granovetter, 1985) and that the embeddedness leads to social mechanisms that govern the exchange process (Jones et al., 1997). Therefore there is a third governance type; network governance (Powell, 1991), here social contracts and reputation are dominant.



5.2.8 Cost Structure

5.2.8.1 Cost pooling

Cost pooling refers to the extent to which partners share the Capital as well as operational Expenditures (CAPEX/OPEX) and thereby share risks. Two related concepts of costs that are relevant here are sunk costs, i.e. up-front costs that cannot be recovered and marginal costs, i.e. costs that are incurred when producing additional increments to the existing production level. The most important trade-off in this respect is whether investments are concentrated with one actor, or distributed over various actors.

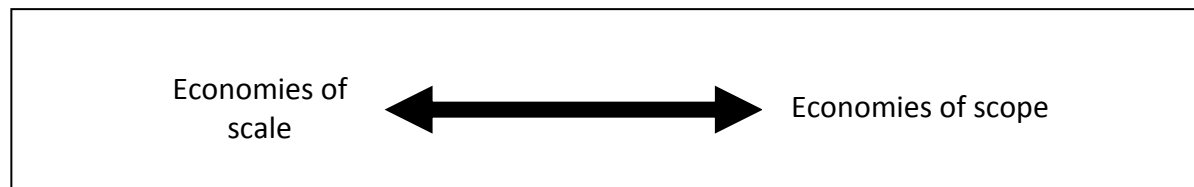


It is commonly argued that 1) uncertainty on the conditions under which an investment will flourish as well as 2) uncertainty on anticipated risks and revenues leads to underinvestment in new ICT products, services and systems. An example of the first argument is the 'chicken-and-egg' problem as studied in the two-sided market theory. A typical example is the fact that mobile application providers have no direct incentive to develop mobile applications as long as there are no mobile phones capable of running these applications, while mobile vendors have no direct incentive to develop a new generation of mobile phones if there are no applications written for it. The second argument of coordination problems appears when stakeholders have different expectations of the risks involved and/or anticipated revenues. Due to a lack of consensus, the negotiations on how to divide revenues becomes cannot be closed before the actual investment, which makes participating all together too risky.

5.2.8.2 Economies of scale/scope

Economies of scale and scope both refer to the phenomenon that as the production and/or selling of (a) product(s) or service(s) increases, the average cost per unit decreases. Whereas 'economies of scale' for a firm primarily refers to reductions in average cost (cost per unit) associated with increasing the scale of production for a single product type, 'economies of scope' refers to lowering average cost for a firm in creating and delivering *two or more* products. For our purposes, we interpret economies of scale to refer to synergies on the production, *value creation* side (left part of canvas), whereas economies of scope are used to cover synergies on the *value delivery* side (right part of canvas). We coin this distinction as the main trade-off.





Examples of synergies on the production side are manufacturing synergies, as a factory is used more efficiently of production reaches a certain scale. But due to advancements in technology, mass customization is also considered to enhance economies of scale as product differentiation leads to no or a minimal increase in average costs per unit.

Examples of economies of scope relate to distribution channels, marketing and sales. For example as the number of products promoted is increased, more people can be reached per dollar spent. At some point, additional advertising expenditure on new products may start to be less effective (an example of diseconomies of scope). Economies of scope can also operate through distribution efficiencies. It can be more efficient to ship a range of products to any given location than to ship a single type of product to that location.

Case study: mPedigree

Launched in 2007, mPedigree is an African-based for-profit company spun out of a non-profit organization, which was founded by a Ghanaian social entrepreneur. mPedigree works with mobile operators and pharmaceutical manufacturers to provide a **mobile phone-based real-time drug verification system** for addressing the issue of the prevalence of counterfeit drugs in pharmacies at the point-of-sale, currently offered in Ghana, Kenya, and Nigeria.

The mPedigree system is simple to roll-out to new customers and easy to access for end- users and therefore a perfect system to scale. mPedigree especially focuses on reaching **economies of scale**, by working on increasing the sales volume of verification codes to pharmaceutical companies. The company is said to be on target to reach over 2m consumers and over 6m products successfully protected by December 2011.

www.mpedigree.net

Hystra (2011)

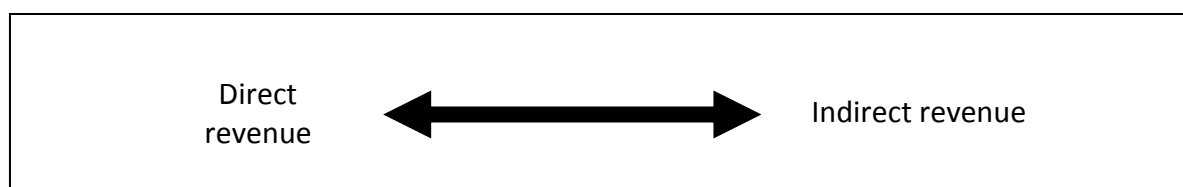


5.2.9 Revenue streams

The Revenue Streams building block represents the cash a company generates. In general, it is expected that the end consumer pays for the value proposition. Also at the BoP this can be the case, however, one can also consider other possible revenue streams. This section provides guidelines that can help in decision making around revenue streams.

5.2.9.1 Revenue model

With earnings of approximately \$2 a day, people living at the Base of the Pyramid are not only very critical consumers; their purchasing options are also limited. This creates business challenges for companies that wish to enter the market. Choices will have to be made on a revenue model that at least covers the costs of operating in the market. In this decision making process, a trade-off can be made between direct revenues and indirect revenues.

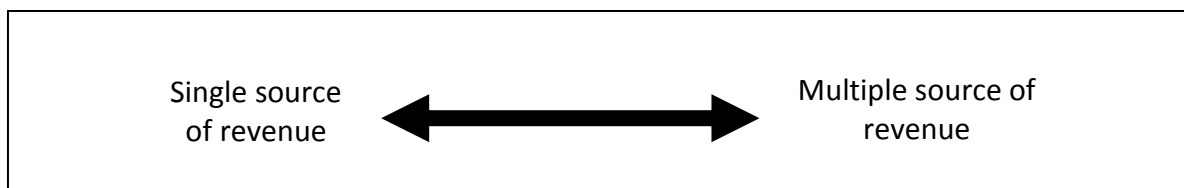


Direct revenues are revenues generated directly from your customer segments. In this case, a company should ask itself, for what value is each customer segment truly willing to pay? Successfully answering that question allows the firm to generate one or more revenue streams from each customer segment. Streams may consist of one-time customer payments (e.g. fixed price or volume or time dependent; a telecom operator may charge customers for the number of minutes spent on the phone) or ongoing payments (e.g. mobile phone subscription). Also differential pricing based on ability to pay can be a form of direct revenue model (Jenkins et al, 2010). Indirect revenues are revenues that do not come directly from your customer segments, but from parties that have an interest in your customer segment and are therefore willing to provide a financial compensation for it. This can be from the private sector (e.g. advertisers) or the public sector (e.g. development communities or government agencies willing to provide subsidies).

5.2.9.2 Revenue mix

The previous critical success factor especially focuses on the choice between direct and indirect revenues. Nevertheless, businesses should also think about whether their business model generates a sufficient amount of revenues from a single source of revenue or if it should focus on generating multiple sources of revenues.





The trade-off between the two types of revenue generation especially has to do with the stability of the revenue stream and the complexity of generating the revenue streams. In case, for example, government subsidies are the only source of revenue for an organisation, this may lead to organisational risks if government policy changes lead to subsidy cuts. In this case it is very advisable to look for additional sources of revenue streams. On the other hand, managing multiple sources of revenue streams may be complex and time consuming. An optimal decision should be made with regard to the revenue mix. The revenue mix may also change over time when grows from the pilot stage to the commercialisation stage in the product development cycle (see chapter 5).

Case study: Narayana Hrudayalaya Hospitals

The Narayana Hrudayalaya Group (NH) is a private group of hospitals with 25 hospitals and two main campuses in India. NH was founded in 2001 by Dr. Devi Shetty with the objective of **providing cardiac care to a diverse patient base** at affordable prices.

In order to be able to provide cardiac care to the Base of the Pyramid, NH initiated a **flexible insurance scheme**: low-income farmers pay low premiums and are given access to same high-quality facilities (such as those of NH) as average or high income patients paying full-price. By managing various levels of income streams, the service becomes sustainable for the poorest to receive world class treatment and for NH to enjoy a 7.7% profit after taxes, higher than the average of US hospitals.

www.narayanahospitals.com

Hystra (2011)

5.3 Conclusions

This chapter is an attempt to break down the high level dilemma of scaling vs. local ownership into practical choices to be made by people and organisations designing, piloting and commercializing services for the BoP. In drawing up the proposed approach, we used the business model canvas as developed by Osterwalder and Pigneur (2003) to map and group critical success factors (CSFs) i.e. the decisions that need to be made that 'make or break' the viability of a business model. Figure 6 gives an overview of the choices in the canvas. The selection of these CSFs and their contents is based on the SotA in business modelling literature for the BoP. We 'repackaged' this body of literature into CSFs.



Key Partnerships	Key Activities	Value Proposition	Customer Relationships	Customers Segments
	Manufacturing		Capacity building	
Content / service portfolio development		Added value	Customer relationship building	Nature of demand
	Organisation learning		User interaction	
	Governance		Customer lock-in	
Organise end-to-end value chain	Key Resources	Open value proposition	Channels	Market entry strategy
	Inter-operability		Local awareness creation	
Scalability	Distribution of functionality	Positioning	Local service delivery	Nature of customer segment
	Human resources		Service management	
Cost Structure		Revenue Streams		
Cost pooling		Revenue model		
Economics of scale/ scope		Revenue mix		

Figure 10: Summary of CSFs for ICT services for the BoP

Based on the description of the type of choice to be made, we identified the trade-off within this choice. Table 3 gives an overview of these trade-offs. They are introduced to outline the spectrum of options decision makers have. The overarching dilemma of scalability/local ownership served as the guideline to identify these. Although the trade-offs are not always directly deductable from this high level dilemma, we feel the set of trade-offs still represents the options decision makers have. Because the identification of this set of CSFs and trade-offs is largely based on desk research, we take these as the hypothesis that will be tested: to what extent are the CSFs and trade-off useful for decision makers?



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Business Model element	Critical Success Factor	Trade-off		
		"Scalability"		"Local ownership"
Value Proposition	Added value	<i>Cost/risk reduction</i>	<----->	<i>Revenue/benefit increase</i>
	Open ended value proposition	<i>Customizable</i>	<----->	<i>Modifiable</i>
	Positioning	<i>Substitutes</i>	<----->	<i>Complementary</i>
Customer Segment	Nature of demand	<i>Needs</i>	<----->	<i>Wants</i>
	Market entry strategy	<i>Market creation</i>	<----->	<i>Market entry</i>
	Heterogeneity of demand	<i>Mass</i>	<----->	<i>Niche</i>
Distribution Channel	Local awareness creation	<i>Above the line</i>	<----->	<i>Below the line</i>
	Local service delivery	<i>Build</i>	<----->	<i>Ally</i>
	Service management	<i>Direct access</i>	<----->	<i>Local agent</i>
Customer relationship	Capacity building	<i>General skills</i>	<----->	<i>Specific skills</i>
	Building customer relationship	<i>Aspirational</i>	<----->	<i>Authentic</i>
	User interaction	<i>Automated</i>	<----->	<i>Personalized</i>
	Customer lock in	<i>Hard Lock in</i>	<----->	<i>Soft lock</i>
Key Resources	Distribution of functionality	<i>Thin</i>	<----->	<i>Thick</i>
	Human resources: skill mix	<i>Techno/economic oriented skills</i>	<----->	<i>Local networking/delivery skills</i>
	Interoperability	<i>Proprietary</i>	<----->	<i>Open</i>
Key activities	Manufacturing	<i>Lean manufacturing</i>	<----->	<i>Demand driven manufacturing</i>
	Organisational learning	<i>Building a generic platform</i>	<----->	<i>Achieving multi- local ownership</i>
	governance	<i>Control</i>	<----->	<i>Trust</i>
Partner network	Develop an end-to-end organisation	<i>Insource</i>	<----->	<i>Outsource</i>
	Scalability	<i>Scale up</i>	<----->	<i>Scale out</i>
Cost structure	Cost pooling	<i>Single party</i>	<----->	<i>Cost pooling</i>
	Economies of scale/scope	<i>Scale</i>	<----->	<i>Scope</i>
Revenue model	Revenue model	<i>Direct</i>	<----->	<i>Indirect revenue</i>
	Revenue mix	<i>Single revenue model</i>	<----->	<i>Multiple sources of revenue</i>

Table 3: Complete overview of CSFs and trade-offs



6 From WHAT to HOW: integrating adoption methodologies into business modelling

Previously, we discussed business models and technology adoption. In this section, we will integrate these two along the lines of a typical product or innovation development cycle. This is helpful in understanding when methodologies, strategies and advice that is mentioned in literature is relevant in making design and business decisions. For example, the approach needed for designing a new product, innovation or service is different from the one needed when it needs to be “scaled up” to reach a broader audience.

6.1.1 Starting point: the dilemma and the development cycle

Based on the local ownership/scale dilemma as outlined in chapter 3, the approach proposed here can be summarized in the figure below of the business goals (the dilemma) and their implications in each phase. This section is devoted to specifying how each phase by its nature (i.e. level of maturity of the service) requires the focus on a specific subset design choices; how it requires specific input to make these decisions in an informed manner; and how the design decision make steer design and decision making in a previous or next phase.

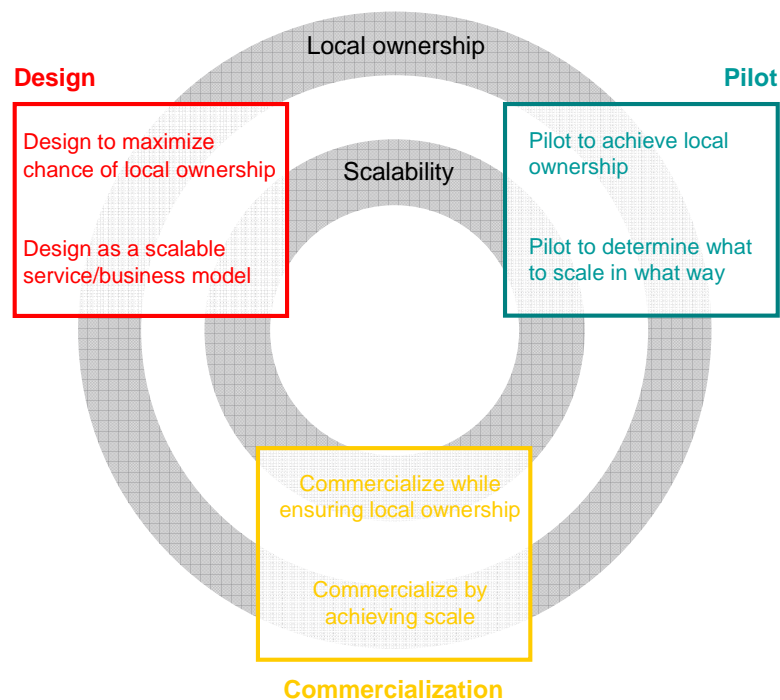


Figure 11: the approach



6.2 Using technology adoption methodologies to organize the development cycle

Our aim in this chapter is to combine business modelling and adoption methodologies. We already had a closer look at business modelling. Now we turn our attention to adoption methodologies as an extension on top of the business model framework. The first thing that needs to be cleared up here is: what is technology adoption?

We describe some models that help in understanding what adoption is and how it works in practice. In the next section we turn to methodologies, strategies and advice for achieving sustainable technology adoption that may be learnt from literature and case studies. Adoption in the sense we use it here describes *how users come to accept and use a technology*. As such, it is clearly focused on specific parts of the critical success factors mentioned in the previous chapter, i.e. the service concept part of the business model canvas (value proposition, customer segment, channel mix and customer relationship).

When users are presented with a new technology, a number of factors influence their decision about how and when they will use it. A good understanding of these factors is a precondition to developing a successful adoption methodology. Several versions of models for technology adoption are available, which describe such influences. The Technology Adoption Model is a well-known one, which describes perceived usefulness and ease of use as important factors.

In the study “technology adoption in developing country contexts” (Cabral, 2009) a literature review of technology adoption models is given, and as a result a slightly extended technology acceptance model is presented. This model, representing a ‘state of the art’ in technology adoption models, is shown in the figure below:

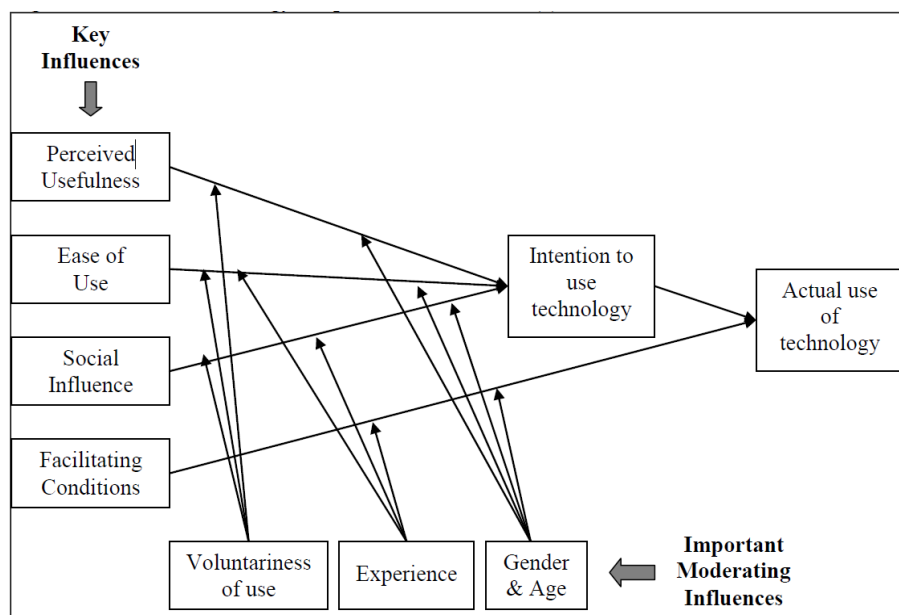


Figure12: from (Cabral, 2009)



This technology acceptance model from (Cabral, 2009) is an extended version of the one described in (Venkatesh et al, 2003) and lists four “key influences” that predict technology adoption

- Perceived Usefulness (or Performance Expectancy): how useful a technology is perceived to be in supporting and/or improving job performance and / or professional goals
- Ease of Use (or Effort Expectancy): how easy or difficult it is (or is perceived to be) to use the system effectively
- Social Influences: including perceived degree to which others approve the use of the technology, internalization of cultural acceptance and perception of how use affects professional image
- Facilitating Conditions: including external conditions such as actual control and resource, organizational and technological conditions, and internal conditions such as perceived control, perceptions of efficacy and compatibility with work style (Cabral, 2009)

In addition, three “moderating influences” are listed, that reduce or increase the relative effect of the key influences:

- ‘Voluntariness’ of Use: the degree to which the adoption of the technology is voluntary or mandatory
- Experience: how the new technology is experienced by the user
- Gender & Age: key demographic factors which are grouped here because of the evidence to suggest they do not have independent influence but interact.

Note that in addition to factors that influence the intention of individuals to use a technology, the factor “facilitating conditions” is listed as a precondition to actual use.

Another key insight in technology adoption comes from the well-known Everett Rogers Technology Adoption Lifecycle model, which is visualized in the figure below:

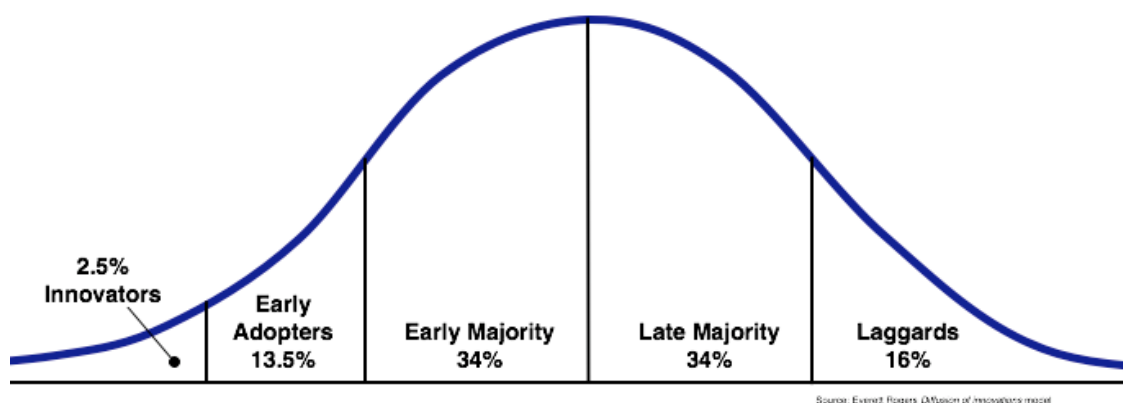


Figure 13: from Wikipedia, based on (Rogers, 1962)

This adoption lifecycle model describes the process of adoption over time, based on the demographic and psychological characteristics of defined adaptor groups. In the model a number of such groups are identified: innovators (as the first to try out something new), early adopters, the early majority, the late majority, and the laggards (who are the last to adopt the new innovation). In the graph becomes visible that the great majority of the users are the early and late majority.



Sometimes a “chasm” is identified between the early adopters and the early majority. This chasm describes the phenomenon in which the product adoption does not go beyond the early adopters, and never becomes widely used. We also identify such a “chasm” in the development cycle that is described later in this document, between the pilot and scale phases. People using a product in a pilot phase can be seen as early adopters, but it is scaling to the much larger early majority which is a big challenge.

Rogers also mentions in his book *Diffusion of Innovations* five intrinsic characteristics of innovations that influence an individual’s decision to adopt or reject an innovation:

- Relative Advantage: how much of an improvement an innovation is over the past or existing technology.
- Compatibility: how easily an individual can incorporate the innovation into their life.
- Complexity or Simplicity: how easily an individual can understand and learn to use the innovation.
- Trialability: how easily an innovation may be experimented with.
- Observability: how often an individual sees others using it, and the positive or negative outcomes of the observed use. (Rogers, 1962)

Note that although these characteristics have some overlap with the key influences mentioned by Venkatesh and Cabral, they are more limited in scope as they describe characteristics of the innovation that influence adoption, instead of influences on technology adoption in general. For this scope, however, the model is more detailed and therefore useful to discuss here.

Earlier in this document, critical success factors were introduced as *elements that are vital for a strategy to be successful*. The key influences listed by Venkatesh and Cabral, and the characteristics listed by Rogers are related to these success factors but not the same. The first give a model for understanding technology adoption (‘WHAT’), while the second give a “model” that enables making decisions to develop a successful business strategy (‘HOW’). Understanding the key influences on technology adoption is an important factor in developing business strategies, and this is especially important when developing for the Base of Pyramid.

These factors may be more or less important in different phases of the innovation lifecycle.

6.3 Design phase

The design phase is generally considered as the phase in which ideas are created, elaborated, and evaluated by means of early user testing. This results in identification of requirements, prototypes. The results of this phase are a stepping stone towards scaling or pilots; the other phases described in this document.



We perceive this phase to take place on the ‘left’ of the business model canvas (see figure 8). During the design phase, decisions need to be made on on the value proposition: what is the idea, the innovation, the service that will be offered? Important at this stage is that decisions are made to what extent the value proposition is ‘open-ended’.

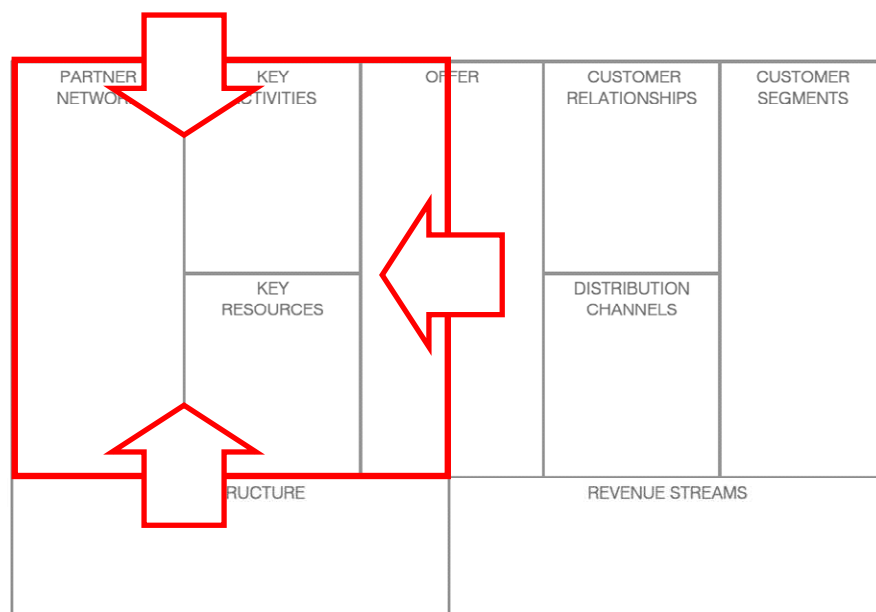


Figure 14: Decision making in the design phase

The design of the value proposition does not occur in complete isolation: the designer is part of an organisation, has a manager, resources and a network of (potential) business partners with whom the organisation might team up to develop such a value proposition. We feel it is safe to work with the hypothesis that the value proposition is often the result of the capabilities of the organisation. Therefore, before jumping to the formulation of a value proposition, an analysis needs to be made of the organisation: what is the strategy, what are we good at that can be leveraged, with what kind of partners are we able to create an attractive value proposition? Defining key activities and resources are crucial steps to move beyond ‘just another idea’ for a value proposition.

The arrows in the figure refer to how input could be gathered to make informed decisions. In this phase, we see a need to align with the strategy of the organisation (strategic fit, top arrow). Furthermore, we see a need to engage in customer research or even preliminary co-creation processes to gather information on the potential market (market fit, right arrow). Finally, we see a need to secure the investment capacity in terms of time, money and technical resources in this phase (financial fit, bottom arrow). This is necessary to ensure not only the design of a service, but also the preliminary commitment to proceed once this phase is over.

To get a grasp on how this phase is specific for the BoP, we turn to literature. In *Next Generation Business Strategies for the Base of the Pyramid* (London and Hart, 2010) the authors state that this phase involves creating market opportunities and crafting solutions



with the Base of Pyramid. Required for this are exploration of potential partnerships, a dialogue grounded in mutual respect, and an appropriate mindset: be patient, stay longer, come back. Also a number of key “innovations” are named of which one or more have been adopted by most successful Base of the Pyramid ventures;

- Introducing radical cost reductions in some value activity (in the context of this report: cost driven value proposition)
- Building a BoP-centric management team, which consists of constantly rebalancing the social impulse (that is, the will to serve the poor) with the more traditional business skills needed to build a successful business (in the context of this report: mobilise key human resources and explore how to balance key activities)
- Implementing human-centric design thinking to products and services (In the context of this report: specify the value proposition, channels and especially customer relationship by applying a holistic approach to the customer). Further, applying co-creation and co-design methods (Boer, Kuiper, 2008).

In the *Base of the Pyramid Protocol* described in (Simanis, 2008), a “pre-field-phase” is described as one of three major phases in an innovation cycle for the Base of the Pyramid that is similar to the design phase as we describe it here. Key activities in this pre-field-phase are the selection of appropriate project sites within the Base of the Pyramid context, the formation and training of a multidisciplinary “field” team and the selection of local community partners. In *Business Linkages: Enabling Access to Markets at the Base of the Pyramid*, the authors list a number of operational challenges in doing business with those at the Base of the Pyramid: securing internal commitment, obtaining reliable, actionable market information, and measuring impact. (Jenkins, 2009)

In conclusion, to make informed decision in this phase, typical activities include:

- Innovation team is selected
- Key roles are identified
- The objectives of the initiative are established
- Team preparation for the process
- Management creates focus and scope of the initiative
- Gather market intelligence as well as creative input
- Make use of co-creation and co-design methods
- Teamwork and leadership
- Cooperation and Creativity

6.4 Pilot phase

In the pilot phase a base of trust with the targeted Base of the Pyramid community is established, a project team including community members is formed, and a full business model is created through small-scale tests and continuous learning. This phase takes local demand and needs, and the local context as the starting point. It should yield indications of size, integration and feasibility of the final project. The results of this phase can be a stepping stone towards (re)design or commercialisation; the other phases described in



this document. The activities performed in this phase should generate lessons to be used for the scale or design phases. The pilot phase may guide choices on what activities, resources and partners are needed.

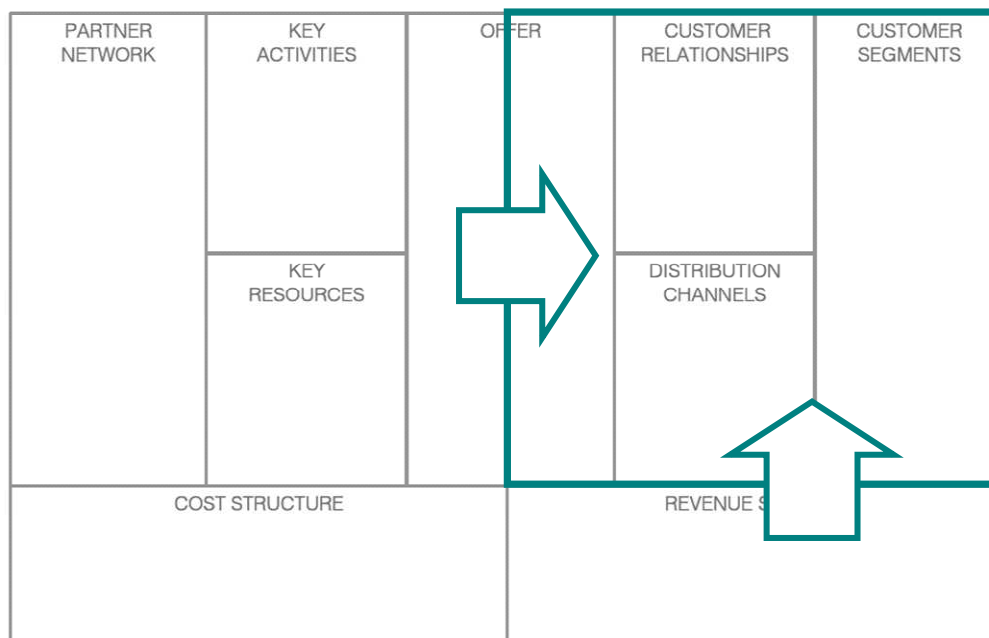


Figure 15: Decision making in the pilot phase

The arrows indicate the type of input needed to make informed decision in creating, managing but also finalising the pilot phase. One important type of input is the decision taken in the design phase. These decisions are put to the test, and might be perceived as working hypothesis. Decision made in the pilot phase should be geared towards learning and iteration of design choices made: testing, refining and optimising the design decision made earlier (left arrow). On the other hand, information on how revenues could be generated should steer the design and management of a pilot (bottom arrow): how are we learning to commercialize in this pilot? The overall tendency in pilots seems to be to steer towards ‘free’ service provisioning.

This is inline with the conclusions stated in *Next Generation Business Strategies for the Base of the Pyramid* (London and Hart, 2010). Here, some key activities for this phase are identified: orchestrating effective experiments, utilizing metrics that support a process of trial and error, explicitly identifying and testing specific hypotheses. Also required is the ability to manage failures, and avoiding turning learning-oriented pilots into philanthropic projects. Also, ensuring a soft landing for the Base of the Pyramid users when the pilot ends, is important.

In the *Base of the Pyramid Protocol* described in (Simanis, 2008), this phase is described as the “in-field-phase”. According to these authors this phase consists of opening up (build



rapport and a base of trust with local communities), building the ecosystem (forming a project team of company representatives and committed and motivated community members), and enterprise creation (creating the full business model using small-scale tests and continued action learning).

A lot of activities in this phase are centred around gathering information, learning about the local context, and establishing local “ownership”. In the *Participatory Entrepreneurship Development Project Training Manual* (Gendt-Langeveld, 2011) some methods and instruments for this are described. They state that “in the context of community work it is mostly about valuing people for what they know and giving them a real role to play. By having such interaction you will find out what they really think.” Several steps in the information gathering during a pilot phase are identified, and participatory instruments offered for each step:

- Plan your research
- Inform the community
- Conduct a test
- Applying the methods
- Analyze the data and information
- Prepare a report
- Evaluate your work
- Take next steps; think of ways to meet the needs you identified

In conclusion, to make informed decisions in setting up and managing a pilot, typical activities for this phase include:

- Collection of new insights and experience
- Saving time and money as well as identify sources of revenue
- Identifying practical improvements
- Facilitating decision making
- Establishing trust

6.5 Commercialisation phase

In the commercialisation phase the knowledge gained from the often small-scale and context-specific test settings and pilots, and the (improved) design resulting from the design phase are used to make revenues, mostly by reaching a larger audience. In Roger’s technology adoption curve, this means getting the innovation from the “innovators” and some “early adopters” to the “early majority”, and hence to a much larger scale.



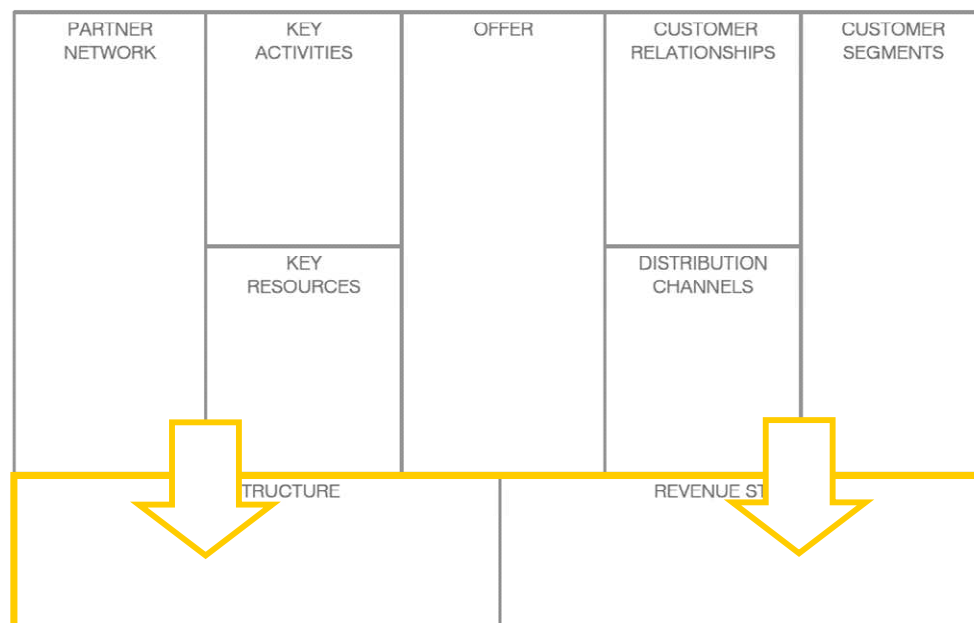


Figure 16: cost and revenues as starting point for the commercialisation phase

This phase takes the cost and revenues of exploiting as a starting point to make choices. Results from this phase can be used to either guide (re)design the business model (left arrow) or service concept (right arrow) to ensuring local ownership.

In *Next Generation Business Strategies for the Base of the Pyramid* (London and Hart, 2010), key activities that are mentioned for this phase are generating a “co-mingled competitive advantage” by gaining access to and investing in existing platforms, and by ensuring partners’ value creation goals are achieved. Also, to leverage and transfer social embeddedness (also described as scaling deep and wide) by gaining access to rich and diverse sources of information and performing frame analysis based on identifying and enhancing ‘what is right’. (London and Hart, 2010)

In the *Base of the Pyramid Protocol* described in (Simanis, 2008) this phase is called the “scaling-out-phase” and involves reaching out to new communities using business ambassadors to localize the core concept, formalizing linkages between the parent business and the new project team, and re-embedding the original business model within the unique context of the new community.

In (London and Hart, 2010) some often occurring structural flaws resulting in a failure to achieve scale are listed:

- A purely top-down approach to Base of the Pyramid enterprises. Successful Base of the Pyramid enterprises are mostly built bottom-up.
- Lack of knowledge of the basic tools of business.



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- Lack of textbook solutions for local, micro level challenges: creating markets where there are none, engaging a community already fractured along caste or tribal lines, non-traditional approaches to marketing, building bridges to governments and other stakeholders that often seem distant and unreachable, managing distribution chains in the face of unreliable transport and power, etcetera.

Typical goals for this phase:

- Leveraging existing platforms
- Partnering with mutual value creation
- Localizing the core concept through business ambassadors
- Re-embedding the original business model within the contexts of new communities



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7 Conclusion: how to work towards sustainable services for the base of pyramid

7.1 Conclusion

This deliverable aims to empower decision makers and designers in designing, piloting and commercialising ICT services for the BoP. Based on the perspective that the BoP needs to be addressed as a market and that people in the BoP can take the role of consumer, local agent and producer, the basis for our approach is a dilemma. On the one side, local ownership is a critical business goal for commercial success. The local consumer market as well as the local business ecosystem are complex and require a specific BoP approach. In order to achieve a sustainable adoption rate of any service at the BoP, considerable attention and nurturing is needed. On the other side scalability of the service and business model is a requirement: reaching a critical mass of customers or products sold is necessary to ensure viability of the business model behind the service, especially for ICT services. This is the first working hypothesis we derived from the SotA that needs validation in further research.

Literature review led us to believe that the distinction between these business goals of local ownership and scalability and the different phases of innovation is sometimes blurred. Local ownership is usually linked to the piloting and design phase and to a lesser extent the scalability phase. Scalability on the other hand is almost exclusively linked to one of the last innovation phases in which commercialisation is the ultimate goal. Also based on the lessons learned in the developing body of literature on the subject, we advocate the view that both business goals need attention in every phase of innovation: people designing and piloting services for the BoP need to take into account that the service needs to be scaled, and in the commercialisation phase, local ownership is not only necessary to take into account by might even turn out to be a driver for scalability. This claim is the second working hypothesis that needs further validation and research.

In drawing up the proposed approach, we used the business model canvas as developed by Osterwalder and Pigneur (2003) to map and group critical success factors (CSFs) i.e. the decisions that need to be made that 'make or break' the viability of a business model. This is the part where the SotA in business modelling literature for the BoP is discussed, but also 'repackaged' into CSFs and the accompanying trade-off within such a factor. These trade-offs are introduced to outline the spectrum of options decision makers have. This is the third working hypothesis that will be tested: to what extent are the CSFs and trade-off



useful for decision makers? “All CSFs are equal, but some are more equal than others”. In the different stages of innovation, not all CSFs are equally important. Literature on adoption methodology showed that in the different stages of innovation, design choices in certain parts of the business model are key, while other design choices either serve as enablers for these decisions or only gain relevance in later stages of innovation. This led to the formulation of a three working hypotheses that can best be summarized by a visualisation as presented in figure 13.

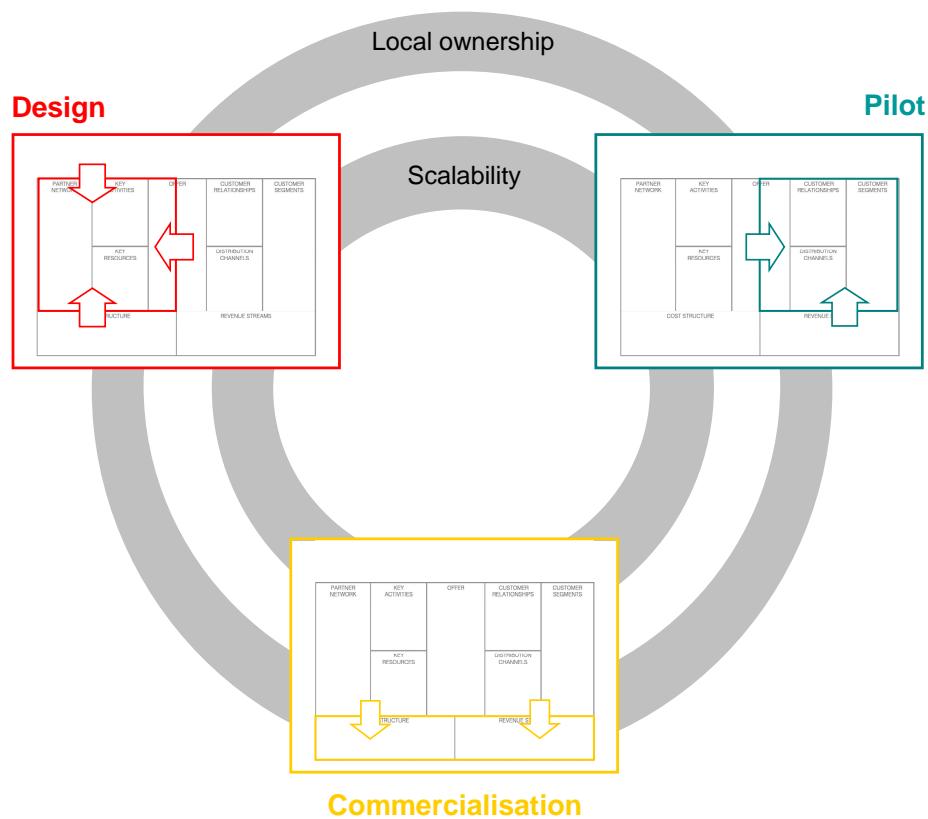


Figure 17: Proposed detailed approach

In the design phase, design of the value creation (left part of the business model canvas) is critical. A requirement is that this value creation process is enabled by financial and non-financial investment of resources. To be able to do this, input on how the organisation intends to deliver this value in the future is necessary (right part of the business model canvas).

In the pilot phase, design of the delivery of value is critical (right part of the canvas). A requirement to do this is an implemented design of the value creation process (left part of the canvas). To be able to make these decisions in an informed manner, input on how revenues can be generated (value can be captured, bottom part of canvas) is needed.

In the commercialisation phase, design of how revenues can outweigh costs is critical. A requirement to do this is a design of the value creation as well as value delivery process.



To be able to do this, input on how revenues can be increased and costs can be lowered is necessary.

The aforementioned approach will serve as the basis for developing a *business modelling toolkit* to support decision making as the starting point for further research into business models for ICT services targeting the BoP. Furthermore, it also serves as the basis for supporting Work Package 4 (m-Health service in Senegal) and Work Package 5 (m-Agro service in Mali) of the VOICES project in developing sustainable ICT services. The Business Modelling and Adoption Methodology approach will consequently be contextualized for both work packages.

7.2 Future research

In this report, we discussed the SotA on business models and adoption methodologies for the BoP and used it to formulate a proposed approach. Although grounded in literature, this approach lacks validation, both in terms of empirical evidence or practical usefulness and usability. Therefore, the conclusions take the shape of working hypotheses as formulated in the previous paragraph. As a consequence, a major part of future research needs to be devoted to validating these hypotheses.

One strand of research is empirical validation. We propose that these working hypothesis can be validated with an aggregated set of case studies along different phases of innovation, across different markets//regions target groups and across different types of products/services. This will allow us to evaluate to what extent the dilemma, CSFs/trade-offs and prioritization of design choices in different phases of innovation hold ground and to what extent these are generally applicable.

A second strand of research is the usefulness and usability by the actual designers and decision makers; the entrepreneurs. By applying these insights in the design, implementation and piloting process with the entrepreneurs, their business partners and (future) users/consumers, we aim to evaluate to what extent and how this approach supports these decision makers in making viable design decisions.

A third strand of research lies in the shortcomings of the business model framework. One conclusion here is that it is hard to pin down design decisions that are (partly) outside the domain of markets and value networks. This applies especially to organisations that act as enablers in creating, delivering and capturing value without any direct involvement in these processes. For example, decision on what strategy could be applied in dealing with local, regional and national governmental organisations is difficult to pin down using the canvas. Also, NGOs have a hybrid character in terms of goals and the design decisions, for example, in terms of partnering only partly address the issues that come to the fore in the SotA on this subject.

A fourth strand of research lies in connecting the phases of innovation phases. Moving design to pilot or from pilot to commercialization implies a change in governance of the value network, business goals etc. Research into how this changes and what types of



organisation act as either coordinator, govern these networks or act as gatekeeper in moving from one phase to the other holds the promise to be of high value. The challenge is to find ways to break down this abstract challenge into useful insights and tooling.

One of the challenges for example is that Research and Technology Organisations (RTOs) and universities are organised around projects, and therefore show a tendency towards organising pilots as this type of activity fits their project-based operation based on trajectories with a clearly defined beginning and end. (Large) commercial organisations on the other hand organize their operation around an ongoing process that is open-ended and evolves in close coordination with internal and external forces. Therefore, they tend to focus on design as well as commercialisation and treat piloting as a second order means to achieve goals in the other phases. From a different perspective, NGOs have a tendency to focus on the business goal of local ownership, while commercial organisations tend to focus on scalability. The big question is how to ensure that in moving towards a next phase, partnerships are forged that not only align strategically but also show the appropriate balance in terms of governance and operational fit.



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Appendix

OV9292 Travel information service

Website : www.OV9292.nl

Voice service reachable via : +31 (0)900 9292

OV9292 is a semi-public organisation offering travel information about all public transport in the Netherlands. It provides departure times, real-time delay information and cost information for train, bus, tram, metro and ferry travels. It also gives additional information on other modes of transport, such as taxis, compares travel times using public transport to using car or bicycle. It offers this information either through a telephone service, via a website or via a mobile app. The telephone service uses voice technology for users to input their travel starting point and destination as well as preferred time of arrival or departure, to automatically generate travel advice. For this telephone service customers pay 0,70 EURO per minute, with a maximum of 14 EURO. The website and app are free, but show online ads. OV9292 also sells the aggregated travel information to third parties, such as Google.

OV9292 is the result of a partnership between all Dutch public transport companies, who provide travel data and some subsidies to support the service. The travel data is aggregated by OV9292 from all local transport companies (each with its specific data structure/layout/format), and transposed into a single database. Speech technology is used as a means to automate the customer call center, cutting cost for telephone operators.

The service first originated as a telephone-only service in the 1990's, (hence the numerical name, where OV is a Dutch abbreviation for Public Transport), and later evolved to also include web and app access. Currently most travel information request come in via the web and app, although the voice service is a useful service for people who prefer to use a phone, or who are in situations where the (mobile) internet is not available or practical to use (e.g. when driving in a car to the train station).



Transport for London (TFL) Travel information service

Website : www.tfl.gov.uk

Voice service reachable via : +44 (0)843 222 1234

Transport for London is the integrated body of Mayor of London and it manages transport services of London. It is a statutory corporation regulated under local government financial rules. It manages services for buses, underground, railway, river and coach station. Apart from these, maintaining main roads and traffic lights of the city, regulating taxis and promoting walking and cycling initiatives

TFL provides travel information through its website, app and telephone service. The telephone service uses voice recognition system. The price for the call is set by the telephone operators . The lowest price is 5 pence per minute. TFL charges telephone operators a few pence and does not profit from the calls. The website and apps are free but have online adds.

TFL is different than OV9292 in the sense that TFL is the managing body of all the transport services, whereas OV9292 only provides travel information which is aggregated from different transport companies. Therefore TFL provides the travel information which it already owns to its customers.

1.800.Flights – flight departure and arrival information

Website : <http://www.1800flights.com>

Voice service reachable via : +1.800.3544487 (FLIGHTS)

1.800.Flights offers a toll-free number where users can speak airline and flight number of any flight in the US and retrieve departure or arrival information. During the call, users are presented with a audio commercial. Audio commercials are either uploaded into the system by 1.800.Flights or by certain trusted advertisers themselves. A software program manages which commercial to be played to which customer, and in what frequency.

The service gathers its data from the Flightstats database, which offers users an add-supported web site where the same departure and arrival information can be found. 1.800.Flights pays a fee to Flightstats for the use of its database.



Wixi Telephone connect service

Website : www.wixi.nl (currently not available anymore)

Voice service reachable via : 1894 (only from NL, not available anymore)

Users wanting to be connected to a person or company could call Wixi (1894 local number), and speak keywords into a voice recognition system (they could search for “mr. Smit in Amsterdam” but also use more fuzzy terms to search for “pizza delivery in Amsterdam”). The system then gave a list of hits based on those keywords. Users could select a hit, and the system would connect the user through to that phone number.

Users paid a fee for using such a system, the actual fee is not available anymore, but comparable phone directory services such as 1888 charge 0,80 EURO a minute. The fee for Wixi could be lower because the service uses voice technology and therefore needs fewer call center staff.

The ‘catch’ with these type of systems is that when a user is connected to the number of his choice, the call is routed through the call-centre, meaning that the caller keeps paying 0,80 EURO a minute even though he/she is calling to a regular fixed line phone number.

Wixi had one other source of revenues, its users could purchase specific keywords associated with their business, so they would attract more customers. Wixi aimed to have people repeatedly use the keyword calling service rather than using the 10 digit code. Wixi failed because the OPTA (Dutch Telephony Regulator) required number information services to always provide the actual phone number, so the repeated keyword calling scheme could not work. Also, the service experienced heavy competition from other (non-speech recognition) number services. (Source: interview with Octavalent, founder company of Wixi).



TNO colleague connect serviceWebsite : www.tno.nl

Voice service reachable via : +31 (0)88 866 0717

TNO is the Netherlands Applied Research Organisation (also a member of the Voices consortium, and author of this deliverable). TNO has approximately 4.000 employees, working in 7 research areas, who often work together in ad-hoc multidisciplinary teams. It offers an internal telephone service where TNO employees can easily be connected to other employees' phones by speaking the name of the colleague they want to be connected to into a voice menu on a central phone number. The system is supplied by Dutcheer, a TNO voice technology spinoff. The system has been supplied to other large corporates as well.

The business goals of the system are to: a) make it easier for TNO employees to connect to their colleagues without having to search for phone numbers, b) save cost for staffing of the call centre and c) limit waiting lines at the call centre and allowing the operators to spend more time on handling external calls from clients and suppliers, so a better customer satisfaction can be achieved.

The system is operated from an internal server that is connected to the internal personnel database. In a first implementation TNO paid a licensing fee to Dutcheer for the use of the system, based on the number of lines that are being used, and expanded by some consultancy/administrator services. Later, TNO decided to purchase a stand-alone version of the system, and now fulfils the administrator role by itself.



Flora Holland order picking system

Website : <http://www.floraholland.com/en/>

Voice service reachable: no. Video available via <http://youtu.be/c-tDCDiGf0Y>

Flora Holland is the world's leading flower and plant auction, processing 120.000 transactions a day. Batches of flowers come in from suppliers all over the world, are auctioned, repackaged and shipped to the needs of individual buyers, again from all over the world. Its distribution centre in Aalsmeer measures 990.000 m² and is the largest roofed trading structure in the world, and the 4th largest building in the world in terms of floor space.

Understandably, the order picking of the auctioned flowers involves a huge effort. Order pickers drive through the large hall on electric scooters with a series of flower containers in tow. Previously, order pickers worked with a paper ticket indicating what crate to be dropped at what station, then driving back to a central location to get a new paper ticket. Starting in 2011, the paper tickets are replaced by a voice system. Order pickers get instructions through a headset connected to a wireless device worn on a belt, and respond by saying "OK" (I have understood the assignment) or by reading a code that is writing on the floor (I am at the right location). This system allows an order picker to process more batches of flowers a day, to make less mistakes (due to the check mechanism based on the codes on the floor), and to allow for real-time changes in instructions, making the distribution more flexible.



American Airlines (AA) – Flight information and reservationsWebsite : <http://www.aa.com>

Voice service reachable via : +1-800-882-8880

American Airlines is the world third largest airline company, which is a subsidiary of the AMR Corporation. It operates in a wide national and international network. Besides the website, AA provides telephone service with speech recognition menu for its customers. With this service customers can reach flight information, information about their reservations, baggage and they can also get some travel tips. The service is provided through a toll free number.

The speech recognition system in part replaces personal assisted telephone service. Customers are prompted to answer questions (are you calling for reservations, baggage, AAdvantage program or other questions?). The service uses voice input to replace interaction with a human call centre agent or a touch-tone system. In this way, the company can give a faster, more intuitive service to its customers and can also decrease the costs by reducing the number of call centre agents.



Apple Siri – Personal assistant

Website : <http://www.apple.com>

Voice service reachable: no. Video and information via

<http://www.apple.com/iphone/features/siri.html>

Apple introduced Siri to the Iphone 4s which entered the market in 2011. Siri is a Voice User Interface which allows the phone user to interact with a virtual assistant. The user can speak tasks into the phone, which are then executed by the virtual assistant. These assistant can be asked to call a certain number,, write a text (which can be dictated) or read out incoming e-mails or text messages. The virtual assistant can also retrieve information, such as local weather or other internet searches, appointments from the users calendar etc.

The use of Siri is free of charge, and comes with all Iphone 4S's. The assistant requires an internet connection to the Apple cloud, which can lead to extra charges by operators. It is argued that by offering Siri, Apple aims at several goals. One is to have its users bypass the use of the search engine of its main competitor Google. Also, by channelling a large fraction of user interaction through Siri, Apple can build personal profiles, and offer targeted services that fit the specific needs of a single customer. When asking Siri for "a good pizza restaurant nearby" Siri can direct a customer to a restaurant that has received high reviews from other users in the users network. A third route is to have advertisers pay to have their results given more priority in Siri's search.

These routes are all based on highly speculative blog posts and articles from different market and technology reviewers, Apple itself has not given any comments on its future plans or business models regarding Siri.

