Final general framework/guideline for a business case calculation and final business models

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Executive summary

This document is part of work package 4, task 4.3 and task 4.4. In part A, it contains the final general framework/guideline for a business case calculation (T4.4). In part B this document focuses on advancing business research in the area of “suitable business models for business network collaborations”, which we pursue at the example of “multisided platforms for smart water networks” (task 4.3).

In part A the deliverable presents the final general framework/guideline for a business case calculation. It is targeted at persons with a light understanding of business economics in need for a guideline on how to present their idea in terms of economic viability. Overall, the guideline addresses four main sections of a business case: (1) introduction, (2) qualitative analysis, (3) quantitative analysis and (4) summary. As a guideline, the document presents for each category tools which can be chosen by the business case author depending on the audience.

Part B of this document focuses on advancing business research in the area of “multisided platforms for smart water networks”. Therein, we consider multisided platform business models as a suitable business model for network collaboration. With regard to the tremendous industry transformations this business model pattern is causing to the energy sector, we explore, whether that pattern might also be applicable to the water sector. The related business research question is: “How could iWidget support water utilities in becoming a regional driver of water saving, while enabling them to compensate the revenue loss occurring through sustainable consumption behaviour? We pursue this business model challenge in the broader context of “green business model innovation”, targeted at changing part(s) of a water utility’s business model, while capturing economic value and reducing the water utility’s ecological footprint. The resulting business model option “iWidget as a multisided platform” represents a novel business model for the water sector. We consider the change in the water utility’s role from being a provider of reliable water services towards being the local driver and enabler of a sustainable lifestyle as major transformation. The water utility’s role change, thereby, is facilitated by the iWidget water service platform. Therefore, the iWidget platform (a) provides water utilities with advanced analytics to improve their operational efficiencies and (b) enables water utilities to unlock new water related service revenue streams to cover revenue losses occurring through water demand reduction in the short run and improving the water utility’s profitability over a longer period. We consider this business model as novel to the water sector that entails great potential, but also risks. For the time being, the iWidget Decision Support System (DSS) consists of different widgets that are accessible by water utilities and water consumers, enabling both customer groups to become more resource efficient. Implementing the iWidget water service platform would require further develop efforts and investments. Based on our assumptions made in the business case, we believe that such an investment would be profitable for a private company.
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1. Introduction

1.1. Objective of iWidget

The objectives of the iWidget project are to advance knowledge and understanding about smart metering technologies in order to develop novel, robust, practical and cost-effective methodologies and tools to manage urban water demand in households across Europe, by reducing wastage, improving utility understanding of end-user demand and reducing customer water and energy costs.

Therefore, iWidget’s purpose is twofold: first, it will enable householders to better understand their water and related energy use in real-time, to identify inefficient usage and leaks and to support them in changing wasteful habits. Second, it will enable utilities to better understand the behavioural patterns of their customers through the assembly of data and processed information at much higher resolutions than hither to. This allows a more refined approach to the design and deployment of measures to improve the utilities’ performance and manage down demand, the measures being both hard, i.e. in engineering design and soft, i.e. in behavioural changes.

1.2. Objectives of this document

This document is part of work package 4, task 4.3. and task 4.4. The goal of this document is two-folded: On the one hand, it contains the final general framework/guideline for a business case calculation (T4.4). The business case guideline presented in this document focuses on the generic approach to write and present a business case and draws on scientific literature (see references) as well as on knowledge at SAP in the many years of business research. The audience this guide is aiming at is considered as someone with a light understanding of business economics in need for a guideline on how to present his / her idea in terms of economic viability.

On the other hand, this document focuses on advancing business research in the area of “multisided platforms for smart water networks” (task 4.3). Therein, we consider multisided platform business models as a suitable business model for network collaboration. With regards to the tremendous industry transformations this business model pattern is causing in the energy sector, we explore, whether that pattern might also be applicable to the water sector. The business research question we are pursuing within iWidget is the following business model design challenge: “How could iWidget support water utilities in becoming a regional driver of water saving (instead of focusing on water efficiency only!), while enabling them to compensate the revenue loss occurring through sustainable consumption behaviour? We will pursue these efforts in the broader context of “green business model innovation”, targeted at changing part(s) of a water utility’s business model, while capturing economic value
and reducing the water utility’s ecological footprint. Due to the peculiarities of multisided platforms identified in state-of-the-art research, we are aware that we will face dedicated challenges when recommending an implementation strategy to bring a platform-based business model to market. Against this background, part of our business research efforts in iWidget is to develop a guideline to develop multisided business models in the presence of network effects.

1.3. Outline of this document

According to its goal this document is split into two parts. Part A covers the final general framework/guideline for a business case calculation (T4.4). It describes a generic guideline for developing a business case. In general, a business case is calculated to support the decision-making process. It helps clarifying whether the target group should invest in an idea or not. Depending on its purpose, it includes qualitative and quantitative data, highlighting the benefits and chances, as well as the risks and threats of the new product/project. The business case guideline is structured into five parts:

- Part 1 - Introduction to the business case
- Part 2 - Qualitative analysis
- Part 3 - Quantitative analysis
- Part 4 - Summary
- Part 5 – The verbal presentation

Part B contains our research efforts in the area of “business models in a collaborative environment” – pursuit at the example of “multisided platforms for smart water networks” (task 4.3). Chapter 7 contains the fundamentals: Therein, we briefly summarise the main business models in business network collaborations. Further, section 7.2 entails a brief overview on green business model innovation.

Chapter 8 explores the requirements placed on business model innovation in the water sector. It starts with a PESTEL analysis of the European water sector, followed by an analysis of the peculiarities of the European water utility business model and emerging business model in the energy sector.

Chapter 9 presents our efforts in exploring a platform-based business model for the water sector. Based on our business model challenge we develop the “iWidget water service platform”, a platform that enables water utilities to become a regional driver of water savings and test its financial viability.

Chapter 10 embraces the guidance to develop multi-sided business models in the presence of network effects, which is applied to the iWidget platform. The chapter closes by discussing the implications of the iWidget water service platform on water utilities revenue.

Chapter 11 entails the conclusion of the overall deliverable.
Part A: General framework/guideline for a business case calculation

2. Introduction

When reviewing the extant literature on developing business cases (e.g., Gambles, 2009; Harvard Business School Press, 2013; Taschner, 2013), multiple requests on how to succeed with a business case for a particular product / project can be found. We coded and categorized these requirements as presented in the following list.

- **Business-orientated**: Content is about business capabilities and impact instead of technical details.
- **Understandable**: Content must be logical and relevant, easy to follow and evaluate.
- **Comprehensive**: All relevant factors for a complete evaluation are included.
- **Consistent**: Fundamental issues need to be addressed in every business case.
- **Transparent**: Risks and benefits need to become clear to the reader.
- **Accountable**: Accountabilities and commitments of benefits and costs need to become clear.
- **Well presented**: If the author is invited to present the case, the way of presenting it should be convincing.

Finding the correct structure to present a business case in a comprehensive way is challenging and very much depended on the coded literature and the targeted audience. Sometimes decision makers prefer to have qualitative arguments rather than quantitative as the latter are often based on assumptions. Overall, the business case needs to target its audience and be structured logically. The literature on developing business cases is massive, presenting competing patterns, focusing on different aspects of the literature. In an attempt to find what we would consider as the best of breed approach, where our industry knowledge can be combined successfully with scientific literature, we build this general guideline for business case calculation on an adapted a priori-structure provided by a standard references in this field: “Developing A Business Case” (Harvard Business School Press, 2013). We cluster the publication’s seven steps to five in order to the reduce complexity.

Covering the main points of **Introduction, Qualitative Analysis, Quantitative Analysis, Summary, and Presentation** we perceive the following structure for our guideline to be useful:
• **Part 1 - Introduction to the business case.** The first section guides the author of a business case on how to get the reader prepared for his or her business idea: the executive summary, the introduction to the business case. This step is about precisely defining the actual business opportunity. The challenge lies in articulating the opportunity to be pursued.

• **Part 2 - Qualitative analysis.** Part 2 addresses arguments which are not underlined by financial statements. This step is about identifying the solution space. Ideas are collected in a qualitative way to make sure many options exist one can choose from. Further, all the information needed to analyze the alternatives is gathered. A time frame is set and estimates/assumptions are documented.

• **Part 3 - Quantitative analysis.** Part 3 addresses the financial aspects. Explicitly, it clarifies possible risks and chances, while strengthening credibility through the usage of different types of analyses. This is the heart of each business case. Alternatives are analyzed using investment analysis methods, a choice is made and its risks are assessed.

• **Part 4 - Summary.** Part 4 explains how to summarize the main facts and guide the author of a business case on how to strengthen key points for decision making. A plan on how to implement the ideas is added.

• **Part 5 – The verbal presentation.** Section 5 takes on the challenge of the verbal business case presentation. Often the case is not only handed in but needs to be presented verbally. Part 5 discusses important points to consider in such a situation. Techniques for presenting a business case are outlined.

Before the five steps are outlined in detail, we explain our approach on the top-ranked literature, which we draw on to gather and select the presented knowledge.
3. Theoretical foundation

We conduct a systematic literature review in order to ensure a solid theoretical foundation. The foundation allows us to explain the five parts on the required level of detail. In our review, we follow the four phases of approach choice, population, selection, and analysis (e.g., Levy & Ellis, 2006; vom Brocke et al., 2009; Webster & Watson, 2002). Following the concrete approach of Webster and Watson (2002), we started to explore the field from a high quality journal perspective as “The major contributions are likely to be in the leading journals” (Webster and Watson 2002, p. 16). As the phenomenon of business cases belongs to the literature on general business studies, the population includes journals in this discipline. Totally, we include seven peer-reviewed academic journals from the time range 2010 to 2015. The selection of the journals is described as follows.

Concerning general business studies literature, we refer to the VHB-JOURQUAL 2 sub-ranking for general business studies (German Academic Association for Business Research, 2009). Rating and ranking international and German-language academic journals which are considered relevant for business researchers, VHB-JOURQUAL is the official journal ranking of the German Academic Association for Business Research (Verband der Hochschullehrer für Betriebswirtschaftslehre – VHB). We decided to select this ranking, as the results of an online survey of VHB members in 2007 (n = 489) give evidence that VHB-JOURQUAL is widely accepted (Schrader & Hennig-Thurau, 2009). Considering all journals ranked A+, which states the top 8.5% (seven out of 82), resulted in the inclusion of the journals Administrative Science Quarterly, Management Science, Academy of Management Journal, Academy of Management Review, Strategic Management Journal, Journal of Industrial Economics, and Journal of Economics and Management Strategy.

Based on this population, we process the selection of all relevant papers by conducting a keyword search with the publisher independent journal data base search engine EBSCOhost in the database Business Source Premiere. The selection of the right keywords and categories (e.g., title, abstract, or subject) is a very critical and considerable challenge that “[...] presents a classic cold-start problem for the novice researcher; how can one identify the applicable keywords for an unknown domain” (Levy & Ellis, 2006, p. 190). Therefore, we initially read known literature with an eye for potential keywords (Levy & Ellis, 2006) and observe that all papers carry a focus on “investment analysis”. Five of 20 papers are object of the following analysis. They serve as starting of our review which is complemented by a forward and backward search to explore the field in all directions.
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*Table 1: Structured Literature Review on Investment Analysis*
4. Business case framework
In the sequel, we describe the five parts of the business case framework in detail.

4.1. Part I: Introduction to the Business Case
In this first part, the business case is introduced to its audience. This can be done in various ways, like through an executive summary, a project facts sheet or the business case story. The elements can also be combined.

4.1.1. Executive summary
The executive summary is characterized as follows (Nagl, 2010):
- First part to be read, first chance to convince the reader.
- In some cases, it might be the only part that is read (e.g., by management).
- Not more than ½ page.
- Has to be written clearly and easily to understand.
- Best written after the case has been complemented.

Checklist of points to be addressed in this section:
- What is the new idea?
- Who are the target customers?
- What are the benefits (for the client and for the respective company)?
- Are all points of interest to the reader and target his/her interests?

4.1.2. Project fact sheet
An additional project fact sheet might provide general information (short overview) on the project (Schmidt, 2002). It is often located between executive summary and business case story. It can be written using keywords. Figure 1 provides an example of a potential template.
Besides organizational information at the header, the template entails the purpose and the description of the solution and its scope. The scope of the business case defines its boundaries and sets the range along several dimensions, helping to identify which data belongs in the case and which does not. In particular, it entails:

- Time horizon, determining the length of analysis period
- Organizational and geographical scope, stating where the product is introduced
- Personnel scope, defining whether certain personnel are included.
- Technical scope, clarifying which technology categories are included and which systems and processes are subject to analysis

Importantly, it has to be clarified from which perspective the business case is created:

- Customer or end-user perspective, evaluating the potential of purchasing a new product or implementing a specific project
- Solution or service provider perspective, dealing with the questions of whether it is worthwhile for a company to develop a new product.
4.1.3. Business case story

Also helpful to get the attention of the audience might be the usage of the business case story (Nagl, 2010). In practical terms, it might be enough to focus on the executive summary only, however, depending on the audience the business case story might be also an option. The business case story provides details on the background and purpose of the project. It follows the introductory section to the topic itself and is the last part before the qualitative / quantitative analysis of the case.

Characteristics of a business case story:

- Written to attract the reader’s interest
- Short, simple and easy to understand, no longer than ½ page
- Interesting and electrifying: Use emotions
- Does not provide any numbers or results out of the Business Case
- Clarifies that something needs to be done (thus shows a problem)
- Presents possible future actions (not yet concrete solutions)
- Use the elevator pitch principle to write the story (see end of part A)
- Checklist of points to be considered in the context of the business case story.
- Describe a current problem
- Show how your solution can solve the problem
- Excite
- Demonstrates the purpose of the business case

This section has outlined possibilities to attract the reader’s attention and to provide a summary for readers who might not be interested to look at the details in the case. Whilst from a structural viewpoint this section is the first in a business case, it might only be written after the qualitative and quantitative argument of the case has been developed. Both, the qualitative as well as the quantitative analysis are discussed in the next two sections.
4.2. Part II: Qualitative Analysis

This section discusses the qualitative analysis which is particularly important in the case where numbers can only be assumed and thus might not make a strong argument. Furthermore, again depending on the reader, some decision makers focus on qualitative rather than quantitative arguments.

Within this section we touch upon Porters’ Five Forces, the market analysis, SWOT and what to do if the business case might be justified if considered as part of a strategic decision.

4.2.1. Porters’ Five Forces

Porter’s Five Forces (Porter, 2008) evaluates competitive rivalry within the industry, bargaining power of suppliers and customers, threats of new entrants and substitute products (cf. Figure 2). Porter’s Five shall support the reader with the market analysis in making a qualitative evaluation of a business case’s strategic position. As the framework covers the entire spectrum of potential factors influencing a business model and its business case on a very high level, it serves as an appropriate starting point to generate a checklist required for the following qualitative market analysis and the quantification in Part III. Why starting with this approach is helpful is explained by Porter (2008, p. 80):

“Understanding the competitive forces, and their underlying causes, reveals the roots of an industry’s current profitability while providing a framework for anticipating and influencing competition (and profitability) over time. A healthy industry structure should be as much a competitive concern to strategists as their company’s own position. Understanding industry structure is also essential to effective strategic positioning. As we will see, defending against the competitive forces and shaping them in a company’s favour are crucial to strategy.”

Therefore, the awareness of the five forces can help a company understand the structure of its industry and stake out a position that is more profitable and less vulnerable to attack.

According to Porter, the five forces model should be used at the line-of-business industry level; it is not designed to be used at the industry group or industry sector level. An industry is defined at a lower, more basic level: a market in which similar or closely related products and/or services are sold to buyers. (See industry information.) A firm that competes in a single industry should develop, at a minimum, one five forces analysis for its industry. Porter makes clear that for diversified companies, the first fundamental issue in corporate strategy is the selection of industries (lines of business) in which the company should compete; and each line of business should develop its own,
industry-specific, five forces analysis. The average Global 1,000 company competes in approximately 52 industries (lines of business).

![Porter's Five Forces Diagram](image)

**Figure 2: Porters Five Forces (Porter, 2008)**

When analysing an industry, typical steps to follow are suggested by Porter (2008) (cf. Figure 3).
**Typical Steps in Industry Analysis**

**Define the relevant industry:**
- What products are in it? Which ones are part of another distinct industry?
- What is the geographic scope of competition?

**Identify the participants and segment them into groups, if appropriate:**
- Who are
  - the buyers and buyer groups?
  - the suppliers and supplier groups?
  - the competitors?
  - the substitutes?
  - the potential entrants?

**Assess the underlying drivers of each competitive force to determine which forces are strong and which are weak and why.**

**Determine overall industry structure, and test the analysis for consistency:**
- Why is the level of profitability what it is?
- Which are the controlling forces for profitability?
- Is the industry analysis consistent with actual long-run profitability?
- Are more profitable players better positioned in relation to the five forces?

**Analyze recent and likely future changes in each force, both positive and negative.**

**Identify aspects of industry structure that might be influenced by competitors, by new entrants, or by your company.**

**Common Pitfalls**

In conducting the analysis avoid the following common mistakes:
- Defining the industry too broadly or too narrowly.
- Making lists instead of engaging in rigorous analysis.
- Paying equal attention to all of the factors rather than digging deeply into the most important ones.
- Confusing effect (price sensitivity) with cause (buyer economics).
- Using static analysis that ignores industry trends.
- Confusing cyclical or transient changes with true structural changes.
- Using the framework to declare an industry attractive or unattractive rather than using it to guide strategic choices.

**Industry Analysis in Practice**

Good industry analysis looks rigorously at the structural underpinnings of profitability. A first step is to understand the appropriate time horizon. One of the essential tasks in industry analysis is to distinguish temporary or cyclical changes from structural changes. A good guideline for the appropriate time horizon is the full business cycle for the particular industry. For most industries, a three- to five-year horizon is appropriate, although in some industries with long lead times, such as mining, the appropriate horizon might be a decade or more. It is average profitability over this period, not profitability in any particular year, that should be the focus of analysis.

The point of industry analysis is not to declare the industry attractive or unattractive but to understand the underpinnings of competition and the root causes of profitability. As much as possible, analysts should look at industry structure quantitatively, rather than be satisfied with lists of qualitative factors. Many elements of the five forces can be quantified: the percentage of the buyer’s total cost accounted for by the industry’s product (to understand buyer price sensitivity), the percentage of industry sales required to fill a plant or operate a logistical network of efficient scale (to help assess barriers to entry), the buyer’s switching cost (determining the inducement an entrant or rival must offer customers).

The strength of the competitive forces affects prices, costs, and the investment required to compete; thus the forces are directly tied to the income statements and balance sheets of industry participants. Industry structure defines the gap between revenues and costs. For example, intense rivalry drives down prices or elevates the costs of marketing, R&D, or customer service, reducing margins. How much? Lower barriers to entry or close substitutes limit the level of sustainable prices. How much? It is these economic relationships that sharpen the strategist’s understanding of industry competition.

Finally, good industry analysis does not just list pluses and minuses but sees an industry in overall, systemic terms. Which forces are undermining (or constraining) today’s profitability? How might shifts in one competitive force trigger reactions in others? Answering such questions is often the source of true strategic insights.

Figure 3: Typical steps in industry analysis and its requirements (Porter, 2008, pp. 87, 92)
4.2.2. Market analysis

One of the five forces is the bargaining power of the buyers. With the following approach to market analysis, we elaborate more on how to qualitatively identify the target customers and their buying power.

The basis of a market analysis is STP (Kotler, Keller, & Bliemel, 2007):
- Segmentation (of the market)
- Targeting (the customers)
- Positioning (the new product)

Figure 4 provides a recommended structure.

Figure 4: Recommended structure of a market analysis (Kotler et al., 2007)

Step 1: Total market and relevant market
The first step is to define the total market and from there the relevant market for the product/project. General questions embrace:
- What is the overall market?
- What is the relevant market?
- Where are possible market niches?
- What is the company’s current market share?

Figure 5 represents the differentiation between total market, relevant market, market segment and market cluster.
Figure 5: Total market, relevant market, market segment and market cluster

**Total market = How big is the universe?**
The total (addressable, available) market quantifies the revenue opportunity available for a product or service as a whole without focus on specific companies or countries (Blank & Dorf, 2012). It helps to prioritize business opportunities by serving as a quick metric of the underlying potential of a given opportunity. Asking how much of the market any company can gain if there were no competitors is one way of estimating it. A more sophisticated way is to look for the market size that could theoretically be served with a specific product or service.

**Relevant market = How many can I reach with my sales channels?**
Once constraints are added (e.g., competition, distribution channels, regulation), the market is reduced down to the serviceable available market, also known as relevant market, the percentage of the market that can actually be served (i.e., either by that company or all providers) out of the total market (Blank & Dorf, 2012).

**Segment = Who will be the most likely buyers?**
“An identifiable group of individuals, families, businesses, or organizations, sharing one or more characteristics or needs in an otherwise homogeneous market. Market segments generally respond in a predictable manner to a marketing or promotion offer” (Rouse, 2015). Examples of common characteristics are: interests, lifestyle, age, gender, etc. Common types of market segmentation include: geographic, demographic, psychographic and behavioral.
Step 2: Segmentation and target customers
After having identified the relevant market, segmentation and positioning follows in the next step.

Requirements:
- Distinct differences in behavior (for example, people, countries, products)
- Segments must be accessible (for example, urban vs. rural)
- Segments must be clearly separable and measurable
- Segments must be stable over time
- Profitability is key

Example - Segmentation criteria for industrial markets
- Demographics: Industry, company size, customer location
- Operating variables: Company technology, product/brand use, customer capabilities
- Purchasing Approaches: Purchasing function, power structure, buyer-seller relationships, purchasing policies, purchasing criteria.
- Situational Factors: Urgency of order, product application, size of order.
- Buyers’ Personal Characteristics: character, approach.
- Questions on customers:
  - Who are my target customers?
  - How can I cluster my customers in homogeneous groups?
  - What are the characteristics of my target customers?
  - Does the product meet the customers’ expectations?
  - Why should anyone buy this new product?
  - What is the likelihood for someone buying the product?

Step 3: Competitors
The competitor analysis embraces an assessment of the strengths and weaknesses of current and potential competitors. Main questions are:

- Who are my competitors?
- Who is/are the main competitor/s?
- How successful is the strongest competitor and why (possible source: annual report)?
- Which potential competitors could enter the market?
- Which competitors have the potential to become market leader? Does a market leader already exist?

To visualize the competitive situation, a competitive matrix figure might be used (cf. Figure 6).
Step 4: Product and positioning
This part is intended to present the product idea to different target audiences. Key questions embrace:

- How innovative is my idea? Is it a pioneer’s solution?
- Which product solutions do already exist? Who offers them?
- How does the idea differ from other already existing products?
- How likely are substitutes? Is it easy to copy the product?
- Questions related to positioning embrace:
  - How can I differentiate from the competitors?
  - How can I position the product in the market so that it will get into the customers’ minds?

Another useful tool to demonstrate the qualitative side of a business case is the SWOT analysis.
4.2.3. SWOT Analysis

In the early 1950s, two professors of Business Policy at Harvard, George Albert Smith Jr., and C. Roland Christensen, taught students to question whether a firm’s strategy matches its competitive environment. Thereby, the SWOT Analysis was developed. It stands for Strengths, Weaknesses, Opportunities and Threats. It combines an internal and external perspective by analyzing internal strengths and weaknesses as well as external opportunities & threats (cf. Figure 7) (Hill & Westbrook, 1997). Strengths are characteristics of the business or project that give it an advantage over others. Weaknesses place the business or project at a disadvantage relative to others. Opportunities are elements that the project could exploit to its advantage. Threats are elements in the environment that could cause trouble for the business or project.

**Key Questions:**
- What are our internal strengths?
- What are our internal weaknesses?
- What are possible external opportunities?
- What are possible external threats?
- Sample questions:
  - Do we have the expertise and technology required to implement the idea?
  - What do we already have and what is still needed?
• What are technological preconditions at the customer’s side?
• What are technological advantages/risks for existing products?
• What are the dependencies on existing product developments/existing technologies?

4.2.4. Strategic decisions

In some cases, the immediate business case might not suggest to decide for a project to go ahead. Looking more closely, however, it might be worthwhile nevertheless (e.g., Gambles, 2009; Harvard Business School Press, 2013; Taschner, 2013). Examples relate to such a situation are:

Competitive advantage
- Improves unique selling position of products
- Builds up market barriers
- Counters negative connotations (i.e., corruption, problems with certain regulations)
- Better relations with government/regulators
- Corporations who engage strongly in social responsibility tend to have better relations to governmental bodies and regulators

Generating brand equity
- Customers are sensitive to companies’ positions on corporate social responsibility.
- Customer loyalty is also built on social engagement/corporate ethics.
- Improves image and reputation.

Human resource management
- Recruit new employees and retention of current employees: People seek to work for “good” companies
- Improved team work of employees by doing volunteer work etc.

Risk management
- Reducing risk: Costs of conflicts with other groups (i.e. governmental organizations) can be high
- Damage of reputation (i.e., via scandals) can draw unwanted attention from government, media etc.

Other reasons
- Reduced environmental impact
- Keep market position (i.e., market leader)
o Gaining access to potential markets and clients (i.e., if United Nations are the target customer, invest in developing countries/emerging economies)

In this section, tools were presented which underline the qualitative arguments of a business case. However, in most cases, this is not sufficient, especially as numbers are often easier to compare in case several project requests are handed in to one decision maker.

### 4.3. Part III: Quantitative Analysis

The figure below represents the structure which could be chosen for the quantitative analysis. It is also the structure according to which we will discuss the elements of the quantitative section within this guideline. The structuring approach is based on experience of the business case team at SAP.

- **Step 1** includes calculations needed before starting with the basics. For example, the author needs to clarify assumptions and choose methods.
- **Step 2** presents the basics of the quantitative analysis of a Business Case.
- **Step 3** refers to fundamental concepts. Calculating the proposed concepts will help the author to increase the credibility of the case. We therefore recommend including at least some of these concepts in a Business Case.
- **Step 4** is the financial summary to provide an overview on the financial indicators. It includes results from the basics and the fundamental concepts.
- **Step 5** consists of sensitivity and risk analysis, which will help the author to reduce possible risks and weaknesses of the case.

It has to be noted, that also in this section, not all tools need to be chosen. Which ones to choose best depends very much on the general practice within an organization / the preferences of the target group.
4.3.1. Preceding preparation

The first step entails required assumptions and methods as well as the scenario analysis.

Assumptions and methods

A Business Case is based on certain assumptions. Depending on these assumptions, the result of the Business Case might vary. Furthermore, some assumptions might be based on variables, which change over time (we thus suggest to always calculate a best, worst and realistic case). It is necessary to outline at the beginning of the quantitative section, which assumptions and methods have been chosen, why and how they influence the results. The author may choose categories to do so, such as ‘Global Assumptions’ (salary, user numbers), cost assumptions (oil price), benefit assumptions (expected margin).

Scenario analysis

The scenario analysis is used for analyzing possible future events by considering alternative possible outcomes (scenarios) (Hsia et al., 1994; Postma & Liebl, 2005). We recommend elaborating on the following three scenarios, each differing in the underlying assumptions:

1. Best case scenario
2. Realistic case scenario
3. Worst case scenario
For example, for a best case, the author assumes that 200 customers will buy the product, in a worst case only 50. The realistic case might be 120. This would influence the expected revenue as shown in the example below:

![Figure 9: Scenario analysis example (fictitious)](image)

4.3.2. Basics

The second category includes pricing, costs and revenues.

Pricing

Most companies hugely underestimate the impact of pricing, even though it is by far the most important profit lever (Simon-Kucher & Partners, 2015). Pricing is a key variable to calculate the revenues. Pricing may vary depending on the product, the target group, channel, etc. Major pricing types embrace (e.g., Bitran & Caldentey, 2003; Gregson, 2008; Smith, 2011):

- **Cost-based pricing**: Cost-based pricing depends on the direct and indirect costs plus an additional amount to generate profits.
- **Value-based pricing**: Value-based pricing is built on how much the customer will pay for a given product or service and maximizes the company’s revenue.
- **Competitor-based pricing**: Competitor-based pricing depends on the number of market player, the competitive price(s) and the market saturation.

The pricing decision is a complex process. Therefore, we suggest to follow a reference framework (Rao, 1984) that guides through the price decision process for a new product. On the right side of Figure 10, the actual process is explained. Assume that a firm is about to launch a new product for which pricing decisions need to be made for
a period of time. It is common practice to consider this decision as part of the overall marketing strategy for the product. The target market selection and product positioning has been explained above. For the composition of the marketing mix elements, we suggest McCarthy's four Ps (i.e., product, price, promotion, and place). The marketer E. Jerome McCarthy proposed this classification in 1960, which has since been used by marketers throughout the world (McCarthy, 1981). On the left side, input parameters are listed that are required for the decision process.

Figure 10: Framework for the price decision process for a new product (Rao, 1984, p. 42)

Costs
We provide a business cost distinction which will help to quantify the business case’s costs (Tracy, 2013).
• **Direct versus indirect costs**: easy vs. difficult to match with a process or product
• **Fixed versus variable costs**: variable costs increase accordingly with each sold unit, but fixed costs do not
• **Actual, budgeted, and standard costs**: The actual costs your business incurs may differ (though hopefully not significantly) from its budgeted and standard costs:
  o **Actual costs**: Historical costs, based on actual transactions and operations for the period just ended, or going back to earlier periods.
  o **Budgeted costs**: Future costs, for transactions and operations expected to take place over the coming period, based on forecasts and established goals.
• **Standard costs**: Costs, primarily in the area of manufacturing, that are carefully engineered based on detailed analysis of operations and forecast costs for each component or step in an operation.
• **Product versus period costs**: Some costs are linked to particular products, and other costs (not linked to products) are recorded as expenses immediately, without passing through the inventory account.

Revenues

A pricing strategy is an important parameter for the quantification of revenues. In the following, we present an approach to forecasting product revenues (McIntyre, 2002). Revenue is defined as income that a company receives from its business activities. The sale of goods and services to customers are the traditional case of generating revenues. The combination of all revenue streams of a business is called revenue model. The following definitions and explanations draw on McIntyre (2002).

<table>
<thead>
<tr>
<th>Customer base</th>
<th>total penetration</th>
<th>product's share of base penetration</th>
<th>price per unit</th>
<th>units per year</th>
</tr>
</thead>
</table>

- The first factor in developing a forecast revenue model requires determining the **customer base** (i.e., number of potential customers for your product). Either prevalence or incidence best fits the product’s sales volume profile.
  - **Prevalence** is the total number of potential customers at any one point in time. It is the appropriate choice if the product will be purchased by the same customer on a recurring basis.
  - **Incidence** is the number of new potential customers each year. It is appropriate if the product serves a one-time acute event and is generally easier to estimate.
• **Total penetration** is the percentage of the customer base currently being served by all available products that would be categorised with your product.

• Product’s share of penetration, or *market share*, refers to the percentage of the total penetration that your product will possess. The three-step process that MyIntyre (2002) has developed to determine this market share percentage is as follows.

<table>
<thead>
<tr>
<th>Step</th>
<th>Determination and Calculation</th>
</tr>
</thead>
</table>
| Step 1 | Determine peak share by:  
• analysing product attributes v current competitors, use primary research with customers to estimate potential peak share of penetration;  
• assessing impact of potential new product introductions on peak market share;  
• adjusting potential peak share by non-product factors such as relative marketing strength or distribution strength |
| Step 2 | Estimate timing of ramp-up of product sales to peak share based on factors such as:  
• speed of customer and/or vendor acceptance;  
• sales and marketing roll-out;  
• technology roll-out;  
• training requirements;  
• label and/or indication expansions, etc. |
| Step 3 | Estimate long-term share decline by analysing:  
• future novel competition including likely timing and probability of market entry and potential product attributes;  
• future generic competition. |

**Figure 11: Determining market share percentage in three-steps (McIntyre, 2002, p. 295)**

The optimal **price per unit** for a product needs to be determined before an accurate revenue forecast can be developed. The price per unit depends on your pricing strategy and the following revenue options (e.g. Chiang, Chen, & Xu, 2007; Williams, Haka, Bettner, & Carcello, 2011), which serve as input parameters for the price per unit assumption.

**Basic Revenue Types**

• **One-time Revenues**: transactional revenues, where the customer pays just once for the value.

• **Recurring Revenues**: revenues, where the customer continuously pays to continue receiving the value, or to receive ongoing support for an initial purchase.

**Revenue Options**

• **Asset Sale**: The customer purchases a product from a company for an agreed price.

• **Subscriptions Fee**: The customer pays a regular subscription for continued use of a service (e.g., monthly fees for access to a Television or music channel).

• **Usage Fee**: The customer pays for using a service provided by the company on a per-use basis.
- **Brokerage Fee**: The customer pays for a broker’s intermediation between two parties of a broker (e.g., eBay acting as an intermediary between buyers and sellers)
- **Lending/Renting/Leasing**: The customer pays for the right of accessing or using a company’s good or service for a fixed period of time. Physical goods must be returned at the end of the agreed period of time.

**Direct Revenue Options**

- **Asset Sale**: The customer purchases a product from a company for an agreed price.
- **Subscriptions Fee**: The customer pays a regular subscription for continued use of a service (e.g., monthly fees for access to a Television or music channel.)
- **Usage Fee**: The customer pays for using a service provided by the company on a per-use basis.
- **Brokerage Fee**: The customer pays for a broker’s intermediation between two parties of a broker (e.g., eBay acting as an intermediary between buyers and sellers).
- **Lending/Renting/Leasing**: The customer pays for the right of accessing or using a company’s good or service for a fixed period of time. Physical goods must be returned at the end of the agreed period of time.
- **Licensing**: The customer pays a license fee for the permission to use the intellectual property of somebody else. E.g., license fees to be paid to the license holder in order to play a song, use a software.
- **Advertising**: The company receives fees from advertisers for providing advertisement space on their Internet pages or in their media channels.
- **Freemium**: The company charges no fees for basic functionalities, in order to attract users and convince the user for a later upsell/conversions, where the company charges fees for premium services to the user.

**Ancillary Revenue Options**

- **Referral Revenue**: a company earns rewards for sharing qualified leads with another company that converts them to won, closed, and paid deals.
- **Affiliate Revenue**: A company develops and continuously attracts and retains the patronage of a target group. It generates revenue by carrying ads or links to merchants with products that its visitors seek or are interested in.
- **Back-end offers**: a company generates revenue through add-on sales from other companies as part of their registration or purchase confirmation process, or by selling existing traffic to a company that strives to monetize it and share the resulting revenue.
- **Email list rentals**: a company charges fees for renting their customer email list to advertiser partners.
4.3.3. Fundamental concepts

The third step entails details concerning the cash flow, the payback period and the operating margin (Schmidt, 2002).

Cash Flow

Cash flow refers to the movement of cash into or out of a business. Cash flow is usually different from revenues and expenses because of the matching principle used in legal accounting. Example: A company buys a computer for 2,700 EUR. This will lead to a cash outflow of 2,700 EUR, when the invoice for the computer is paid. However, as the company will use the computer for approximately 3 years, the company will recognize an expense of 900 EUR/year in the following 3 years. The following concepts represent traditional knowledge on investment decisions (Berk, DeMarzo, & Stangeland, 2014).

**Cash flow can be used:**
- To show the cash flow impact of an investment
- To show the business liquidity (positive operating income does not necessarily equal liquidity)
- Different types of cash flows are used for different purposes: Net cash flow, cash flow cumulative, discounted cash flow

**Net cash flow**
- Is the very basic cash flow, which shows actual inflows and outflows of cash
- Net cash flow = cash inflows – cash outflows
- Taxes are taken into account as a type of cash outflow

**Cash flow cumulative**
- Used to represent the development of the cash flow
- Consists of the sum of net cash flows
- Sample calculation: The project scope is 2013 – 2015.
  - Cash flow cumulative 2013 = Net cash flow of 2013 (In the first year of the project, the cash flow cumulative is the same as the net cash flow.)
  - Cash flow cumulative 2014 = Cash flow cumulative 2013 + net cash flow 2014
  - Cash flow cumulative 2015 = Cash flow cumulative 2014 + net cash flow 2015

**Present value**
- Estimated future Net Cash Flow * (1 + Discount Rate)^-number of years
- Example: One dollar received one year from now, with a discount rate of 10%, would be worth today: $1*(1+0.10)^{-1} = 0.90909
Figure 12: Present value

Net present value (NPV)
- The sum of discounted cash flows (all inflows and outflows).
- The value of the NPV indicates, if from a financial perspective, an investment should be made:
  - NPV > 0 positive indicator for investment.
  - NPV < 0 negative indicator for investment
  - NPV = 0 the investment would neither gain nor lose value for the firm

Payback period
The payback period shows when the initial investment is recovered. This is already shown with the discounted cash flow. We explain characteristics of this concept and provide an example based on Kinney and Raiborn (2008).

Characteristics are:
- Payback: Number of years to recover the investment.
- The longer the payback period the more risky the investment (events in the future are difficult to foresee).
- Easy to calculate but should not be used as single criteria to decide upon an investment: The criteria ignores the timing of cash flows and with this the time value of money.
- To overcome the pitfalls of the simple payback calculation, a dynamic payback can be calculated by taking into account the discounted cash flows.

Payback period - Example
A project pays back evenly 20,000 Dollars/year over 5 years. Payback would be 5 years. Another projects cash flow is 0 for four years and 100,000 in the last year. Equally, payback would be 5 years. However, every dollar received today is worth more than
the one to be received in the future. Thus, even though the payback period is equal, the first project is to be preferred.

![Dynamic payback period](image)

**Figure 13: Dynamic payback period**

**Operating margin**

Operating margin is a measurement of what proportion of a company’s revenue is left over after paying for variable costs of production (Farris, Bendle, Pfeifer, & Reibstein, 2010). It is calculated:

- Operating margin = (Revenues - operating expenses)/revenues
- Finally: Operating margin * 100 \(\rightarrow\) to get the percentage

Please refer to the definitions at the beginning of this section. Revenues do not equal cash inflow.
4.3.4. Financial summary

The financial summary provides an overview on the main financial facts and refers to the different scenarios (best case / worst case) (Taschner, 2013). Similar to the executive summary, it provides decision makers with an overview and potentially with an easy to understand format to compare different business cases from a monetary perspective.

The financial summary provides an overview on the main financial facts. In particular, it provides comparative overview of best (B), realistic (R) and worst (W) case scenario. For each scenario, the above explained and calculated key figures (i.e., revenues, costs, cumulated cash flow) are listed for each year. The key figures payback period, operating margin, and net present value are not calculated for each year, but rather for the entire period. These are the figures you require to eventually enable a decision. The figures are especially interesting to potential venture capitalists and banks.

<table>
<thead>
<tr>
<th>YEAR</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scenario</td>
<td>B</td>
<td>R</td>
<td>W</td>
</tr>
<tr>
<td>Revenues</td>
<td>135,800</td>
<td>81,600</td>
<td>67,600</td>
</tr>
<tr>
<td>Costs</td>
<td>121,800</td>
<td>152,250</td>
<td>182,700</td>
</tr>
<tr>
<td>CFCum.</td>
<td>15,000</td>
<td>-70,650</td>
<td>-125,100</td>
</tr>
<tr>
<td>NPValue</td>
<td>239,148</td>
<td>74,831</td>
<td>-9,241</td>
</tr>
</tbody>
</table>

Figure 14: Financial summary (example)

4.3.5. Reducing uncertainty

To reduce uncertainties sensitivity and the risk analysis might be useful.

Sensitivity analysis

Sensitivity analysis refers to the relationship between the relative change in an estimated factor and the desirability of the alternative as a result: If the estimate for a factor is off by some given percentage, does the value of the alternative change a little bit or a lot? A small change in one factor might reduce the desirability of an alternative significantly whilst a major change of another factor does not.

Sensitivity analysis cover the followings dimensions (Taschner, 2013).

- Can relate to quantitative and qualitative information
- Allows decision maker to understand the full range of possible impacts of inaccuracy.
Example: What happens if assumptions change? Which assumptions have a strong influence on results?

- Which assumptions are relatively unimportant?
- Determines which assumptions are most important in controlling overall results
- Simple sensitivity analysis is the process of checking the model’s assumptions, one by one, to determine how each controls the overall results (such as total net cash flow or amount of customers)
- Determining and monitoring the different factors helps reducing uncertainty
- Decide between factors which are totally outside of control (such as the oil price) and factors which can be controlled or influence to some degree by the business case owner

The following example shows a simple sensitivity analysis. Assumptions are increased and lowered in 10% increments, keeping other variables fixed. The light red and purple curve shows the factors which, if changed, have a strong effect on the cash flow results.

![Figure 15: Example of a sensitivity analysis](image-url)
Risk analysis
To be aware and prepared for possible risks, a thorough risk analysis is needed. The quality of your risk analysis will influence the credibility of your case significantly.
Possible questions:
- Which non-financial/financial risks exist?
- Which risks might develop over the years?
- How can we engage with these risks?
- How can we control these risks?
- Do we have a strategy in case the product/project fails (exit-strategy)?
- What is the exit strategy?

Risk analysis gathers data and synthesizes information to develop an understanding of the risk of a particular business case. The data analyzed will include assets in risk, threats, prioritization of vulnerabilities, and appropriate protection measures.

There are two general groupings of risk analysis techniques.
- **Qualitative risk analysis**: process of prioritizing risks for further analysis by assessing and combining their probability of occurrence and impact
- **Quantitative risk analysis**: process of numerically analyzing the effect of identified risks on overall project objectives

Risk analysis – example
First, possible risk factors are identified (e.g., low data quality). Next, likelihood that risk factor occurs, its impact on the investment and its controllability are estimated.

![Figure 16: Example of a risk analysis (1/2)](image-url)
<table>
<thead>
<tr>
<th>Risk Description</th>
<th>Probability</th>
<th>Impact</th>
<th>Controllability</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Data Quality:</strong> The used internal and external information sources are of bad quality, which results in misinformation and misleading of the users.</td>
<td>Medium: Good data quality from internal sources can easily be guaranteed following the required governance processes. It is more difficult for external sources where data quality cannot be guaranteed immediately.</td>
<td>High: As the questionnaire results have shown, users already do not trust in data quality from external sources. Problem in this area would feed their fears and prevent them from using the Mashup platform.</td>
<td>High: Secure governance processes need to be implemented (already considered as a cost item), e.g. to certificate external sources. In addition, this effort needs to be communicated to the users to increase their confidence in Mashups.</td>
</tr>
</tbody>
</table>

Figure 17: Example of a risk analysis (2/2)

### 4.4. Part IV: Summary of a Business Case

The summary of a business case highlights the main arguments and provides recommendations and next steps. The summary should embrace (Schmidt, 2002).

- Overall benefits for the target group.
- Overall benefits for the company.
- The most important non-financial benefits for the company (for example, customer satisfaction).
- The most important financial benefits for the company (for example, revenues).
- Alignment with the company’s strategy (for example, acquire key technology update product line, increasing product quality, decreasing pollution ...).
- Impacts on customer/unit/company level.
- Explain what you want to do next.
- Provide recommendations if you have some.
- Send a final impulse.
4.5. Part V: Verbal Presentation

This section provides ideas to be considered for the moment of the verbal presentation of the business case. It addresses how to make a difference, how to make a particular proposal memorable, how to convince the listener to invest in an idea and not in the (equally good and well presented) ideas of the competitors. In the following we will discuss (1) the possibility of differentiation using the tool of communicating on an emotional level, (2) useful hints when having only a few minutes to present a case in an informal setting and (3) general points to be considered when presenting to an audience.

4.5.1. Differentiation: Communicate on an emotional level

One way to make a business case presentation memorable is to stir emotions in the listener’s mind (Philippot & Schaefer, 2001). The key to stirring the ‘right’ emotions is to understand (1) what matters to the audience and (2) what are the game changing elements of the case.

To understand, what matters to the audience:
- Check keynotes. What are the current problems of your target group?
- Ask people close to the listeners about their likes and dislikes
- Ask people, who have previously presented something to the same group of listeners, about their experiences
- Check online for hobbies and leisure activities (community platforms might be helpful)
- Observe their behavior

To understand, what are the game changing elements of the Business Case:
- Check how the business idea differentiates itself from existing products/ other proposals. What makes it special?
- Find out what people impressed in previous presentations.

With the answers at hand the presenter can penetrate these points whilst keeping in mind to find the perfect match between the audience’s emotions and the business ideas’ vision. Tools to stir emotions are for example:
- Anecdotes and jokes
- Video clips and pictures (no longer than 10% of the total presentation time – leave out if to present to a very business minded audience such as the board).
- Current news/ issues. Refer to current news which is related to the current problems of the target group
- Provide a historical context
• Quotations. Is the listener a sports fan? Maybe use an inspiring quote from a successful sports man
• Associations. Form an association between what the business case aims at and what occupies the audience

It is helpful in this context to:
• Include the audience. Ask questions or let the listeners participate otherwise.
• Appeal to self-interest and identity
• Express own emotions. Show excitement through voice and body movement.
• Use active and not passive tense. *I will explain* … instead of *It will be explained to you* …
• Use different colors to stir certain emotions. For instance, using red can indicate danger whilst green is said to be more calming
• Present financial results as diagrams (instead of numeric charts)
• Chose a suitable font. Depending on the font, messages can be perceived differently:

*He was eaten by a shark* (Times new Roman).
*He was eaten by a shark* (Comic Sans).

Generally, avoiding exaggerations is useful. It helps to choose only tools which are suitable for your audience (not everyone has a sense of humor) and to be careful with stirring negative emotions. A focus on the solution and not the problems should be the key message.

Sometimes the situation might occur where the owner of a business case meets a decision maker in an informal setting. With the knowledge of steering emotions in mind, the following section presents how to structure and what to consider when preparing for such a coincidence. Given the shortage of this type of presentation, this situation is commonly referred to as “elevator pitch”.

4.6. The Elevator Pitch

The information presented within this section highlights, how to prepare for a very short presentation which often occurs unexpected and in informal settings. According to Weyand (2007), the different phases should be structured as follows:

Phase 1: Providing general information
Starting off, it is useful to provide listeners with background information such as
• Who you are
• What are you working at
Phase 2: Getting attention by generating tension
In the second phase, generating tension can be helpful by addressing the target groups’ wants, dreams and needs. What does the other person
- Want (does not necessarily make him buy)
- Dream of (does not necessarily make him buy)
- Need (makes him buy; e.g. like the man in the desert looking out for water)
- Absolutely need (definitely makes him / her buy; e.g. water in the desert)

Phase 3: Releasing tension by providing solutions
Having generated tension, the target group is in a stage of expectation. Acknowledging the problem at hand, it is now the moment to release the tension by providing the solution to the problem: the proposal in question.

Phase 4: Closing phase
In the closing phase, raising interest is important to achieve a follow up. For example a last impulse by underlining the key messages and the solutions the business case owner can provide to solve the problem. At the end, an offer to send a demo version, brochures or further information can be helpful.

Example Elevator Pitch: Christine from the IWidge team meets her SAP CEO in the elevator

<table>
<thead>
<tr>
<th>Phase 1</th>
<th>Phase 2</th>
<th>Phase 3</th>
<th>Phase 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hi, nice to meet you. I am Christine working in our research division on the water management project called IWidge.</td>
<td>Have you seen this article in Spiegel Online on the water pollution in China? Crazy isn’t it? xx% of all fresh water resources are already poisoned! They should invest in effective water management solutions, else this will end in a disaster!</td>
<td>You know, in the research division we have a solution which could be applied. With it they would be able to</td>
<td>By the way, we got a demo version which won the X award. You know what? I will send it to you right away and you can have a look! It’s really good!</td>
</tr>
<tr>
<td></td>
<td>CEO: <em>nodding</em></td>
<td>With it they would be able to</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. ...</td>
<td>2. ...</td>
<td>3. ...</td>
</tr>
</tbody>
</table>
4.7. Presentations

No matter whether ideas in the context of a two minutes elevator pitch are presented or if the business case author is invited to present a fully flesh out Business Case, as long as it is an oral presentation, it is the way the author presents himself and the case respectively, which heavily influences the decisions of the target group. The following presentation rules provide ideas on how to prepare for a successful presentation (Weissman, 2011).

**Rule 1: Create a comfortable atmosphere**
- Time: At what time of the day is the potential listener most attentive? Do not talk to someone when he/ she is tired, stressed, in a hurry, going to toilet/ home/ for lunch
- Room: Choose a room, which reflects the nature of your idea, as well as supports the likes and dislikes of the audience
  To present an innovation, do not chose a very traditional, dark conference room. Choose a clean, bright, well aired room with high ceilings and comfortable chairs.
- General: Provide drinks and food your listeners are fond of
  - It is not helpful to offer a manager a cup of coffee if he drinks only tea.

**Rule 2: Communicate your emotions**
- Talk about personal feelings
  - Working on this project was …
- Talk openly about difficulties and possible solutions.
  - At the moment we are facing the following difficulties … As a first solution we have tried to …
- Mention experiences
  - We had a similar situation in energy management project X …
- Be provocative
  - Imagine, tomorrow, company XY announces, that from now on, a working week consists of 60 working hours – no additional payments will be made. How would you react …?

**Rule 3: Explain the benefits clearly**
- Talk about the benefits/ importance of the project right at the beginning
- Explain the details of your innovation clearly
- Provide images (to prevent listeners from coming up with their own (wrong) interpretations)

**Rule 4: Use colorful, descriptive speech**
- Offer good explanations, examples and illustrations
- Use the language of the audience. If the presented to a business audience, avoid technical terms (and vice versa)
**Rule 5: Let your listeners participate**
- Ask open questions (W-Questions).
  What do you expect from ...? Which experiences did you ...? Why would you buy ...?
- Ask rhetorical questions or use upgrading expressions
  Being marketing experts, we all know that ...
- Let the listeners show up via hand sign
  How many of you would buy this product?

**Rule 6: Reduce your listeners' certainty**
- Make the listener realize, that he/ she does not yet have all relevant information
  (and thus should listen carefully)

**Rule 7: Understand your listeners**
- Avoid words or examples, stimulating negative thoughts
  Do not compare your project with another failed or critical project.
- Know your listeners’ hobbies and personal dislikes

Do not offer a cigarette to an activist of the non-smoking movement. Do not talk about the Rangers, if he is a Celtic fan.

**Rule 8: Use additional stimulants**
- Make use of quotations, cartoons, jokes, compliments, caricatures, mottos
- Demonstrate a prototype

**Rule 9: Use a simple layout**
- Present only one main argument per section (located in the middle)
- Use interesting headlines
- Use key words instead of whole sentences

**Rule 10: Change your position and speech patterns**
- Position yourself in the centre of the room when introducing your topic
- ‘Interrupt yourself’ by talking about personal experiences or anecdotes (you can show a black slide meanwhile)
- Illustrate and/ or write down important information on a flipchart/ whiteboard/ webpage
- Move towards the person you are talking to
- Speak slowly, when talking about important, difficult or new points
- Speak faster and louder, when trying to motivate (also use more gestures)
- Emphasize main arguments

**Rule 11: Try to avoid**
- Absolute statements or generalizations such as It is always ... That is defiantly the case ...
- Weakening words such as possibly, most likely, probably or generally and verbs such as trying
- Prefix sentences such as if you ask me, well, honestly ...
- Expressions such as I am not exactly sure but ...
- Superlatives such as fantastic, super, gigantic.
- Impersonal forms such as one or the German equivalent ‘man’, like for example one might want ...

**Rule 12: To prepare, present your presentation to someone, who does not belong to your target group.**
- Ask for feedback
- Get used to reply to critical questions
- Gain self-confidence

**Rule 13: If the other person points out disadvantages or problems in relation to your project ...**
- Agree if the other site is right
- Provide a positive counter-argument
  - Disadvantage: This water management solution is too expensive.
  - Counter-argument: Yes, it is a big investment. But in the long run it can save a lot of money. And moreover, you will save thousands of lives. You can’t put a price on that.
- Draw on your own experiences, when explaining how you are planning to approach the problem.

**Rule 14: If confronted with hypothesis or subjective, offensive comments ...**
- Stay objective
  Comment: You have no interest in saving lives. You only see the money.
  Counter: Your argument tells me, that I have not been clear enough about the advantages of such a solution. I happily take this opportunity to summarize the key points once more ...
  - Use bridging sentences to stay calm and gain time. Lead the listener back to the key points:
  I am not sure how you got this impression. The idea behind IWidget is ...

**Rule 15: Watch the body language**
It is often difficult to interpret the other person’s reactions, especially if listener and presenter meet for the first time. There are several general indicators to understand the listener by observing the listeners’ eye and head movements. Wirth (2010) points out:

Eye movement:
- Left up → Person refers to things, situations or people seen before
- Right up → Person refers to things, situations or people never seen before
- Left → Person tries to remember voices, noises, etc. heard before
- Right → Person tries to think of voices, noises, etc. never heard before
- Left down → Person listens to inner voice
- Right down → Person processes overall impression

Head movement:
- Raised → Self-confidence, managing the situation, stable emotions – but creates the impression of arrogance, if a person remains in this position for too long
- Lowered → Hopelessness, lack of self-confidence, not able to handle the situation – but can also be a sign of intensive thinking
- Tilt to the right → Skepticism, doubts, distrust; more information/ facts are needed
- Tilt to the left → Open-mindedness, sympathy and impartiality; person wants to listen/ talk
- Turned away → No interest, rejection, negative attitude to what has just been said
- Thrown back → Display of superiority (maybe to hide uncertainties) - but also willingness to face a new challenge
- Facing → Sincerity, honesty, strong interest, openness, emotional participation

To finish this section on points to consider when presenting a case, below a general remark on structuring an argument: The structure of the argument determines whether a listener can follow. If ideas are presented in an unstructured way, with many long, intertwined sentences, the audience will have difficulties to understand, what the speaker is trying to say. The Pyramid Principle (Minto, 2005) can help you to structure your argument in a comprehensive way.

![Figure 18: Pyramid Principle (Minto, 2005)](image)

The key principles are: Start with the core message or the key point(s). Then present the arguments underlining the key points. Do not use more than 3-5 arguments, if you want your audience to remember what you were saying. Present the arguments in a logical order (for instance, group related arguments) and strengthen the arguments by providing proof. Furthermore, prioritize the arguments. It is best to distinguish between mandatory, nice-to-have and optional information.
5. **Summary**

This section provides a general framework / guideline for a business case calculation. The guideline addresses the four main sections of a business case (1) introduction (2) qualitative analysis (3) quantitative analysis (4) summary. As a guideline, the document presents for each category tools which can be chosen by the business case author depending on the audience. Whilst some decision makers prefer the qualitative analysis, others might be in favor of financial statements. Furthermore, the guideline addresses the special moment of the business case presentation in providing hints on how to present the proposal and how to make it memorable. The guideline is written from a practitioner’s viewpoint based on knowledge accumulated in SAP’s business research team as well as on key readings in the area (see references).
Part B: Final business models in a collaborative environment

6. Multisided platforms for smart water networks

In part B we advance business research in the area of “multisided platforms for smart water networks” (task 4.3). Therein, we consider multisided platform business models as a suitable business model for network collaboration. With regard to the tremendous industry transformations this business model pattern is causing to the energy sector, we explore, whether that pattern might also be applicable to the water sector.

The business model option “iWidget as a multisided platform” developed in chapter 9 represents a new approach to uncover a new business model for the Water industry. To our best knowledge, there aren’t yet any two-or multisided business platforms in the water segment. Business model innovation initiatives such as the one of Ceres - founded by a small group of investors in 1989 – are working on transforming the Water sector by building their new business models upon flexibility, resilience and resource efficiency.1

Throughout our business research efforts in iWidget, we are following a different approach: Instead of focusing on improving resource efficiency only, we are trying to uncover additional means to increase the fixed revenue part of a Water utility. We hope that by changing part(s) of a water utility’s business model water utilities will be enabled to capture additional economic value, while reducing the water utility’s ecological footprint. To give a brief background on that challenge: Utility revenues consist of non-operational and operational revenues, whereas the latter consist of fixed and variable revenues. If private water consumption decreases due to demand reduction, the variable revenue of the water utility decreases, causing an additional loss-making for the water utility. As today’s water utility business model is based on the amount of paid “throughput” water utilities might either increase water prices and / or improve efficiencies in the water supply process. Therefore, water utilities are applying improved methods of water auditing and loss control in order to reduce the large volumes of non-revenue water that get lost through leakage. Additional utility efforts relate to providing incentives to customers to optimize their water consumption.

The business research question we are pursuing within iWidget is the following business model design challenge: “How could iWidget support water utilities in becoming a

regional driver of water saving, while enabling them to compensate the revenue loss occurring through sustainable consumption behaviour? This approach includes changes in the water utility’s business role as well as in their service portfolio in order to identify monthly recurring revenue streams that might compensate the revenue loss water utilities are facing due to demand reduction.

To solve that business model challenge, we apply the business model pattern “Two-/multisided platform” to the iWidget case as this platform pattern has been a major transformation driver in the energy sector throughout the past years. However, this business model type differs tremendously from traditional business models along a value chain and has not yet been applied to the water sector. Further research is required to solve these challenges, which we approach by envisioning the “iWidget water service platform”, being operated by iWidget Ltd. – a private limited company (Ltd.) that operates the platform in the “Cloud”. By using these platform services, water utilities may become able to make their business more green/sustainable; e.g. by providing additional water related services to their customers, while increasing their revenue stream and decreasing their costs and ecological footprint with regard to sustainable water and energy consumption.

6.1. Business research motivation

Green business models are emerging throughout European markets, spreading out over different industries (EC, 2008). Businesses recognize the trend towards green transition and realize the necessity to preserve natural resources and the global economy, while governments seek new ways to promote sustainability and a green economics activity (Beltramello et al., 2013). In this context, green business models are expected to make an important contribution to the transition towards green growth, fostering the sustainable use of resources in a manner that future generations may not experience resource scarcities or be exposed to environmental risks (Bisgaard et al., 2012).

Taran & Lindgren (2011) see ICT as a key enabler for green business models. Modern technologies provide businesses with higher efficiency and better control mechanism to increase environmental performance. For the iWidget case that means: Through an increase in water efficiency enabled by the iWidget DSS, water utilities may profit from a cost reduction in their water supply.

Overall, green business model innovation aims at tackling the transition towards sustainability and green growth, in particularly by changing part(s) of a company’s business model, while capturing economic value and reducing the company’s ecological footprint (Bisgaard et al., 2012). Explicitly, the lasting impact of the business model often contributes to the organization’s profits, growth and long-term survival (Girotra & Netessine, 2013). However, adopting the right business model is essential for successful commercial innovations (Teece 2010) and presents a major challenge for established companies and start-ups. The same applies to green business model
innovation: Adopting the right business model is essential for successful sustainable innovations, in particular with regard to the concern that environmental sustainability often is considered a burden to businesses associated with extra costs (Andersen & Murdock, 2013).

6.2. Business model challenge

When doing green business model innovation in the water sector, the question appears how a water utility can profit from the increased environmental performance in terms of its financial performance. Thus, the relationship between environmental and financial performance matters. Throughout our business research we focus on that aspect by asking: “How could iWidget support water utilities in becoming a regional driver of water saving, while enabling them to compensate the revenue loss occurring through sustainable consumption behaviour?

6.3. Business model innovation approach

To solve that business model challenge, we follow an explorative research approach and apply the business model pattern “Two-/multisided platform” to the iWidget case as this platform pattern has been a major transformation driver in the energy sector throughout the past years. However, this business model type differs tremendously from traditional business models along a value chain and has not yet been applied to the water sector. Further research is required to solve these challenges, which we approach by envisioning the “iWidget water service platform”, being operated by iWidget Ltd. – a private limited company (Ltd.) that operates the platform in the “Cloud”. Figure 19 summarizes our approach, accordingly.
### Introduction: Multisided platforms for smart water networks
- Business research motivation
- Business model challenge
- Business model innovation approach

### Fundamentals
- Suitable business models for business network collaborations
- Peculiarities of multisided platforms
- Green business model innovation

### Requirements elicitation
- Characteristics of the European water sector
- Peculiarities of European water utility business models
- Emerging business models in the energy sector

### Specification
Requirements placed on green business model innovation in the water sector

### Developing the iWidget Water Service Platform
- Business model
- Financial viability
- Impact on the water utility’s current business model

### Guideline to develop the iWidget Water Service Platform in the context of network effects

### Conclusion

---

**Figure 19: Research approach**
7. Fundamentals

This chapter provides the foundation of our business research on “multisided platforms for smart water networks”. Therein, we highlight that multisided platform business models are - among others - a suitable business model for network collaborations. The chapter is complemented by the fundamentals of green business model innovation, explaining what it is and highlighting the important role of ICT as enabler of green business model innovation.

7.1. Suitable business models for business network collaborations

Business network collaboration is the fuel of any business, whether it is between employees, partners or customers, offering exceptional opportunities for fast innovation. Business Network collaboration represents a partner-like relational form of inter-organizational cooperation, describing the degree to which focal activities to the relationship are carried out jointly (Bensaou, 1997). The concept of inter-firm cooperation thereby refers to relations of mutual dependence between organizations that retain their separate identity as legal and/or economic entities (Arrighetti et al., 1997). Global drivers caused by a changing global environment both foster and require inter-organizational cooperation. (Williamson & De Meyer, 2012) mention the trend towards outsourcing, the increasing product and service complexity, uncertainty and change as well as cost-effectiveness as strategic and operational reasons for engaging in inter-organizational cooperation. Thereby, the variety of inter-organizational cooperation differs as much as the variety of different business models inherent to these collaborations. Table 2 represents the variety of different types of cooperation, followed by an overview on common business model types applicable to business networks.
<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hierarchical Relations</td>
<td>Through acquisition or merger, one firm takes full control of another’s assets and coordinates actions by the ownership rights mechanism.</td>
</tr>
<tr>
<td>Joint ventures</td>
<td>Two or more firms create a jointly owned legal organization that serves a limited purpose for its parents, such as R&amp;D or marketing.</td>
</tr>
<tr>
<td>Equity investments</td>
<td>A majority or minority equity holding by one firm through a direct stock purchase of shares in another firm.</td>
</tr>
<tr>
<td>Cooperatives</td>
<td>Coalitions of small enterprises that combine, coordinate, and manage their collective resources.</td>
</tr>
<tr>
<td>R&amp;D Consortia</td>
<td>Inter-firm agreements for research and development collaboration, typically formed in fast-changing technological fields.</td>
</tr>
<tr>
<td>Strategic Cooperative</td>
<td>Contractual business networks based on joint multi-party strategic control, with the partners collaborating over key strategic decisions and sharing responsibilities for performance outcomes.</td>
</tr>
<tr>
<td>Agreements</td>
<td></td>
</tr>
<tr>
<td>Cartel</td>
<td>Large corporations collude to constrain competition by cooperatively controlling production and/or prices within a specific industry.</td>
</tr>
<tr>
<td>Franchising</td>
<td>A franchiser grants a franchisee the use of a brand-name identity within a geographic area, but retains control over pricing, marketing, and standardized service norms.</td>
</tr>
<tr>
<td>Licensing</td>
<td>One company grants another the right to use patented technologies or production processes in return for royalties and fees.</td>
</tr>
<tr>
<td>Subcontractor Networks</td>
<td>Inter-linked firms where a subcontractor negotiates its suppliers’ long-term prices, production runs, and delivery schedules.</td>
</tr>
</tbody>
</table>

Table 2: Varieties of inter-organizational relations (Knoke, 2001)

Given the variety of different industries, companies and forms of business network collaboration, we list the four most common business models, highlighting the role of the business network.
7.1.1. One-time sales model

The traditional and most common business model is the one-time sales model. In this instance, the core offering is priced competitively and sold in return for money or other compensation via different channels. Supplier networks are of particular importance, manufacturing and delivering products and services along the value chain.

<table>
<thead>
<tr>
<th>Key Partners Supplier(s)</th>
<th>Key Activities</th>
<th>Value Proposition</th>
<th>Customer Relationship</th>
<th>Customers Customer Segment(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Product Design and Development</td>
<td>Value Proposition</td>
<td>Hotline, Support center</td>
<td></td>
</tr>
<tr>
<td>Key Resources</td>
<td>Engineers, Sales, IP</td>
<td></td>
<td>Online Channel; Sales force</td>
<td></td>
</tr>
<tr>
<td>Cost Structure</td>
<td>Product Development costs</td>
<td>Marketing and Sales costs</td>
<td>Human Resource costs</td>
<td>Revenue Streams Product Sales</td>
</tr>
</tbody>
</table>

Figure 20: Business model canvas: Generic One-time Sales Model (Weiss, 2013)

7.1.2. Subscription model

Depending on the product, one-time sales models might entail a significant customer initial investment. In turn, the subscription or rental model allows a company to lower the market hurdle of the initial investment and ensure recurring revenue. This way, customers are able to cancel their subscriptions whenever they wish, while they will be more likely to try the product. Overall, the aim of the subscription model is to secure customers on a long term contract so that they are consuming the company’s product or service well into the future. Similarly to the one-time sales model collaboration mainly includes supplier relations along the value chain.
### Key Partners
Supplier(s)

### Key Activities
- Product Design and Development

### Value Proposition
- Value Proposition

### Customer Relationship
- Hotline, Support center

### Customers
- Customer Segment(s)

### Key Resources
- Engineers, Sales, IP

### Key Activities
- Platform Development & Maintenance

### Value Proposition
- Free basic Service

### Customer Relationship
- Network Effects

### Customers
- Large base of free users
- Small base of paying users

### Key Resources
- Platform

### Channels
- Online Channel

### Revenue Streams
- Fee basic services fostering network effects and attracting new users.
- Paid premium services

---

**Figure 21: Business model canvas: Generic subscription model (Weiss, 2013)**

#### 7.1.3. Freemium model

The Freemium model describes a business model, wherein a company gives a core product away for free and sells the premium version. For example, Skype: the company gives away free computer calls and sells voicemail, calls to landlines and other products. This model predominantly entails a network of infrastructure partners, such as cloud infrastructure providers and telecommunication companies.

---

**Figure 22: Business model canvas: Generic freemium model (Weiss, 2013)**
7.1.4. Multisided platform model

Multisided platform models refer to technologies, products or services that create value primarily by enabling direct interactions between two or more customer or participant groups. Prominent examples include Alibaba.com, eBay, connecting buyers and sellers or Airbnb, connecting dwelling owners and renters (see also section 10.2.1). Their strength lies in building a strong business ecosystem around their platform.

<table>
<thead>
<tr>
<th>Key Partners</th>
<th>Key Activities</th>
<th>Value Proposition</th>
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<tr>
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<td>Revenue from Customer Segment #2</td>
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<td>Revenue from Customer Segment #3</td>
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*Figure 23: Business model canvas: Generic multisided platform model (adapted from: Weiss, 2013)*

“Multisided platforms differ from other offerings in a fundamental way. In the traditional value chain, value moves from left to right: To the left of the company is cost; to the right is revenue. In two-sided networks, cost and revenue are both to the left and the right, because the platform has a distinct group of users on each side. The platform incurs costs in serving both groups and can collect revenue from each, although one side is often subsidized” (Eisenmann et al., 2006). Multisided platforms (MSPs) are technologies, products or services that create value primarily by enabling direct interactions between two or more customer or participant groups. Their key strengths lay in continuously enlarging the platform ecosystem by adding new sides and platform functions that might be valuable to the existing sides and therefore create positive synergies (Hagiu, 2013; Gawer & Cusumano, 2012). Figure 24: Figure 24 illustrates the two market sides of a platform, represented by user group one and two.
Overall, the product or service is offered to two or multiple distinct classes of users, e.g. gamers and software developers in the case of video games. It applies that an increase in the number of users on one side of the market creates a rise in the other side (Eisenmann et al., 2006). Section 10.1 will provide a more detailed overview on the peculiarities of multisided platforms.

7.2. Green business model innovation

Sustainable business is not only about producing environmental goods or services. A change towards an environmentally sustainable consciousness requires the integration of novel technologies in a combination of green business models, products and services that may create new industries and markets (Titley, 2008). Against this background, this section introduces the green business model innovation concept.

7.2.1. Key terms and definitions

The following section explains key terms related to green business innovation.

- **Green growth**: To preserve long-term economic growth, it is increasingly important that the green transitions of business practices will be further impelled. Such a transition aims to protect the climate and natural resources, which are the foundation of future growth and existence. Assuming the living standards of today’s population is continuously increasing, new ways of consuming and producing are needed (Henriksen et al., 2012; OECD 2011a). Basically, a green economy guarantees that future generations won’t be exposed to environmental risks, ecological scarcities and ensures low carbon emissions and resource efficiency (UNEP, 2011). Correspondingly, the OECD (2011a) considers green growth as the maximization of economic growth without unsustainable pressure on quality and quantity of natural resources.
Thereby, eco industries embrace all firms, which are producing or providing goods and services that are made to protect the environment, including clean technologies, renewable energy, waste recycling, ecological renovation and natural protection (Henriksen et al., 2012). In turn, eco innovation includes all activities that create goods and services, which help to measure, prevent, limit or minimize environmental (Henriksen et al., 2012; OECD, 2011a). Finally, natural sustainability includes all resources humans need for their well-being and survival, either directly or indirectly over the natural environment. Sustainability creates and maintains the nature in that condition humans need it for their survival and fulfills the present and future generations’ requirements (EPA, 2009).

- **Green business model**: Green business models are considered as “business models, which support the development of products and services (systems) with environmental benefits, reduce resource use/waste and which are economical viable. These business models have a lower environmental impact than traditional business models.” (Henriksen 2012, p. 40). More generally, green business models focus on the optimization of production management, innovative business strategies and business relations to reduce energy consumption, resource use or waste. Thus, they create an economic benefit for supplier and customers, which includes a win-win situation (FORA, 2009). FORA (2009, p.6) specify the product service systems as one of such green business models and explain them as follows: “Product Service Systems cover business models that are developed to provide the customer with a mix of products and services that are tailored for the customer’s needs”. Green business models are therefore describing similar propositions as regular business models with an additional value proposition for the society, namely the lower environmental impact.

- **Green business model innovation**: Throughout academic literature, there is yet no established definition of green business model innovation. Overall, the concept may be considered as a way to create positive environmental impacts, more innovation and financial benefit. Bisgaard et al. (2012., p. 22) determine “green business model innovation is when a business changes part(s) of its business model and thereby both captures economic value and reduces the ecological footprint in a life-cycle perspective. Generally, it can be said that (1) the more parts of a business model which are changed and have a green effect, and (2) the more profoundly a green change is taking place within the individual parts of the business model – going from modification, redesign, alternatives, to creation – the greener the business model innovation is and the higher potential for creating radical eco-innovation”. Thus, the main question is how the impact can be lowered, while making profits. Frey & Wunder (2012) as well as Nidumolu et al. (2009) argue that there are five steps to sustainability. The legal environment forces businesses to follow ecological
standards, which could be exceeded before greening the value chain (Level 1 & 2). The public demand is driving a green product and service innovation (Level 3). The “ecopreneurship” is explained as a green business model innovation and the creation of new markets (Level 4 & 5).

7.2.2. Different types of green business model innovation
Green business model-innovation includes a variety of possible changes within the business landscape and the value chain of corporates (Beltramello, 2013). Bisgaard et al. (2012) differentiated between two main models: incentive models and life cycle models. Incentive models include ways of giving firms and consumer’s incentives to reduce their consumption in energy, water, materials, chemicals and others. Life cycle models, in turn, include business innovations, which imply the re-usage of materials (cradle to cradle-method), symbiosis industry solutions, green supply chain and others.

Beltramello et al. (2013) differentiate between incremental innovations, such as eco-efficiency improvement, and radical or systematic changes. There is different product-service systems or incentives models like for example energy-service companies. Another group of green business model innovation is centered on ICT applications. These ICT solution based models offer services to control the energy and resource consumption and the installation of smart grids in combination with cloud computing.

7.2.3. Drivers of green business model innovation
“One of the most important drivers for companies to initiate green business model innovation is increased consumer awareness towards sustainability” (Bisgaard et al., 2012, p. 7). An additional driver relates to a favourable market environment. Public policies and the rising awareness are helping to convince businesses. Furthermore, rising energy prices and competitive markets drives some industries to increase their green innovation activities. Since the public interest in climate change and resource efficiency increased also the capital markets gained interest in green investments. Nowadays, the environmental sustainable market is considered to be mainstream (Titley, 2008). Therefore, it could be argued that if the public awareness raises, financial investments would automatically increase and one of the major issues would be resolved. However, for the mainstream population’s preferences, it cannot certainly be said that consumers are willing to pay a higher price for a greener product but there is a growing segment of consumers prioritizing sustainable products (Titley, 2008).

7.2.4. Barriers to green business model innovation
Nidumolu et al. (2009) believe there is no way around a sustainable development in the international environment. They mention that both organizational and technological innovation yields returns, also from decreasing costs. Controversially, they state that managers often have the belief that the more environmental friendly
they produce, the higher are their costs and the investment would not deliver immediately financial benefits. Bisgaard et al. (2012) add that the recycling and reusing systems also require new infrastructures, which are costly in development and implementation. The belief that cost from new equipment for production, green inputs from suppliers and the not willingness to pay more from the consumer side causes the need to change the regulatory side from a governmental perspective to force the change.

Nilsson & Andersen (2012) analyzed green business model innovation in the tourism sector. They argued that if businesses would add a green fee to the price of a service, customers tend to be not willing to pay for such a sustainability fee. Therefore, they suggest that the green business model innovation should be driven with business to business activities. In turn, Beltramello et al. (2013) underline the complexity of gaining access to financing a green business model innovation. Especially riskier and more radical innovative business model changes face a financing problem. Hereby a policy change is necessary to enhance access to finance. Within eco-innovation Beltramello et al. (2013) see specific market failures, which limit the access to finance.

Besides high costs and limited access to financials another important barrier for companies to move towards a greener production is the lack of knowledge of the employee throughout the entire value chain. It could be, that employee are not aware of what kind of materials they are using in their production process or which materials would be create a more sustainable product (Bisgaard, 2012). Eco-innovations are mostly a result from multidisciplinary cooperation. Beltramello et al. (2013) found out, that skill shortages in business model innovation, such as efficiency optimization by the ICT sector, in different case studies was mentioned as a barrier for innovation.

7.2.5. ICT as enabler for green business model innovation

For a green development and green business model innovation, it is important that infrastructure and supporting technologies are available. ICT technologies have potential in enabling new technologies without containing a too radical innovation and complexity, to minimize inconveniences of customers and maximize the efficiency of any kind of system. Because of this ability green business model innovation becomes more interesting for the ICT industry. In addition, “Green IT” technologies were seen as the most important strategic technology in 2008 (Watson, 2010). Service oriented business models, like these, which optimize the energy consumptions are dependent on ICT technologies that regulate and control the energy consumption of households and industries (EPA, 2009). Watson et al. (2010) propose that the information systems should create a new market called energy informatics, which aim to reduce energy consumption, thus reduce emissions. Such energy informatics can help the supply side and demand side with increasing
efficiency. Some of the suppliers are also interested in an improved consumer demand management, such as the electricity industry. Watson et al. (2013) differentiates between flow networks, sensor networks and sensitized objects. The flow networks include systems, which improve the flow of a continuous good, such as water, electricity, oil or gas, or a discrete object, such as packages, container or people. The sensor network measures the environmental condition of a good, like the direct pollution and air composition or temperature. A sensitized object is a physical good, where as the owner has the capability to sense and report data. Watson et al. (2010) summarize important functions of information systems as follows:

- Collect data from the sensor network and feed them into flow optimization algorithms,
- Transmit data to automated controllers in the flow network to dynamically change a network based on the output of the optimization algorithms,
- Supply information to flow network managers so they can manage and monitor their networks,
- Supply information to consumers about the consumption of resources within their control,
- Manage supply and demand to minimize usage and avoid adding high cost resources to meet peak demand,
- Enable consumers to automate or control object usage to reduce energy consumption,
- Supply comparative information to suppliers and consumers so they can benchmark their efforts and set new targets for energy reduction,
- Supply information to governments on flow network performance.
8. Requirements elicitation

This section analyses the peculiarities of the water sector and its business models in order to identify the requirements placed on green business model innovation in the water sector. It starts with a detailed PESTEL analysis, followed by an analysis of the peculiarities of European water utility business models and an overview on current business model transformation in the energy sector.

8.1. Characteristics of the European water sector

To get an understanding about the water sector this chapter introduces the industry. This section is used as a tool of promotion creativity, which aims to strengthen the intuition or a systematic-analytical process (Wirtz, 2013). For this procedure the PESTEL analysis serves as a part of a systematic-analytical process to define key requirements for a business model. The PESTEL analysis aims to analyze macro-environmental factors. One assumption of the framework is that an organization or management solution is better to understand with having relevant business environment background information (Bucherer, 2010; Wirtz, 2013). Hereby the business environment is all relevant physical and social factors outside of a firm which are considered to be decision-making relevant. The PPESTEL analysis gives the reader a “satellite view” of the position of an organization, an industry or the viability of a management solution within a business environment (Peng & Nunes, 2007).

8.1.1. Political factors

Water refers to a resource, which describes a basic need to live. Water is a critical resource in that sense that it faces health and shortage issues. In poorer countries people have to fight with water associated illness. Such diseases are among to the most common causes of death. The World Health Organization estimates the numbers of death associated with water. Mostly, because of the low quality and diseases transferred over the contaminated water. Their estimation states over 5000 death a day are caused by diarrheal diseases. Mostly the children are affected. In 2002 65% of people in Asia, 27% in Africa, 6% in Latin America and 2% in Europe were not served by water supply (WWDR 1, 2003). Since 2010 the UN declared having access to clean water as a human right. Water is therefore different to a commodity, also because of the following targeted restrictions. They declare that 50 to 100 liters is a minimum requirement to fulfill daily basic needs. There shall be water in reach of maximum 1000 meter and the collection time under 30 minutes (UN, 2010). Furthermore, the water costs shall not exceed 3% of household income (UNDP, 2010). Water, seen different can be defined as public and as private good. On the one side it needs to be available to everyone, on the other side one can buy it as a private good. Furthermore, it appears the question about the differentiation of fresh water, the sanitation and treatment (OECD, 2009). Water scarcity is however a big issue of the future. The WWDR (2009) is
forecasting that in 2030 47% of the world population is living in regions of high water stress. 67% might still not be connected to public sewerage systems. This water crisis has different drivers. One of them is the demographic development and another is the climatic change (WWDR 3, 2009). Water shortages can cause conflicts, which might appear locally but generate challenges for sustaining peace and security (WWDR 4, 2012).

Water is essentially a local issue. The water crisis in OECD countries is largely a governance crisis with many different stakeholders involved. On municipal, state, national and international level the challenges for managing policy interdependencies and governmental differences are tremendous. The water sector is characterized by hyper-fragmentation of roles and responsibilities, low financial and technical capacity, asymmetric information, poor regulations, institutional and integrity frameworks. To overcome the issue of this fragmented market robust policies are needed. The creation of such policies seems to be a complicated act, since private and public market players have different targets and interests. Ideal governance, which would manage quality and pricing in the interest of the public, is a major concern to establish (OECD, 2011b). The water sector is largely financed through the 3T’s, tariffs, taxes and transfers. The tariffs, which are paid by all users per amount of consumption, often provide the major share to cover the water services costs. Two objectives are most important. The financial sustainability of the water service provider and the affordability of water consumption for the low-income households have to be ensured. The result is unfortunately often underfinanced services, lower than needed to cover investments and maintenance. Low tariffs prevent the extension or development of water services (OECD, 2009). Until 2009, in the OECD countries’ water sector, some noticeable changes were observed. First, the increase of real prices of water services is a recent trend in OECD countries. This could signal an increasing importance of tariffs in the cost recovery. Second, the use of block-tariffs or flat-fee systems in household models is a decreasing phenomenon. The two sided tariff model with fixed charge for the connection, a variable fee for the amount of usage and an increasing block volumetric component is instead up-coming. Third, besides tariffs also taxes are more applied upon water bills. Forth, the charges for drink water consumption and the wastewater treatment are more often separated. Increasing wastewater charges are based on higher costs. Last, many countries tried to engage the private sector in operating, modernizing or expanding the water sanitation infrastructure. Both, public and private models can work and both have negative experiences at the same time. However, the debate has nowadays shifted from ownership discussions towards safety, efficiency, effectively and sustainable water sanitation services. Private institutions tend to not be willing to investigate in such a commitment. Creating a policy to harness the private sector capabilities is difficult in the making. Governments, despite of the emerging privatization of the sector, are still not relieved in maintaining the safety, efficiency or
prevent monopoly generation. In some European countries, like France, the public is rethinking the private engagement in water services (OECD, 2009).

8.1.2. Economic factors

The economic nature has to be respected when creating new water policies to ensure effectiveness, benefit perception and the willingness to pay for the services by final users. In combination with economics, it is important to distinguish two services. The first are services, which benefit the direct user with the supply of water. Secondly, wastewater treatment creates positive externalities beyond the actual user. While consuming, the water is seen as consuming a private good, it appears the question whether wastewater can be defined as a public good. Within this model the networked services can be seen as a club good and the groundwater as a common good (OECD, 2009). This categorization brings the analysis to a pricing question. A private good might be charged to the direct consumer but public goods might be charged equally to every user. The club good, should be maintained and could therefore also be financed by the public (OECD, 2009). Another specific characteristic of the water sector is the cost structure. Rogers (1996) divided the costs into three parts, supply costs, economic costs and the full costs. First, operation and maintenance costs are those associated with the costs for the daily supply system. Costs are typically including the raw water, electricity for the pumps, labor, repair and managing costs of the distribution and operating plants. The capital costs are for the renewal investments. Second, the economic costs are the sum of the supply costs plus the opportunity costs and all economic externalities. The full costs add externalities to public health and ecosystems (Rogers, 1996). Over the OECD countries the average costs have been expressed as percentage. The networks carry an average cost fraction of 85% and the treatment 15% out of the total costs (OECD, 2009).

Regarding the distribution of water and the waste water treatment are these usually natural monopolies. The fixed costs from distribution account for about 70% of the total costs for domestic customers. Furthermore, the transportation of water is relatively expensive with 50% of wholesale costs compared to 5% in the electricity sector and 2.5% in the gas sector. European member states started the discussion how to outline the sector more transparent and competitive. Looking at the competition, in the past many antitrust, state aid and merger cases were remarkable. Public procurement rules and public private partnerships were seen as good solutions for implementation. With a public private partnership the preliminarily vertical integrated operators could be changed. Authorities have traditionally carried out public service obligations on operators, such provisions to ensure the quality requirements will be in everyone’s interest to maintain. Therefore, it is unlikely that liberalization would result with benefits like other network industries. The two reasons were mentioned earlier already, the high network maintenance costs and the connected difficulty to supply from distant sources. The mentioned quality issue would be a problem for a third party access to the
network. As explained earlier the distribution and waste water collection are natural monopolies. But the supply of water is not. Large water, commercial, consumers could be supplied by local or neighboring operators. Another possibility is to self-supply or consume from neighbors self-supply installments (Gee, 2004).

In 2010 the European water market turnover in technological products accounts for 95 € billions and has a higher turnover than the gas sector. The products include filtration, disinfection, purification, desalination and membrane technologies. That is an estimated 33% of the world’s market share. The EU was accommodating the five largest utilities in the world: Suez, Veolia, SAUR, Agbar and RWE. These firms account for 70% of the total market (EPEC, 2011). Large scale established producers of water and waste water technologies, also in combination of the risk-averse constellation of the water utilities, are also a big barrier to entry the market for external firms (EPEC, 2011). Until 2010 the ownership structure in the European market of private market companies became more concentrated. The big multinationals as Veolia or Suez are dominating the market of water services. A big issue with private companies offering water services is that nearly all active international water firms have a similar strategy. They are trying to avoid concessions or leases involving higher investments or long-term commitments. These water service providers prefer short-term management and advisory contracts. The treatment plants are usually on a BOT (build-operate-transfer) strategy model (Hall & Lobina, 2010). After the privatization failed many terminated contracts were reported within the EU (OECD, 2009b).

8.1.3. Social factors

There appears a discussion whether water is a public or an economic good. A main challenge of developing a competitive and economical reasonable environment is that water still stays a key requisite for human but also economic development. A consequence of mismanagement or poor investments are low water quality and accessibility (OECD 2009). Thinking about Europe, we can say, nearly everyone has got flawless water access. It still has to be reminded that water as a basic need has to stay accessible and therefore affordable for everyone. This is also a challenge for pricing water. Behavioral factors are also relevant for a complete analysis. Randolph & Troy (2008) concluded that pricing of water in Australia is unlikely to be an effective method of managing water. An issue is that only few users knew how much water costs and how high their consumption is. A high acceptance in Australia was brought to extra charges for extra high water usage. Social attitudes can act as a barrier for an environmental responsible behavior. Publicity work can help to raise public awareness. The problematic is often that consumers are aware of the fact that water consumption should be more responsible. But they are reasoning that they themselves couldn’t improve and rather others than themselves act irresponsible (Randolph & Troy, 2008).
Another driver for higher water demand and water shortages in the future is demographic. The global population is growing by about 80 million people a year. This brings an additional fresh water demand of 64 billion cubic meters a year. Until 2050 the population is estimated to be at 3 billion higher and 90% of those are in developing countries, where access to safe drinking water is limited and water stress appears. Migration is another factor, which will be most urgent in coastal areas with 18 out of the largest megacities worldwide. The urbanization rate in developed countries is much lower and sometimes even declining. Also the increase in life expectancy is putting pressure on water demand (WWDR 3, 2009).

8.1.4. Technological factors

Some of the leading water service firms were acquiring many technology companies in the past years. Throughout this process they built up capabilities across the diverse applications. The European technology advance in water services is world leading and maturing. The rate of innovation is rated being incremental. A market driver for fast innovation processes in this sector are the besides others the implementation of stringent regulations and also the overall energy saving need. The innovative focus is therefore on water production with higher water quality as output to lower energy consumption (EPEC, 2011).

The report of EPEC (2011) compared three technology groups in the water services sector. They describe the filtration and disinfection for three water and wastewater treatment classifications. The desalination plants are mainly needed overseas and have the purpose to treat seawater in water stressed areas. Spain is mentioned as the 13th largest desalination technology user. Furthermore, Global Water Intelligence foresees a tripling of water re-use capacity between 2008 and 2016 and a doubling of the capacity in desalination plants (OECD, 2009b). European utility producers are however large technology exporters also in this sector. Water monitoring technologies are used to test the water quality and the percentage compounds (EPEC, 2011).

The smart meter technology is already under discussion in the energy market. Smart meters are a technology for metering and communication. It would allow a more efficient consumption control of consumers and automatically track the consumption. The results could be reported online for less usage and costs savings. There are further advantages in leaking detection and automated billing on the utility side (Smart meter initiative, 2012). In the electricity sector a primary objective is to level up the responsiveness of consumers to electricity market conditions. They can help consumers to reduce their usage when the supply is tight and the prices are eventually higher. A reimbursement strategy for lower usage is an optional strategy for motivational purposes. In most countries of the OECD large electricity consumers make use of smart metering in the electricity sector. The 3rd liberalization package of the EU set as goal to achieve 80% of households being connected to a smart meter network by 2020.
Thereby, a challenge is the high costs of smart metering. It is estimated that to replace all 47 million gas and electricity meters in the UK, an investment of 8.6 billion GBP is needed. Furthermore, the question appears who is responsible to carry these costs and which incentives does an investor have. Therefore, the problem about ownership of smart meters is a topic (OECD, 2010). In Germany the topic smart meters is on the news. Critics warn people about privacy issues. The entity with control over the usage data has a large power and could analyze e.g. how many people are currently at home (Biermann, 2013).

8.1.5. Environmental factors

A big challenge is the world’s climatic change. The current International Panel on Climate Change (IPCC) projects rising temperatures and sea level. The water cycle has been analyzed intensively and floods, droughts and other climatic events are expected to intensifier. Especially coastal regions might be affected. In 1996 until 2005 global inland floods were twice as large as between 1950 and 1980. The very dry regions on Earth have more than doubled since 1970. The World Bank and the United Nations are trying to anticipate the costs of climate change adaption. The Mediterranean ecosystems nowadays are still diverse but also vulnerable to changes in water conditions. With a temperature rise, 60-80% of the species might disappear. In the Arctic region and the Tundra the loss of permafrost and methane release possibility can cause greater warming at the poles. Also mountains see earlier snow melt and decrease in snow fall (WWDR 3, 2009).

8.1.6. Legal factors

The water framework directive was created by the European Union and targets to protect water and its management. Management plans and programs of measure must be established for each body of water. The protection targets mainly inland surface water, groundwater, transitional water and coastal waters. The objectives of the framework are preventing and reducing pollution, promoting sustainable usage of all kinds of water, protect the environment, improve the water ecosystem and mitigate the effects of floods and droughts. Moreover, The European legislation defines the essential water quality standards and seeks harmonization of measures for waste water treatments for all member countries (EU legislation, 2010).

An important law describes the Article 101 of the Antitrust Regulations. This article prohibits agreements and concerted practices which may affect trade and prevent, restrict or distort competition in the European Economic area. The French companies SAUR, Suez and Veolia were accused to coordinate their behavior on the French water and waste water market in line with the Fédération Professionelle des Entreprises de l’Eau. The main point they got blamed for was the prices they invoiced the final consumers. According to Article 101, on the market price discussions are prohibited.
Furthermore, the purpose on privatizing the market was to create competition, which was apparently not realized (EC, 2012).

8.2. Peculiarities of European water utility business models

Public or private water utilities are responsible for providing and developing water supply and sanitation services to their customers. In addition, they are responsibility for developing, modernizing, maintaining and operating their water supply and sanitation infrastructure. Figure 25 summarizes the business model of a public water utility.

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<td>Low interaction, primarily on billing-related issues.</td>
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<td>Tariffs, Taxes, Public transfers</td>
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</table>

Figure 25: Business model canvas of a public water utility

Overall, water utilities both in public, private or public-private ownership provide their customers with reliable water supply in high drinking quality at a “socially acceptable” price. In addition, they provide sustainable sanitation services. Therefore, the key activities contain Water generation and supply, quality control, and Waste water treatment, while ensuring European and national quality standards. Key resources are linked to the right to access water and the distribution network, which include pumping stations and the distribution grid. Moreover, key resources embrace the customer base connected to the local network offers water consumers and consumption data. Traditionally, the customer relationship is based on low interaction between the utility and their customers, primarily on billing-related issues. Water utilities operate a direct
sales channel model. That means the utilities provide their customers water via the public grid. The tariff options may vary from the nature of the customer. The revenue structure is defined by the 3 T’s tariffs, taxes and transfers, while the cost structure primarily contains supply costs, network maintenance, environmental and new investment costs.

However, most water utilities find themselves in a challenging situation from which it is difficult to escape (Spiller and Savedoff, 1999). As illustrated in figure 26 this spiral combines weak performance incentives, low willingness of customers to pay, insufficient tariffs to recover costs, and lack of funding for maintenance, leading to high rehabilitation costs (Baietti et al. 2006, Spiller and Savedoff 1999).

![Crisis spiral](image)

Consequently, a sustainable financing for water supply and sanitation (WSS) systems turns out being a key obstacle to achieving the WSS-related Millennium Development Goals.
8.2.1. Major revenue streams of a water utility

Major revenue streams for operations and maintenance, occasional repairs and replacements, as well as investments in the WSS relate to tariffs, taxes and transfers (3Ts). The 3Ts concept has been developed by the OECD Horizontal water programme, targeted at describing and categorising the three ultimate financial sources of investment for the water sector (OECD, 2010):

- Tariffs refer to user fees or contributions water service providers may charge for providing access to a service (connection charges) and for delivering the service (either a flat charge, a volumetric one, or a combination of both).
- Taxes refer to funds raised by national/regional/local governments through the tax base, which are subsequently diverted to the WSS sector.
- Transfers primarily relate to payments that mainly come from foreign sources, e.g. ODA (official development assistance), but also includes private philanthropic contributions.

Besides taxes and transfers, water supply investments may be financed through internally generated tariffs as well as through debt, such as credits from commercial Banks, international financial institutions such as the World Bank, the European Investment Bank and regional development banks or bonds. Figure 27 summarizes the revenue sources of a water utility in its broader context.

![Figure 27: Strat. financial planning for water supply & sanitation (OECD, 2009)](image-url)
The big five water utility markets (France, Germany, Italy, Spain and the UK) in 2012 are predicted to account for almost $50 billion of CAPEX and OPEX spending in Europe. As such, they are leaders and crucial testing grounds for new technologies and innovative practices. Correspondingly, leakage and non-Revenue Water reduction as well as smart water technologies are of major importance in these markets (Water World, 2015).

8.2.2. Cost structure and water pricing

Water pricing might be a powerful tool to drive water efficiencies, but its effectiveness depends on the level and structure of the tariff system. This indicates passing on the true costs of water services to consumers, which is now recognised necessary to deliver a sustainable water sector. The European Water Framework Directive establishes the full cost recovery principle as a legal obligation across all EU member states, highlighting that water is a social, but at the same time, an economic good. In addition, article 9 of the EU Water Framework Directive (WFD) sets guidelines for establishing water pricing schemes that promote sustainable and efficient water use (Babak, 2002). Figure 28 identifies full economic costs.

---

**Figure 28: Economic full cost recovery (Babak, 2002)**
8.2.3. Impact of water demand reduction on revenue

Water utilities are capital intensive companies with a low share of variable costs and a high share of fixed costs. This indicates that any kind of end-use efficiency has a negative effect on a utility with an existing asset base, because its costs are not reduced proportionally to the reduction in revenues. Consequently, utilities tend to focus on maintaining - and potentially increasing - water throughput in order to secure profit margins. The following section explains the impact of water demand reduction on the water utility’s revenue in more detail (AWWA, 1996):

- **Variable costs**: Variable costs relate to those costs that vary directly with the amount of water delivered. They directly change with the changes in the volume of water produced. Costs that do not vary with the level of supplied water are fixed costs.

- **Fixed costs as major utility costs**: In the water industry, variable costs represent a relatively small percentage of the total costs of operations. For most utilities, fixed costs by far exceed their variable costs for utilities, particularly when debt service payments and other capital expenditures are included in the calculation. In the typical water utility, variable costs consist of the costs of chemicals used in treatment and distribution, energy costs associated with pumping and treatment processes, sludge disposal costs and some components of maintenance expenses, e.g. the replacement of filter-bed material. Fixed costs, in turn, include labour, billing and meter reading, transportation, insurance, rent, contracts, employee benefits, repair of equipment, maintenance of the infrastructure etc. Overall, the sum of variable and fix costs is the total cost of providing water, which utilities must ultimately recover from various revenue sources, primarily water tariffs, in order to avoid financial losses.

- **Effects of demand reduction**: In the short run, demand reduction usually leads to reduced water sales and in turn, for lost utility returns. Although demand reduction also reduces the costs of supplying water, these cost reductions are normally considerably less than what is needed to offset lost revenues. The variable cost component is affected by demand reduction. As water production decreases, the variable costs, such as energy, chemicals and purchased water, are reduced. In the short run, fixed costs are not affected by reduced production. However, fixed costs such as capital facilities or labour costs might change over a longer time period. The cost impact on a utility from reduced demand relates to the marginal cost that is avoided. Thereby, the avoided marginal cost includes both short term costs that are avoided as a result of less chemical usage, lower energy requirements etc. and the long term costs that can be avoided as planned new facilities are deferred or cancelled: As demand for water is reduced, the cost of production is decreased. These lower costs represent marginal cost savings. The magnitude of the impact is determined by
how the demand reduction affects a utility’s peaking characteristics compared to its average level of consumption:

- **Potential for cost savings:** In the short run, demand reduction that affects peaking may generate larger cost savings than a reduction that affects only the average level of production. A demand reduction that decreases maximum-hour or maximum-month production may generate more savings than that one that decreases the average-hour or average-month level. One option is to charge more for peak-month usage than for non-peak usage. Thus, reducing peak usage will generate greater savings than reducing average usage. Additionally, reduced peaking can mean greater cost savings for utilities that meet peak summer demand by producing supplemental water from a source more expensive than the normal supply. In the long run, peak savings may be greater than average savings. Peak-hour and peak-day demand are important factors used by many utilities in sizing treatment and distribution facilities. Thus, reducing peak-day demand may allow utilities to downsize or delay construction of planned treatment facilities, thus, providing lower long-term marginal costs.

- **Water tariff adjustments:** Reduction in water demand clearly affects the costs incurred by water utilities. Similarly, most utilities experience an effect on revenue streams as water consumption decreases. Only, where water revenues are not based on the amount of water consumed are revenues not affected by reduced demand. Examples relate to unmetered communities with fixed monthly charges. The responses to reduced revenues may include rate adjustments, budget (cost reductions) beyond those attributed to the reduced consumption, or use of reserves to absorb the revenue losses. However, reduced revenue can be recovered in subsequent periods through rate adjustments, although there may be constraints on this recovery, e.g. limitations set by the regulatory agencies. Importantly, increasing rates may further limit demand: As rates increase, it is likely that higher rates will cause water demand to decrease even further. How much depends on the price elasticity of demand.
8.3. Emerging business models in the energy sector

Throughout the past years, the energy sector has faced severe transformation. Long-standing electric utility business models have become outdated in light of new technologies, policy changes and more demanding consumers. Roles along the value chain have shifted, with traditional buyers gaining a foothold as value providers. Whereas the traditional electricity value chain consisted of the generation-transmission-distribution-retail pathway from energy source to end use, the introduction of smart grid technologies enabled new participants and business models (Valocchi et al., 2010). Figure 29 represents the traditional electricity value chain.

Figure 29: Traditional electricity value chain (Valocchi et al., 2010)

Correspondingly, the traditional business model in the energy sector was primarily focused on fulfilling energy needs at low costs. Figure 30 summarizes the business model of a traditional utility in the energy sector.

![Figure 30: Traditional business model in the energy sector](image-url)
As indicated before, the tremendous transformations of the energy sector shifted roles along the supply chain, with strong implications on the traditional utility business model. Formerly linear business models turned into networked business models, resulting in high importance of big data, multisided platforms and network collaborations. To give an example: Energy companies such as the German green energy provider “Lichtblick” have turned their traditional business model into a two-sided platform business model by collaborating with Volkswagen.

**The Future of Energy: A Power Station in Your Basement**

By Frank Dohmen

Green-energy provider Lichtblick and German automaker Volkswagen are joining forces and promising to stir up the energy market with an unusual plan. Instead of relying on massive energy facilities, the average consumer may soon have a miniature power station in their basement.

**Figure 31: Lichtblick’s power station (Der Spiegel, 2009)**

By providing a power station to their customers, they are now able to address two different target groups: Energy consumers and private energy suppliers (e.g. homebuilder associations, homeowners) who are willing to install the power station in their basement. In result, Lichtblick AG is able to generate and supply energy to their customers. Figure 32 describes the concept in more detail:
The changing role of the utility from an energy generator supplier to a platform provider is highlighted in Figure 33, followed by the business model canvas, describing Lichtblick’s business model in Figure 34.

Figure 32: How Lichtblick’s power station works (Der Spiegel, 2009)

Figure 33: Explanation - Lichtblick AG as a two-sided platform
Key Partners
Volkswagen to build the power station (natural-gas-powered engine used in some Volkswagen Golf models) with high efficiency factor (92%)

Key Activities
Power generation and distribution
Demand management
Mediation of supply and demand

Key Resources
- Control over the power station
- Access to consumption and demand data

Value Proposition
Decentralized, flexible power & heat generation
Green-electricity
Cost reduction (pay less)

Customer Relationship
Hotline/Call center

Channels
Direct Sales over public grid
Own Web page
VW channels

Cost Structure
Power station costs
Repair and maintenance costs
Technicians & Labour costs

Revenue Streams
Energy tariffs (usage based)
all-inclusive fee of €5,000

Figure 34: Business model canvas: Lichtblick AG

Overall, we consider the trend towards two- or multisided business models in the energy sector highly important for the water sector.

8.4. Requirements placed on green BMI in the water sector

The PESTEL analysis has shown that the water sector is a critical industry. Politicians are challenged to maintain a high living standard for everyone and regulations are hard to implement to satisfy all interests perfectly. Worldwide the basic need of water access is a recent topic. Within the European Union more governance issues appear about ownership and the control of water. The move from privatization in the early 21st century is partly returning towards state controlled water management to ensure the quality and fairness of water services for the public. The cost fragmentation is hereby a major issue, which needs to be financed sufficiently. The smart meter debate, which is more advanced in the energy sector, combines efficiency improvement interests, privacy and investment options issues.

There are several issues, which need to be considered when defining the requirements to business model innovation in the water sector. One major issue is the cost factor. The new investments and maintenance costs are enormous and both, the public as private
sector, have shown to have troubles to keep the system on a high level. Therefore, the financial sustainability of the water sector has to be improved balancing underfinanced services. One problem concerning the high costs is the affordability of the water for the public. The water service has to reach all of us as a basic need. A fair pricing model needs to be maintained while improving the network infrastructure. Smart meter technology offers the opportunity to improve the safety and efficiency of water services. The related challenge, however, relates to the high costs of smart metering and who will pay for it.

In result, business model innovation in the water sector is required to:

- Target the financial sustainability of the water service provider, while ensuring the affordability of water consumption for the low-income households,
- Break the spiral of weak performance incentives, low willingness of customers to pay, insufficient tariffs to recover costs, and lack of funding for maintenance, leading to high rehabilitation costs,
- Cover revenue losses through water demand reduction in the short run and unlock the potential for cost savings through peak reduction over a longer time period,
- Empower and incentivize water consumers in their demand of a sustainable lifestyle that combines reducing an individual’s use of natural resources and personal resources.

Correspondingly, we phrase the business model challenge as follows: “How could iWidge support water utilities in becoming a local driver of water saving, while enabling them to compensate the revenue loss occurring through sustainable consumption behavior?”
9. Designing the iWidget Water Service Platform

In the sequel, we will design the iWidget water service platform by applying the multisided platform pattern provided by the St. Gallen Business Model Navigator (www.bmi-lab.ch): “A multisided / multisided market facilitates interactions between multiple interdependent groups of customers. The value of the platform increases as more groups or as more individual members of each group are using it. The two sides usually come from disparate groups, e.g., businesses and private interest groups”.

9.1. Business model idea

The basic idea of the iWidget water service platform relates to decoupling revenues from throughput and establishing additional revenue sources. Figure 35 briefly summarizes the idea described below in more detail.

![Figure 35: Business model idea](image)

We envision iWidget Ltd. (private limited company) as two- or multisided platform business that operates the “iWidget water service platform”. That company is targeting both water utilities and water consumers.
On the one side, the iWidget service platform provides (near) real-time analytics to water utilities, enabling them to gain visibility into actual network inflow, total metered water consumption, total metered water consumption per customer type and associated energy consumption. Advanced analytics helps water utilities to sustainably manage water demand in their region and to reduce their water and water related energy costs, while reducing their financial risks caused by an aging infrastructure. In particular, the iWidget water service platform supports water utilities in:

- Improving and enhancing their system operation and maintenance,
- Managing apparent and real water losses, and reducing energy costs,
- Encouraging their water customers to save water,
- Unlocking new service revenue streams to improve the utility’s profitability.

On the other side, iWidget attracts water consumers by providing them with services that help them to make their lifestyles more sustainable, while reducing their water and water-related energy costs. In particular, water consumers are enabled to:

- Understand and control their water and water related energy consumption and improve water saving behavior patterns,
- Detect leakages in their household,
- Compare their water use to others, neighbors and friends,
- Find advice on how to increase their water use efficiency,
- Benefit from a large number of complementary water services funded or co-funded by their utility to help them save water.

These complementary water services that move beyond the iWidget service portfolio are provided by a partner ecosystem that is loosely connected to the iWidget water service platform.
service platform and managed by the iWidget Ltd. company. An example of complementary water services might embrace smart washing machines or dish washers to rent that water consumers might rent via the iWidget service platform. This way, water consumers would not need to invest in a new washing machine or dish washer, but could rent a less expensive smart household appliance for a monthly fee, which even might be subsidized by the local water utility in order to a) gain access to water consumption data and b) support their customer’s water saving behaviour. We could even consider venture capitalists becoming part of the ecosystem. Water insurances could integrate ads or banners to the water consumers’ accounts (without purchasing consumption data), subsidizing basic iWidget services so that they could be given for free to water consumers, while premium services would require a monthly usage fee.

9.2. Business model design options

Based on the business model idea described in section 9.1, we first identify different business model design options. In a second step, we further detail one of these options. Then, we will evaluate this option in a qualitative and quantitative manner. Finally, we will discuss the implication of the iWidget Water service platform on a utility’s revenue.

Most fundamentally, we envision iWidget Ltd., being a private limited company (Ltd.) that operates the iWidget in the “Cloud”. The term “Cloud” or “Cloud Computing” involves “deploying groups of remote servers and software networks that allow centralized data storage and online access to computer services or resources” (Wikipedia, 2015 - Cloud_computing).

iWidget as a two- or multisided platform could be considered at least in three variations:

- iWidget as a two-sided platform, addressing water utilities and householders;
- iWidget as a multisided platform, addressing water utilities, householders and external developers to complement the service offerings;
- iWidget as a multisided platform, addressing water utilities, householders and market research organizations, paying for consumer data.

Variations among these options may vary, e.g. one option might also include the integration of advertisers who would cross-finance householder services to be offered for free to householders in order to drive adoption of iWidget platform services. In the sequel, each platform variation is briefly sketched.
9.2.1. iWidget as two-sided platform

In this business model variation, we envision iWidget Ltd. to target two different user groups. In the case of iWidget, these are Water utilities and householders. On the one side, iWidget Ltd. is offering iWidget water utility services to Water utilities and is receiving monthly subscription fees as revenue. In addition, iWidget is providing Water utilities with a product and service portfolio of complementing water services delivered by the iWidget product and service suppliers. Out of that product and service portfolio Water utilities may choose dedicated products or services, which they might fund or co-fund in order to incentivize their customers to adopt iWidget’s water consumer services. On the other side, iWidget Ltd. is offering iWidget water consumer services to private householders. Whereas basic services may be free of charge, premium services embrace a monthly usage fee or might be subsidized by the Water utility to be free of charge for Water consumers. Important precondition to benefit from iWidget water consumer services is the installation of smart water meters to enable the iWidget system to run dedicated consumption analysis and provide recommendations of saving water at the household’s level. It applies that the more customers of a certain water utility install smart meters and use iWidget water consumer services, the more valuable the iWidget water platform becomes to Water utilities as they gain better access to consumer data and more reliable consumption data, patterns and profiles for their water region. In turn, the more water utilities use the iWidget Water service platform and offer related iWidget partner products and services to their customers, the more commercial business partners are willing to offer their products and services via the iWidget water platform, increasing the variety for choice of complementary products services offered – and therefore, increasing the platform’s attractiveness for Water consumers. As reaction customers might contact and ask their Water utility, whether they would also be willing to provide those services they have seen at their friend’s house. This feedback loop would again drive the adoption of the iWidget Water platform. Figure 37 visualizes the value creation architecture of iWidget as two-sided platform.
Figure 37: iWidget as two-sided platform
9.2.2. iWidget as multisided platform, integrating a developer community

In the second option, we find the same situation as described in the first option, but add the third platform user group: Software developers. In order to integrate them, iWidget Ltd. provides a set of open APIs and embeddable widgets to the developer community, enabling them to develop additional water related services (apps/widgets) on top of the iWidget platform. Whereas developers might sell their apps to either water utilities or householders, iWidget Ltd gains a revenue share of each app that is sold to a customer. Figure 38 visualizes the value creation architecture of iWidget as a multisided platform, integrating a developer community.

Figure 38: iWidget as multisided platform, integrating a developer community
9.2.3. iWidget as multisided platform, integrating marketers and advertisers

In the third option, we again find the basic setting as described in the first option. However, instead of adding developers as third user group to the platform, we consider marketers / advertisers as third user group, who are interested in a) gaining access to consumer behavior data or b) would be interested to reach their target audience via the iWidget Water platform. In this case, iWidget Ltd. could fund or co-fund a variety of water-related products and services for householders to drive the adoption of the iWidget Water platform - in exchange for collecting and providing behavioral data and patterns to marketers and advertisers. This would need to become part of the platform’s terms and conditions.

Figure 39: iWidget as multisided platform, integrating marketers and advertisers
9.3. iWidget water service platform

Section 9.2 has highlighted different business model design options that differ from each other in the number and choice of user groups. In order to step further, we develop the business model in the so called network view. While the left blue side entails the partner network, comprising different commercial partners to complement the core iWidget service offering, the right green side depicts different the platform users. Due to privacy reasons, we would recommend to restrain from any business model option, considering advertisement-based or data-selling revenue streams for iWidget. For the reason of completeness, however, we include advertisers, marketers and market research organizations in dotted lines. Figure 40 represents the network view.

![Network view of iWidget as multisided platform](image)

**Figure 40: iWidget as multisided platform (Network view)**

Next, figure 41 represent the business model canvas of iWidget as a multisided platform.
In the sequel, we describe each section of the business model canvas in detail:

- **Customers:** iWidget Ltd. targets Water utilities, Water consumers and software developers as customer segments of the iWidget Water service platform. Due to privacy concerns, we restrain from considering advertisers/marketers and market research institutes as an appropriate customer segment to the iWidget case.

- **Value proposition:** The iWidget water service platform provides three different value propositions to its three customer segments:
  - **Water utilities:** Through advanced analytics iWidget Ltd. helps water utilities to sustainably manage water demand in their region and to reduce their water and water related energy costs, while reducing their financial risks caused by an aging infrastructure. In particular, the iWidget water service platform supports water utilities in:
    - Improving and enhancing their system operation and maintenance,
    - Managing apparent and real water losses, and reducing energy costs,
• Encouraging their water customers to safe water,
• Unlocking new service revenue streams to improve the utility’s profitability.

• **Water consumers:** iWidget Ltd. provides water consumers with advanced sustainability services that help them to make their lifestyles more sustainable, while reducing their water and water-related energy costs. In particular, water consumers are enabled to:
  • Understand and control their water and water related energy consumption and improve water saving behaviour patterns,
  • Detect leakages in their household,
  • Compare their water use to others, neighbours and friends,
  • Find advice on how to increase their water use efficiency,
  • Benefit from a large number of complementary water services funded or co-funded by their utility to help them save water.

• **App developer:** iWidget Ltd. provides a set of open APIs to its developer community, enabling them to a) access supply and consumption data in the iWidget database and b) complement core iWidget software services (widgets) and selling them via the platform to water consumers and water utilities. This way, app developers can unlock an additional revenue stream for their business.

**Channels:** iWidget water services are sold online via the iWidget water service platform, marketed through online marketing programs. Partner sales channel will link to the support iWidget water service platform.

**Customer Relationship:** The company’s interaction with customers is reduced to automated self-services, enabling customers to consume order and pay services online.

**Revenue streams:** Revenues come from four key revenue streams:
  • Monthly service fees from utilities,
  • Monthly premium services fees from water consumers,
  • Revenue shares from app developers,
  • Referral fees from partners, who benefit from new purchases.

**Key partners:** The platform’s ecosystem embraces six partner types, complementing the platform’s value proposition:
  • **Manufacturers,** embracing manufacturers of smart household appliances as well as manufacturers of smart meters, offering smart meters and household appliances for rent or at a reduced price,
  • **Service providers,** such as craftsmen to install smart meters, paying referral fees to iWidget Ltd. once a contract is signed.
Consultants, advising water consumers and water utilities upon demand, while paying referral fees to iWidget Ltd. once a contract is signed.

Insurance companies, offering water consumers water insurances for a reduced price, while paying referral fees to iWidget Ltd. once a contract is signed.

Investors, investing in the iWidget water service platform, while gaining shares.

Infrastructure providers, such as Telecommunication companies and Cloud infrastructure providers, delivering the underlying infrastructure for the platform.

Water authorities, gaining access to detailed sustainability dashboards that enable them to directly govern the water utility, while initiating, influencing and controlling water saving initiatives.

- **Key activities:** Primary company activities embrace platform development in order to continuously innovate the platform’s service portfolio; data collection and analytics as well as Ecosystem management to attract partners to the iWidget water service platform.

- **Key resources:** Key resources embrace the company’s exclusive access to Water consumption data & behaviour as well as the business ecosystem. Both resources represent a major competitive advantage in any platform business.
9.4. Financial viability of the iWidget Water Service Platform

This section answers the question, whether the iWidget water service platform might be profitable for a company like iWidget Ltd. Therefore, we run a quantitative analysis as described in the general business case framework developed in Part A of this document.

9.4.1. Key assumptions on platform adoption

The following qualitative analysis bases upon certain assumptions to develop a worst, a realistic and a best case scenario. These scenarios help potential venture capitalists whether to invest in a venture like iWidget or not.

**Target market and size:** The iWidget water service platform is targeting European water utilities of every size. As we lack the exact number of European water utilities, we estimated the number of 2000 plus utilities according to the number of European cities and towns with more than 20,000 inhabitants. The numbers below base on the numbers provided under: http://www.citypopulation.de/Europe.html.

<table>
<thead>
<tr>
<th>Country</th>
<th>Cities</th>
<th>Includes cities and towns with more than:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>26</td>
<td>20,000 inhabitants</td>
</tr>
<tr>
<td>Belgium</td>
<td>145</td>
<td>20,000 inhabitants</td>
</tr>
<tr>
<td>Denmark</td>
<td>33</td>
<td>20,000 inhabitants</td>
</tr>
<tr>
<td>Finland</td>
<td>58</td>
<td>20,000 inhabitants</td>
</tr>
<tr>
<td>France</td>
<td>50</td>
<td>100,000 inhabitants</td>
</tr>
<tr>
<td>Germany</td>
<td>675</td>
<td>20,000 inhabitants</td>
</tr>
<tr>
<td>GB</td>
<td>193</td>
<td>50,000 inhabitants</td>
</tr>
<tr>
<td>Greece</td>
<td>53</td>
<td>20,000 inhabitants</td>
</tr>
<tr>
<td>Ireland</td>
<td>16</td>
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<td>Italy</td>
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<td>Netherlands</td>
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<td>Poland</td>
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<td>Spain</td>
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<td>Sweden</td>
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<tr>
<td>Switzerland</td>
<td>43</td>
<td>20,000 inhabitants</td>
</tr>
<tr>
<td>Sum:</td>
<td>2008</td>
<td></td>
</tr>
</tbody>
</table>

Table 3: Assumed market size
**Platform adoption:** In order to calculate the business case we assume the following adoption rates for the different case scenarios:

<table>
<thead>
<tr>
<th>Pricing</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water utilities</td>
<td>20</td>
<td>50</td>
<td>300</td>
</tr>
<tr>
<td>Water consumers</td>
<td>5</td>
<td>2500</td>
<td>15000</td>
</tr>
<tr>
<td>3rd party apps</td>
<td></td>
<td>10</td>
<td>30</td>
</tr>
</tbody>
</table>

Table 4: Assumptions on platform adoption – worst case

<table>
<thead>
<tr>
<th>Pricing</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water utilities</td>
<td>20</td>
<td>5000</td>
<td>30000</td>
</tr>
<tr>
<td>Water consumers</td>
<td>50</td>
<td>150</td>
<td>450</td>
</tr>
<tr>
<td>3rd party apps</td>
<td>10</td>
<td>50</td>
<td>150</td>
</tr>
</tbody>
</table>

Table 5: Assumptions on platform adoption – realistic case

<table>
<thead>
<tr>
<th>Pricing</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water utilities</td>
<td>100</td>
<td>300</td>
<td>600</td>
</tr>
<tr>
<td>Water consumers</td>
<td>50</td>
<td>20,000</td>
<td>100,000</td>
</tr>
<tr>
<td>3rd party apps</td>
<td>20</td>
<td>100</td>
<td>300</td>
</tr>
</tbody>
</table>

Table 6: Assumptions on platform adoption – best case

**Pricing:** iWidget Ltd. is offering the platform in a freemium model to their customers. The freemium model – basically a common pricing strategy in the ICT sector - offers iWidget customers basic iWidget services (widgets) free of charge, whereas premium services include a monthly subscription fee.

<table>
<thead>
<tr>
<th>Pricing</th>
<th>Worst case</th>
<th>Realistic case</th>
<th>Best case</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water utilities</td>
<td>249€/month</td>
<td>249€/month</td>
<td>249€/month</td>
</tr>
<tr>
<td>Water consumers</td>
<td>2.99€/month</td>
<td>2.99€/month</td>
<td>2.99€/month</td>
</tr>
<tr>
<td>3rd party apps</td>
<td>19€/month</td>
<td>19€/month</td>
<td>19€/month</td>
</tr>
<tr>
<td>Revenue shares</td>
<td>20%</td>
<td>20%</td>
<td>20%</td>
</tr>
</tbody>
</table>

Table 7: Pricing assumptions

In order to discuss the implications of pricing on platform adoption we calculate two additional cases:
### Pricing assumptions – low / high case

<table>
<thead>
<tr>
<th></th>
<th>Low price case</th>
<th>high price case</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water utilities</td>
<td>169€/ month</td>
<td>499€/ month</td>
</tr>
<tr>
<td>Water consumers</td>
<td>0.99 €/ month</td>
<td>3.99 €/ month</td>
</tr>
<tr>
<td>3rd party apps</td>
<td>19€/month</td>
<td>19€/month</td>
</tr>
<tr>
<td>Revenue shares</td>
<td>20%</td>
<td>20%</td>
</tr>
</tbody>
</table>

Table 8

#### Cost calculation

The following table covers the major cost blocks of the iWidget water service platform over the first three years. They embrace start-up expenses, management salaries, platform development and maintenance costs, expenses for web hosting as well as costs for marketing, sales and ecosystem management. Overall, we expect the costs to sum up to 3.5 Mio EUR over the first years. Table 9 contains detailed assumptions.

<table>
<thead>
<tr>
<th>Costs</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>All incl. VAT</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Start up Expenses</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LLC Registrations</td>
<td>50,000,00 €</td>
<td>-</td>
<td>-</td>
<td>50,000,00 €</td>
</tr>
<tr>
<td>Accountant fees</td>
<td>2,000,000 €</td>
<td>5,000,000 €</td>
<td>10,000,000 €</td>
<td>17,000,000 €</td>
</tr>
<tr>
<td>Rental cost</td>
<td>48,000,00 €</td>
<td>48,000,00 €</td>
<td>48,000,00 €</td>
<td>144,000,00 €</td>
</tr>
<tr>
<td>Utilities (Electricity, gas, water)</td>
<td>6,000,00 €</td>
<td>7,000,00 €</td>
<td>8,000,00 €</td>
<td>21,000,00 €</td>
</tr>
<tr>
<td>Phone connection</td>
<td>8,000,00 €</td>
<td>12,000,00 €</td>
<td>15,000,00 €</td>
<td>35,000,00 €</td>
</tr>
<tr>
<td>Internet connection</td>
<td>1,200,00 €</td>
<td>1,200,000 €</td>
<td>1,200,000 €</td>
<td>3,600,000 €</td>
</tr>
<tr>
<td><strong>Total start up costs</strong></td>
<td>65,250,00 €</td>
<td>73,200,00 €</td>
<td>82,200,00 €</td>
<td>220,650,00 €</td>
</tr>
<tr>
<td><strong>Management SALARIES</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CEO</td>
<td>50,000,00 €</td>
<td>75,000,00 €</td>
<td>100,000,00 €</td>
<td>225,000,00 €</td>
</tr>
<tr>
<td>CMO</td>
<td>50,000,00 €</td>
<td>75,000,00 €</td>
<td>100,000,00 €</td>
<td>225,000,00 €</td>
</tr>
<tr>
<td>COO</td>
<td>50,000,00 €</td>
<td>75,000,00 €</td>
<td>100,000,00 €</td>
<td>225,000,00 €</td>
</tr>
<tr>
<td>CTO</td>
<td>50,000,00 €</td>
<td>75,000,00 €</td>
<td>100,000,00 €</td>
<td>225,000,00 €</td>
</tr>
<tr>
<td>CFO</td>
<td>50,000,00 €</td>
<td>75,000,00 €</td>
<td>100,000,00 €</td>
<td>225,000,00 €</td>
</tr>
<tr>
<td><strong>Total Mgt Salaries</strong></td>
<td>200,000,00 €</td>
<td>300,000,00 €</td>
<td>400,000,00 €</td>
<td>900,000,00 €</td>
</tr>
<tr>
<td><strong>Dev. &amp; Maintenance Costs</strong></td>
<td>600,000,00 €</td>
<td>500,000,00 €</td>
<td>400,000,00 €</td>
<td>1,500,000,00 €</td>
</tr>
<tr>
<td><strong>Web Hosting (Amazon EC2)</strong></td>
<td>976,32 €</td>
<td>1,944,000 €</td>
<td>3,888,000 €</td>
<td>6,808,32 €</td>
</tr>
<tr>
<td><strong>Marketing &amp; Sales</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Google adds</td>
<td>10,000,000 €</td>
<td>15,000,000 €</td>
<td>15,000,000 €</td>
<td>40,000,000 €</td>
</tr>
<tr>
<td>Newspapers</td>
<td>10,000,000 €</td>
<td>10,000,000 €</td>
<td>10,000,000 €</td>
<td>30,000,000 €</td>
</tr>
<tr>
<td>Product placement</td>
<td>2,000,000 €</td>
<td>5,000,000 €</td>
<td>5,000,000 €</td>
<td>12,000,000 €</td>
</tr>
<tr>
<td>Trade shows</td>
<td>20,000,000 €</td>
<td>20,000,000 €</td>
<td>20,000,000 €</td>
<td>60,000,000 €</td>
</tr>
<tr>
<td>Campaigns</td>
<td>30,000,000 €</td>
<td>50,000,000 €</td>
<td>50,000,000 €</td>
<td>130,000,000 €</td>
</tr>
<tr>
<td><strong>Total Marketing</strong></td>
<td>72,000,000 €</td>
<td>100,000,000 €</td>
<td>100,000,000 €</td>
<td>272,000,000 €</td>
</tr>
<tr>
<td>Ecosystem Mgmt</td>
<td>200,000,000 €</td>
<td>200,000,000 €</td>
<td>200,000,000 €</td>
<td>600,000,000 €</td>
</tr>
<tr>
<td><strong>Total Costs</strong></td>
<td>1,138,226,32 €</td>
<td>1,175,144,00 €</td>
<td>1,186,089,00 €</td>
<td>3,499,458,32 €</td>
</tr>
</tbody>
</table>

Table 9: Cost assumptions over the first 3 years
9.4.3. Revenue calculation

We base our revenue calculation upon three scenarios:

- In the worst case 15% of European utilities adopt the platform in year 3,
- In the realistic case 22.5% of European utilities adopt the platform in year 3,
- In the best case 30% of European utilities adopt the platform in year 3.

**Worst case:** In the worst case, we assume 5 subscribers to the premium water services during the 1st year. This amount will increase to 2,500 in the 2nd year and to 15,000 in the 3rd year. Regarding the premium fees for the utilities, we assume 20 water utilities to test the service in the 1st year, 50 in the 2nd and 300 in the 3rd. In addition, we assume that 10 utilities will buy a complementary app for 19€/month in the second year, and 30 utilities in the third year.

<table>
<thead>
<tr>
<th># of Users</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic services (households)</td>
<td>For free</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Premium Services (Households)</td>
<td>2.99 €/m</td>
<td>5</td>
<td>2,500</td>
</tr>
<tr>
<td>Basis Services (Utilities)</td>
<td>For free</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Premium Fees (Utilities)</td>
<td>249 €/m</td>
<td>20</td>
<td>50</td>
</tr>
<tr>
<td>20% Revenue Share (3rd Party Dev.)</td>
<td>19€m</td>
<td>0</td>
<td>10</td>
</tr>
</tbody>
</table>

Table 10: Assumptions made in the worst case

<table>
<thead>
<tr>
<th>Revenue Streams</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic services (households)</td>
<td>- €</td>
<td>- €</td>
<td>- €</td>
<td>- €</td>
</tr>
<tr>
<td>Premium services (households)</td>
<td>179,40 €</td>
<td>89,700,00 €</td>
<td>538,200,00 €</td>
<td>735,463,40 €</td>
</tr>
<tr>
<td>Basic services (utilities)</td>
<td>- €</td>
<td>- €</td>
<td>- €</td>
<td>- €</td>
</tr>
<tr>
<td>Premium fees (utilities)</td>
<td>59,760,00 €</td>
<td>149,400,00 €</td>
<td>896,400,00 €</td>
<td>1,735,463,40 €</td>
</tr>
<tr>
<td>20% Revenue Share (3rd Party Dev.)</td>
<td>- €</td>
<td>456,00 €</td>
<td>1,368,00 €</td>
<td></td>
</tr>
<tr>
<td><strong>Total Income</strong></td>
<td>59,939,40 €</td>
<td>239,556,00 €</td>
<td>1,435,968,00 €</td>
<td>1,735,463,40 €</td>
</tr>
</tbody>
</table>

Accumulated Loss/Profit

| Break-Even                          | - 1,078,286,92 € | - 2,013,874,92 € | - 1,763,994,92 € |

Table 11: Revenue calculation in the worst case
In result, the iWidget water service platform would get a negative accumulated loss/profit through the 3 years with a loss of - 1 078 286.92€ in the first year. This amount will nearly double in the 2nd year (- 2 013 874.92 €). This is only during the 3rd year that it will start to decrease (-1 763 994.92 €). Likewise, the Break-even point is expected to occur during the 3rd year as figures will show a positive result of 249 880.00 € at the end of this year.

**Realistic case:** In the realistic case we expect 20 householders in the first year, 5 000 in the 2nd and 30 000 in the 3rd year. Regarding utilities, the amount will rise from 50 in the 1st year, to 150 in the 2nd and to 450 in the 3rd.

<table>
<thead>
<tr>
<th>Price (€)</th>
<th># of Users</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic services (households)</td>
<td>Year 1</td>
</tr>
<tr>
<td>Premium Services (Households)</td>
<td>2,99 €</td>
</tr>
<tr>
<td>Basis Services (Utilities)</td>
<td>For free</td>
</tr>
<tr>
<td>Premium Fees (Utilities)</td>
<td>249 €</td>
</tr>
<tr>
<td>20% Revenue Share (3rd Party Dev.)</td>
<td>19,00 €</td>
</tr>
</tbody>
</table>

**Table 12: Assumptions made in the realistic case**

In terms of revenue, the accumulated loss/profit stays negative with a break-even point occurring the 3rd year. The main difference comes from the amount of profit made during the 3rd year; while the break-even amount was 249 880.00 € in the worst case, it goes up to 1 269 112.00 € for the realistic case.
Table 13: Revenue calculation in the realistic case

**Best case**: In the best case, we expect 50 householders in the 1st year, increasing to 20 000 in the 2nd and 100 000 in the 3rd. Regarding Utilities, we expect 100 users in the 1st year, 300 in the 2nd and 600 in the 3rd.

<table>
<thead>
<tr>
<th>Basic services (households)</th>
<th>Premium Services (Households)</th>
<th>Break-Even</th>
</tr>
</thead>
<tbody>
<tr>
<td>2,99 €</td>
<td>50</td>
<td>- 985 828,72 €</td>
</tr>
<tr>
<td>Basic Services (Utilities)</td>
<td>Premium Fees (Utilities)</td>
<td>Basis Services (Utilities)</td>
</tr>
<tr>
<td>249.00 €</td>
<td>100</td>
<td>249.00 €</td>
</tr>
<tr>
<td>19.00 €</td>
<td>20</td>
<td>19.00 €</td>
</tr>
</tbody>
</table>

Table 14: Assumptions made in the best case

The best case gives very good financial results with a break-even point occurring in the 2nd year (+ 461 656.00 €). With reference to the accumulated Loss/Profit, we can point out a positive balance the 3rd year with + 2 432 477.68 €.

<table>
<thead>
<tr>
<th>Revenue Streams</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic services (households)</td>
<td>- €</td>
<td>- €</td>
<td>- €</td>
<td>- €</td>
</tr>
<tr>
<td>Premium services (households)</td>
<td>1 794,00 €</td>
<td>717 600,00 €</td>
<td>3 588 000,00 €</td>
<td></td>
</tr>
<tr>
<td>Basic services (utilities)</td>
<td>- €</td>
<td>- €</td>
<td>- €</td>
<td>- €</td>
</tr>
<tr>
<td>Premium fees (utilities)</td>
<td>298 800,00 €</td>
<td>896 400,00 €</td>
<td>1 792 800,00 €</td>
<td></td>
</tr>
<tr>
<td>20% Revenue Share (3rd Party Dev.)</td>
<td>4 560,00 €</td>
<td>22 800,00 €</td>
<td>68 400,00 €</td>
<td></td>
</tr>
<tr>
<td>Total Income</td>
<td>305 154,00 €</td>
<td>1 636 800,00 €</td>
<td>5 449 200,00 €</td>
<td>7 397 154,00 €</td>
</tr>
</tbody>
</table>

Accumulated Loss/Profit:
- 958 828,72 € onto - 1 521 972,72 € onto - 252 860,72 €

Break-Even:
- 985 828,72 € onto - 536 144,00 € onto 1 269 112,00 €
Loss/Profit Break-Even | - 833 072,32 € | 461 656,00 € | 4 263 112,00 €

**Table 15: Revenue calculation in the best case**

9.4.4. Implications of a low service fee strategy on platform adoption

In the next step, we calculate two cases, one with lower price points and higher adoption rates and one with higher price points and lower adoption rates.

**Low price case:** The low price has established a monthly fee of 0.99 € for premium iWidget household services and monthly 169 € for premium utilities services.

<table>
<thead>
<tr>
<th>Price (€)</th>
<th># of Users</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic services (households)</td>
<td>For free</td>
</tr>
<tr>
<td>Premium Services (Households)</td>
<td>0.99 €</td>
</tr>
<tr>
<td>Basis Services (Utilities)</td>
<td>For free</td>
</tr>
<tr>
<td>Premium Fees (Utilities)</td>
<td>169,00 €</td>
</tr>
<tr>
<td>20% Revenue Share (3rd Party Dev.)</td>
<td>19,00 €</td>
</tr>
</tbody>
</table>

**Table 16: Assumptions made in the low price case**

In terms of revenue, the accumulated loss/profit becomes positive in the 3rd year, with a positive amount of + 2 432 477,68 €. Meanwhile, the break-even point occurs during the 2nd year with a positive balance of + 74 656,00 € and + 3 083 512,00 € in the last year).

<table>
<thead>
<tr>
<th>Revenue Streams</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic services (households)</td>
<td>- €</td>
<td>- €</td>
<td>- €</td>
<td>- €</td>
</tr>
<tr>
<td>Premium services (households)</td>
<td>2 376,00 €</td>
<td>415 800,00 €</td>
<td>2 376 000,00 €</td>
<td></td>
</tr>
<tr>
<td>Basic services (utilities)</td>
<td>- €</td>
<td>- €</td>
<td>- €</td>
<td>- €</td>
</tr>
<tr>
<td>Premium fees (utilities)</td>
<td>405 600,00 €</td>
<td>811 200,00 €</td>
<td>1 825 200,00 €</td>
<td></td>
</tr>
<tr>
<td>20% Revenue Share (3rd Party Dev.)</td>
<td>4 560,00 €</td>
<td>22 800,00 €</td>
<td>68 400,00 €</td>
<td></td>
</tr>
</tbody>
</table>
Table 17: Revenue calculation in the low price case

**High price case:** The high price case proposes higher price. As an effect, the adoption rate will be lower. Prices given are the following:

- 3.99 €/m for iWidget premium householder services
- 499 €/m for iWidget premium utility services

<table>
<thead>
<tr>
<th>Price (€)</th>
<th># of Users</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic services (households)</td>
<td>For free</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Premium Services (Households)</td>
<td>3.99 €</td>
<td>5</td>
<td>2000</td>
<td>10000</td>
</tr>
<tr>
<td>Basis Services (Utilities)</td>
<td>For free</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Premium Fees (Utilities)</td>
<td>499.00 €</td>
<td>15</td>
<td>40</td>
<td>150</td>
</tr>
<tr>
<td>20% Revenue Share (3rd Party Dev.)</td>
<td>19.00 €</td>
<td>20</td>
<td>100</td>
<td>300</td>
</tr>
</tbody>
</table>

Table 18: Assumptions made in the high price case

The revenues earned remain lower than within the Low price case. We expect an accumulated Loss/Profit of - 1 043 606.92 € the 1st year, - 1 860 670.92 € the 2nd year and -1 601 358.92 € the 3rd year. The break-even occurs the 3rd year, and is much lower than in the low price case (+ 259 312.00 € instead of + 3 083 512.00 €)

<table>
<thead>
<tr>
<th>Revenue Streams</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic services (households)</td>
<td>- €</td>
<td>- €</td>
<td>- €</td>
<td>- €</td>
</tr>
<tr>
<td>Premium services (households)</td>
<td>239,00 €</td>
<td>95 760,00 €</td>
<td>478 800,00 €</td>
<td></td>
</tr>
<tr>
<td>Basic services (utilities)</td>
<td>- €</td>
<td>- €</td>
<td>- €</td>
<td>- €</td>
</tr>
<tr>
<td>Premium fees (utilities)</td>
<td>89 820,00 €</td>
<td>239 520,00 €</td>
<td>898 200,00 €</td>
<td></td>
</tr>
<tr>
<td>20% Revenue Share (3rd Party Dev.)</td>
<td>4 560,00 €</td>
<td>22 800,00 €</td>
<td>68 400,00 €</td>
<td></td>
</tr>
</tbody>
</table>
Table 19: Revenue calculation in the high price case

Conclusion: According to the different cases, we can identify two different periods. During the two first years, the majority of revenues are expected to come from utilities (200 676.00 € compared with only 1 061.28 € through householders). During the 2nd year, they are both gaining users with 300 000 € of additional revenue. This is only during the 3rd year that the trend changes with householders progressively reaching utilities revenues and even exceeding it with a global revenue of 1 611 480.00 € for householders and 1 351 440.00 € for utilities.

Taking in consideration that the payback period can be expected to be in the 3rd or 4th year in the realistic case, we highlight the importance of a high utility adoption rate during the two first years. Due to the low amount of householders subscribing to the premium services in the first years, the loss would have been massive without the utilities.

The following figure details this evolution throughout the first 3 years.

![Revenue Comparison: Utilities / Households](image)

Figure 42: Revenue Comparison: Utilities / Households
9.4.5. Cash flow calculation

Cash flow per year: The cash flow covers the income and costs of a venture. The net income used for the cash flow calculation usually includes figures such as taxes, depreciation/amortization, or interest due to a potential loan. Once those figures will be known, the calculation will change a little bit, giving more specified figures such as the following Income Statement.

In the business case at hand, we assume there are no depreciation/amortization, no interest expenses and no taxes throughout the first 3 years. In others words, the cash flow per year will equal the difference between the loss and profit. It has already been calculated through the break-even point. The following table will sum up the different case flow for each scenario.

<table>
<thead>
<tr>
<th>Year</th>
<th>Worst Case</th>
<th>Realistic Case</th>
<th>Best Case</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>- 1 078 286,92 €</td>
<td>- 985 828,72 €</td>
<td>- 833 072,32 €</td>
</tr>
<tr>
<td>2</td>
<td>- 935 588,00 €</td>
<td>- 536 144,00 €</td>
<td>461 656,00 €</td>
</tr>
<tr>
<td>3</td>
<td>249 880,00 €</td>
<td>4 263 112,00 €</td>
<td>4 263 112,00 €</td>
</tr>
</tbody>
</table>

Table 20: Cash flow per year

Obviously, none of the cash flows will be positive in the first year. However, the best case and the low price case give both a positive balance the 2nd year. What seems the most relevant information here is the positive cash flow expected on each case in the 3rd year, proving the platform will be financially interesting over a long-term period.

Cumulative cash flow: The cumulative cash flow provides an overview on the evolution of the cash flow. The Y+1 will calculate the cash flow of this year plus the positive/negative one from the last year.
In our platform case, the cumulative cash flow is expected to end up positively in the best case and in the low price case. The realistic case will remain close to nil, and is expected to become positive early in the 3rd year.
Discounted cash flow: The discounted cash flow investigates the attractiveness of an investment. A discounted rate is fixed depending on how risky an investment is. We established here two different risk levels. Basically, a level is considered risky when it is higher than 10%. In the platform example we assume fixed high risk levels. The two different discounted factors used will be: i) the lower risk with a discounted rate of 10% and ii) a very high discounted rate of 30%, which will obviously result in less attractive financial results.

<table>
<thead>
<tr>
<th>Discount Rate</th>
<th>10%</th>
<th>30%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Y + 1</td>
<td>Y + 2</td>
</tr>
<tr>
<td>Worst Case</td>
<td>Cash flow p/y</td>
<td>Discounted Cash Flow</td>
</tr>
<tr>
<td></td>
<td>-1 078 286,92 €</td>
<td>-935 588,00 €</td>
</tr>
<tr>
<td></td>
<td>-980 260,84 €</td>
<td>-773 213,22 €</td>
</tr>
<tr>
<td>Realistic Case</td>
<td>Cash flow p/y</td>
<td>Discounted Cash Flow</td>
</tr>
<tr>
<td></td>
<td>-985 828,72 €</td>
<td>-536 144,00 €</td>
</tr>
<tr>
<td></td>
<td>-896 207,93 €</td>
<td>-443 094,21 €</td>
</tr>
<tr>
<td>Best Case</td>
<td>Cash flow p/y</td>
<td>Discounted Cash Flow</td>
</tr>
<tr>
<td></td>
<td>-833 072,32 €</td>
<td>461 656,00 €</td>
</tr>
<tr>
<td></td>
<td>-757 338,47 €</td>
<td>419 687,27 €</td>
</tr>
<tr>
<td>Low Price Case</td>
<td>Cash flow p/y</td>
<td>Discounted Cash Flow</td>
</tr>
<tr>
<td></td>
<td>725 690,32 €</td>
<td>74 656,00 €</td>
</tr>
<tr>
<td></td>
<td>659 718,47 €</td>
<td>61 699,17 €</td>
</tr>
<tr>
<td>High Price Case</td>
<td>Cash flow p/y</td>
<td>Discounted Cash Flow</td>
</tr>
<tr>
<td></td>
<td>-1 043 606,92 €</td>
<td>-817 064,00 €</td>
</tr>
<tr>
<td></td>
<td>-948 733,56 €</td>
<td>-675 259,50 €</td>
</tr>
</tbody>
</table>

Table 21: Discounted cash flow (10%)

<table>
<thead>
<tr>
<th>Discount Rate</th>
<th>30%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Y + 1</td>
</tr>
<tr>
<td>Worst Case</td>
<td>Cash flow p/y</td>
</tr>
<tr>
<td></td>
<td>-1 078 286,92 €</td>
</tr>
<tr>
<td></td>
<td>829 451,48 €</td>
</tr>
<tr>
<td>Realistic Case</td>
<td>Cash flow p/y</td>
</tr>
<tr>
<td></td>
<td>-985 828,72 €</td>
</tr>
<tr>
<td></td>
<td>-758 329,78 €</td>
</tr>
<tr>
<td>Best Case</td>
<td>Cash flow p/y</td>
</tr>
<tr>
<td></td>
<td>-833 072,32 €</td>
</tr>
<tr>
<td></td>
<td>-640 824,86 €</td>
</tr>
<tr>
<td>Low Price Case</td>
<td>Cash flow p/y</td>
</tr>
<tr>
<td></td>
<td>-725 690,32 €</td>
</tr>
<tr>
<td></td>
<td>-558 223,32 €</td>
</tr>
<tr>
<td>High Price Case</td>
<td>Cash flow p/y</td>
</tr>
<tr>
<td></td>
<td>-1 043 606,92 €</td>
</tr>
<tr>
<td></td>
<td>-802 774,55 €</td>
</tr>
</tbody>
</table>

Table 22: Discounted cash flow (30%)

The “discounted” cash flow involves that an amount of money will worst less in the future than today. For this reason, the discounted cash flow is always lower than the cash flow per year. As expected, the higher the risk is, the lower the amount of revenue. With a high potential risk fixed, the discounted cash flow is more likely to result in disappointing results.
9.4.6. Net present value

Based on the discounted cash flow, we come up here with the following net present value:

<table>
<thead>
<tr>
<th></th>
<th>Y + 1</th>
<th>Y + 2</th>
<th>Y + 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worst Case</td>
<td>- 1 078 286,92 €</td>
<td>- 935 588,00 €</td>
<td>249 880,00 €</td>
</tr>
<tr>
<td>Realistic Case</td>
<td>- 985 828,72 €</td>
<td>- 536 144,00 €</td>
<td>1 269 112,00 €</td>
</tr>
<tr>
<td>Best Case</td>
<td>- 833 072,32 €</td>
<td>461 656,00 €</td>
<td>4 263 112,00 €</td>
</tr>
<tr>
<td>Low Price Case</td>
<td>725 690,32 €</td>
<td>74 656,00 €</td>
<td>3 083 512,00 €</td>
</tr>
<tr>
<td>High Price Case</td>
<td>- 1 043 606,92 €</td>
<td>- 817 064,00 €</td>
<td>259 312,00 €</td>
</tr>
</tbody>
</table>

Table 23: Net Present Value

When analyzing the NPV, we have to consider, whether the sign is positive. It gives a good indicator of how interesting/risky an investment is. We can see through these two tables a positive balance for the best case with 3 891 695.68 € and for the low price case with 3 883 858.32 €. Nevertheless, it would result in a negative NPV for the worst, realistic and high price case scenario with respectively - 1 763 994.92 €, - 252 860.72 € and - 1 601 358.92 €.

9.4.7. Payback period

In order to calculate the payback period, we have to look at the accumulated loss/profit. The payback period is normally the time needed to cover the initial investment made. However, according to figure 25, the iWidget water service platform involves a continuing investment. Thus, we will take both in consideration - the investment made year after year and the earnings made. It will then give us the year when revenues will exceed the annual investments of the venture.

In the best and in the low price case, the payback period is expected to be reached in the 3rd year. In the worst and in the high price case, the payback period isn’t expected to be reached before the 4th year. In the realistic case, the payback period is neither expected to be reached in the 3rd year. Nevertheless, expectations for the 3rd year ends up with an amount close to 0, rising in an impressive way the 3rd year, meaning one could reach the payback very early in the 4th year.
9.4.8. Operating margin

The operating margin will be developed starting in the 2nd year as in the 1st year the operating margin is expected to be negative with a low amount of users. For the 2nd year, the balance is expected to be positive in the low price case and in the best case with 6% (low price) and 28% (best case).

In the others cases, the operating margin are expected to be positive the 3rd year with the following results:

- Worst case: 17%
- Realistic Case: 52%
- High Price Case: 18%

Additionally, the best case would give a positive balance of 78% in the 3rd year, and 72% in the low price case.

Worth mentioning is that the payback period in the realistic case is acceptable with a positive balance of 52%. This amount indicates that each Euro earned through a premium users, the iWidget Ltd. will gain 0.52 €. A more detailed table including the 1st year is shown in the financial summary.

9.4.9. Financial summary

The following tables summarize our calculations throughout the quantitative analysis.

<table>
<thead>
<tr>
<th>Scenarios</th>
<th>1st Year</th>
<th>2nd Year</th>
<th>3rd Year</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Expenses</strong></td>
<td>1 138 226,32 €</td>
<td>1 175 144,00 €</td>
<td>1 186 088,00 €</td>
</tr>
<tr>
<td><strong>Revenues</strong></td>
<td>59 939,40 €</td>
<td>239 556,00 €</td>
<td>-2 013 874,92 €</td>
</tr>
<tr>
<td><strong>Cash-Flow p/y</strong></td>
<td>-1 078 286,92 €</td>
<td>-935 588,00 €</td>
<td>-2 013 874,92 €</td>
</tr>
<tr>
<td><strong>Cumul Cash-Flow</strong></td>
<td>-980 260,84 €</td>
<td>-935 588,00 €</td>
<td>-2 013 874,92 €</td>
</tr>
<tr>
<td><strong>Discount Cash-Flow (10%)</strong></td>
<td>-829 451,48 €</td>
<td>-829 451,48 €</td>
<td>-553 602,37 €</td>
</tr>
<tr>
<td><strong>Operating Margin</strong></td>
<td>-1 179%</td>
<td>-84%</td>
<td>-28%</td>
</tr>
</tbody>
</table>

The following tables summarize our calculations throughout the quantitative analysis.
The sensitive analysis determines in how far a pre-defined factor might affect the final outcome.

The worst, realistic and best case scenario pointed out the high importance of high adoption rates throughout the first years to achieve the platforms profitability. It probably appears as the most influencing factor in our assumptions.

For example, with only 5 households and 20 utilities, the worst case provides disappointing financial results with a total revenue of 59,939.00 €, reaching up to 1,435,968.00 € in the 3rd year for 15,000 householders and 300 utilities. In terms of cash flow per year, results are extremely negative with a balance of -1,078,286.92 € the first year and -935,588.00 € the second year. It is only in the third year that the cash flow becomes positive (but remains low) with 249,880.00 €.

Meanwhile, the realistic case is expected to provide a better revenue for the iWidget Ltd. with 152,937.60 € in the 1st year for 20 households and 50 utilities, increasing up to 2,455,200.00 € in the 3rd year (30,000 households and 450 utilities). However, the cash flow per year remains low with a negative balance in the two first years (-985,828.72 € in year 1 and -536,144.00 € in year 2). Fortunately, year 3 ends with a positive balance of 1,269,112.00 €.

For the best case, financial results start from 305,154.60 € (50 households and 100 utilities) in the 1st year up to 5,449,200.00 € in the 3rd year (100,000 households and 600 utilities). Obviously, the balance of the cash flow is the best one with a positive balance in the two last years (461,656.00 € the 2nd and 4,263,112.00 € the 3rd year).

Overall, the qualitative analysis revealed that customers are extremely price sensitive. In the high price case (price of 3.99€/m and household and 499.00€/m and utility) we considered a lower amount of users. In contrast, the low price case obtains larger amount of users with a price of 0.99€/m and household and 169€/m and utility.

### Table 24: Financial summary

<table>
<thead>
<tr>
<th>Scenarios</th>
<th>Payback</th>
<th>Worst</th>
<th>Realistic</th>
<th>Best</th>
<th>Low Price</th>
<th>High Price</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4/5th year</td>
<td>4th year</td>
<td>3rd year</td>
<td>3rd year</td>
<td>4/5th year</td>
<td></td>
</tr>
<tr>
<td>Revenues</td>
<td>1,435,968.00 €</td>
<td>2,455,200.00 €</td>
<td>5,449,200.00 €</td>
<td>2,432,477.68 €</td>
<td>1,445,400.00 €</td>
<td></td>
</tr>
<tr>
<td>Cash-Flow p/y</td>
<td>249,880.00 €</td>
<td>1,269,112.00 €</td>
<td>4,263,112.00 €</td>
<td>3,083,512.00 €</td>
<td>259,312.00 €</td>
<td></td>
</tr>
<tr>
<td>Cumul Cash-Flow</td>
<td>-1,763,994.92 €</td>
<td>-252,860,72 €</td>
<td>3,891,698.68 €</td>
<td>2,432,477.68 €</td>
<td>-1,601,359.92 €</td>
<td></td>
</tr>
<tr>
<td>Discount Cash-Flow (10%)</td>
<td>187,738.54 €</td>
<td>953,502.63 €</td>
<td>3,875,556.36 €</td>
<td>2,316,688.20 €</td>
<td>194,824.94 €</td>
<td></td>
</tr>
<tr>
<td>Discount Cash-Flow (30%)</td>
<td>113,736.91 €</td>
<td>577,656.80 €</td>
<td>1,940,424.21 €</td>
<td>1,403,510.24 €</td>
<td>118,030.04 €</td>
<td></td>
</tr>
<tr>
<td>Operating Margin</td>
<td>17%</td>
<td>52%</td>
<td>78%</td>
<td>72%</td>
<td>18%</td>
<td></td>
</tr>
</tbody>
</table>
As a result, the total revenue reached in the high price case scenario remains lower than in the low case scenario - with a total amount of 94,619.40 € in year 1; 358,080.00 € in year 2 and 1,445,400.00 € in year 3. The low price case reached 412,536.00 € in the first year; 1,249,800.00 € in the 2nd year and 4,269,600.00 € in the 3rd year. In these cases, we expect a positive operating margin in the 3rd year (with a hugely negative amount of -228% the 2nd year) for the high price case, whereas it becomes positive in the 2nd year for the low price case (6%) and strongly positive the 3rd year (72%). Even more revealing is the NPV of the two cases with one remaining negative (-1,601,358.92 € in the high price case) and another positive (3,883,858.32 € in the low price case).

Given these figures, we highlight the high influence of a low price on adoption behavior and resulting revenues in the platform case. It appears financially more viable to attract a higher amount of users by a lower price point rather than conversely. After this sensitivity analysis, price can be considered as one of the key factors of success in driving platform adoption.

9.4.11. Risk analysis

The iWidget water service platform faces two major risks:

- **Network effects**: The platform’s value to water utilities depends on the number of water consumers. The value of analytics grows as the platform matches demand from both sides. This way, the iWidget Ltd. is challenged to attract both customer sides to the platform.

- **Platform pricing**: iWidget Ltd. in its role as platform provider has to set a price for each platform side, considering the user group’s growth and willingness to pay. A key challenge relates to high price sensitivity of both user groups as well as their high sensitivity to quality.

Academic literature (e.g. Eisenmann et al., 2006) has identified these challenges in the context of two-sided networks. Multiple authors provide strategies to overcome these challenges related to achieving critical mass. The following section provides a guideline.
10. Guidance to develop multi-sided business models in the context of network effects

In the context of Business Model Innovation it is imperative to understand whether the product or service is subject to network effects - and consequently - how to design business models that leverage network effects. In the sequel, we will provide a business model innovation guideline that supports business model developers in considering network effects when designing a two- or multisided platform-based business model. So far, the applicability of the guideline has been tested in SAP internal projects as well as in the course of the Helix Nebula project, targeted at “charting the course towards the sustainable provision of cloud computing - the Science Cloud” (http://www.helix-nebula.eu/). Figure 45 illustrates the drivers of network effects in the Helix Nebula case. Further details are documented in the Helix Nebula deliverable D7.4: Information as a Service – Towards Value Co-Creation in a European Cloud Computing Platform Ecosystem (available at: https://cds.cern.ch/record/1690531?ln=de).

Figure 45: Drivers of network effects in the Helix Nebula case (p. 64)
10.1. Peculiarities of multisided platforms

Multisided platform businesses are perceived as platform operating companies that attract at least two user groups in order to create value by mediating them through the platform (Evans et al., 2006). Frequent examples refer to platform owners in eBusiness, operating e.g. web portals or Internet search engines that are connecting viewers and advertisers; auction sites like eBay, connecting sellers and buyers; payment systems such as PayPal, connecting cardholder and merchants; videogame consoles and other software platforms, connecting gamers or software users and application developers (Evans, 2003a).

Within multisided platform businesses a focal platform represents the centerpiece of value creation. Hence, value can only be obtained through a platform intermediating supply and demand between two platform user groups. In contrast to the traditional supply chain, transactions in multisided platform businesses entail at least a triangular set of relationships. Therein, the focal platform owner mediates the platform users’ interactions, while setting rules such as protocols, rights, and pricing terms to govern transactions (Eisenmann et al., 2006; 2008). Surplus is created whenever these groups interact, so that market success depends upon how well the platform attracts custom from its user groups (Armstrong, 2006). Correspondingly, economic research considers complementing partners and customers each as a separate platform end-user group. Figure 46: End-user interaction in platform businesses (Evans, 2003a) provides a simplified perspective on platform-based end-user interactions.

The principle setting of two or multiple end-user groups of agents interacting with each other through a common platform is characteristic of multisided platform

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businesses. They cause distinct demand patterns of elasticity and platform competition. Economic research, therefore, considers each platform end-user group as separate market, leading to multisided platform markets. These markets are understood as two- or multisided, when (Rochet & Tirole, 2003; Chakravorti & Roson, 2006; Church & Gandal, 2008):

- A third party attracts different groups (e.g. customers, product suppliers, advertisers) to different sides of a platform;
- The value obtained by one kind of user increases with the number of the other kind of user due to indirect network effects being inherent to platform markets; and
- An intermediary is necessary for internalizing the externalities created by one group for the other group.

As a result, multisided platform businesses differ from traditional single-sided organizations in respect to the amount of markets they serve and for which they have to generate demand (Evans, 2003a). Consequently, multisided platform businesses characteristically sell different products or services to the different sides.

Platform revenue, in turn, emerges from trade in interactions between the platform’s end-users. An interaction, for example, occurs when a buyer, e.g. a platform user uses an application provided by a seller, e.g. an application developer (Rochet & Tirole, 2008). Considering the case that both platform end-users, the buyer and the seller, connect directly to the platform and not through intermediaries or complementors, the platform owner is able to directly charge both platform user sides dedicated platform access or usage fees.

Multisided platform businesses, characteristically, sell different products or services to the different sides. They, therefore, face differing demand curves, each depending on the quality-adjusted quantity purchased on the other sides (Evans, 2003a).

![Diagram](image)

**Figure 47: Sources of platform revenue (Evans, 2003a)**

An important characteristic of multisided platforms is that they induce network effects. That means that the two or multiple groups using the platform are attracted to each other. It results that “the platform’s value to any given user largely depends on the number of users on the network’s other side. Value grows as the platform matches
demand from both sides” (Eisenmann et al., 2006). These network effects set platform businesses apart from traditional manufacturing and service businesses.

10.1.1. Implications of network effects on platform adoption

As already indicated above, network effects are inherent to two-sided markets and determine a platform’s market adoption (e.g. Rochet & Tirole, 2003; Armstrong, 2006). Academic research claims that networks exhibit externalities in that the production or consumption activities of one party connected to the network have an effect on the production or utility functions of other participants in the network (Katz & Shapiro, 1985; Shapiro & Varian, 1999). This effect is principally not transmitted through the price mechanism. Correspondingly, network effects are defined as positive consumption externalities, in which ‘the utility that a user derives from consumption of the good increases with the number of other agents consuming the good’ (Katz & Shapiro, 1985: 424). David (1985), Farrell & Saloner (1985), and Economides (1996) provide evidence that the demand for a network good is a function of both its price and the expected size of the network. Correspondingly, networks exhibit positive consumption and production externalities (Economides, 1996). This means that a positive network effect implies that the value of a unit of good increases with the (expected) number of units sold.

10.1.2. Types of network effects

Network effects describe the phenomena that a user of a good or service implies on the value of that product to other users (Katz and Shapiro, 1994). Thereby, a user’s willingness to pay is determined by their intrinsic interest and the number of other people using the good. However, most products or services are not subject to network effects as users do not care whether other users, e.g., buy the same trousers or the same caterpillar. In turn, network effects are present if users prefer a product or a service over another one as its value increases with the amount of users using it (Katz and Shapiro, 1985).

Throughout academic literature, two types of network effects have been identified (Katz and Shapiro, 1985, Eisenmann et al., 2006):

- **Direct Network Effects:** Different members of a group A enjoy interacting with one another through a network; value increases with new members.
• **Indirect Network Effects:** The greater the number of members of group A on a network, the more members of group B will be attracted to the network, which in turn increases the value to members of group A.

• **Cross-Platform Network Effects:** One-directional network effect, representing how the presence of members of group A attracts members of group B, and vice versa, so that indirect network effects might arise.

• **Congestion:** The presence of additional members of group A on a network reduces the value of the network to members of group A. e.g. limited bandwidth.

• **Repulsion:** The presence of members of group A may repel members of group B even though the presence of members of group B attracts members of A. e.g. too many advertisers.

10.1.3. Sources of network effects

Gallaugher (2008) identifies five generic sources of network effects:

• **Exchange/Interaction:** Networks become more valuable the more people join because users might communicate with more people (e.g. Facebook). Exchange embraces any data stream, such as movies, music, money, video games, and computer programs. Exchange requires standards that allow interconnection to snare network effects.

• **Long-Term Viability:** Users aim at sustaining their investments, trying to avoid switching costs. Networks with greater numbers of users suggest a stronger long-term viability. Switching costs can strengthen the value of network effects as a strategic asset. The higher the value of the user’s overall investment, the more they’re likely to consider the long-term viability of any offering before choosing to adopt it (e.g. Microsoft).

• **Complementary Benefits:** Complementary products or services such as ‘how-to’ books, software add-ons, even labour add additional value to the network (e.g.
the variety and quality of software available for the Palm system are greater the more users buy personal digital assistants that run Palm OS).

- **Pricing:** Finding the right price is of utmost importance as high prices slow down market adoption and potentially create a market for competitors. Freemium models or high volume models combined with a modest commission seem to be a sustainable formula to attract users for products and services with network effects. Later on, opt-in payments might be included (e.g. bidding option of Google AdWords). At the beginning it is more important to prove the platform as a viable and efficient distribution mechanism.

- **Innovation/Co-Innovation:** Continuous innovation on the core value proposition as well as on (third party) complements is one of the primary ways to differentiate from the competition in network markets (e.g. Google Labs).

We draw these sources exemplarily in figure 48.

![Figure 48: Sources of platform revenue (own illustration based on Gallaugher, 2008)](image)

### 10.1.4. Critical mass

Depending on whether the community around a product or service reaches critical mass, network effects might be a friend or an enemy. The term “critical mass” was introduced by (Rogers, 1962), defining critical mass to be the point in time within the adoption curve at which the adoption of the innovation is self-sustaining and network growth takes off dramatically (see also figure 49). Thereby, “comparisons across network theory, graph theory and real-life examples of technology adoption show that after around 15 per cent of a community has been penetrated, the rate of acceleration of adoption dramatically increases until it plateaus at a saturation point” (Geddes, 2011). Importantly, critical mass is linked with
the customers’ expectations regarding the performance of a product or service and the expected final size of the network (Mahler & Rogers, 1999). Schoder (2000) claims that as long as the critical mass point is not exceeded, demand synergies can only develop to a limited extent.

Figure 49 visualizes the adoption behaviour before and after reaching critical mass.

Figure 49. Visualisation of the term critical mass (Shapiro & Varian, 1998)

10.2. Steps towards critical mass and market leadership

In the sequel, we reconstruct how Google achieve critical mass and market leadership. The information base upon Google’s company history available at: http://www.google.com/about/company/history/.

**Phase I:** Google, Inc. was founded in 1995. As highlighted in figure 50 Google only addressed searchers for Internet content and continuously worked on improving the quality of search. In detail:

- Recognition as search engine of choice in the Top 100 Web Sites by PC Magazine in 1998.
- Partnership with Yahoo! to become their default search provider in 2000.
- Google Announcement of the first billion-URL index; Google positions itself as the world’s largest search engine in 2000.
• Release of Google Toolbar, a browser plug-in that makes it possible to search without visiting the Google homepage in 2000.

Phase II: In a second step, Google started including advertisers as second user group. Continuous innovation to improve quality of search and quality of analytics are the driving forces of market adoption. Figure 51 represents that phase, which is detailed below:
Figure 51: Google search engine – phase II

- Google AdWords launches with 350 customers with basic functionalities in 2000.
- First public acquisition in 2001: Deja.com’s Usenet Discussion Service, an archive of 500 million Usenet discussions dating back to 1995 (becoming Google Groups later on).
- Google.com is available in 26 languages in 2001.
- Image Search launches, offering access to 250 million images in 2001.
- Partnership with Universo Online (UOL) makes Google the major search service for millions of Latin Americans in 2001.
- Partnership with AOL with access to 34 million customers in 2002.

Phase III: The third phase embraced the integration of a third user group: developers to drive co-innovation and support driving platform adoption:

- Continuous improvements of search as well as acquisitions and new service launch to increase user base.
- Code Jam to enable coders to work in Java, C++, C# or VB.NET in 2003; code.google.com launched in 2005, including the exposure of Google APIs.
- Continuous improvements of advertising services; AdSense launched in 2003, Google Analytics launched in 2005 for measuring the impact of websites and marketing campaigns.
• Launch of Google Chrome in 2008.

Phase IV: The fourth phase still embraced continuous improvements of search as well as acquisitions and new service launch to increase user base.

• Code Jam to enable coders to work in Java, C++, C# or VB.NET in 2003; code.google.com launched in 2005, including all Google APIs.

• Continuous improvements of advertising services; AdSense launched in 2003, Google Analytics launched in 2005 for measuring the impact of websites and marketing campaigns.

Today, Google Inc. is a multinational corporation specializing in Internet-related services and products, including search, cloud computing, software and online advertising technologies. Figure 53 represents this phase graphically.
Overall figure 54 summarizes key sources of network effects the company was able to leverage in order to steps towards critical mass and market leadership.
10.2.1. How airbnb.com is leveraging network effects

According to their company profile Airbnb was founded in August of 2008. Airbnb is a trusted community marketplace for people to list, discover, and book unique accommodations around the world - online or from a mobile phone. Therefore, Airbnb connects people to unique travel experiences, at any price point, in more than 34,000 cities and 190 countries. And with world-class customer service and a growing community of users, Airbnb is the easiest way for people to monetize their extra space and showcase it to an audience of millions (Airbnb, 2015).

Figure 55: Screenshot of the homepage of airbnb.com

Figure 56 depicts the way how airbnb is leveraging network effects to drive market adoption. At the heart of it lays an adequate pricing strategy for both user groups as well as their efforts to create trust and security among its users. In particular:

- **Verified ID**: Guests and hosts verify their IDs by connecting to their social networks and scanning their official ID or confirming personal details.

- **Profile & Reviews**: Hosts and guests are enabled to get to know their guest or host through detailed profiles and confirmed reviews.
• **Peace of Mind for Airbnb Hosts:** The Airbnb Host Guarantee reimburses hosts for up to $1,000,000 in damage to their eligible property.

10.2.2. *How geocaching.com is leveraging network effects*

Geocaching is considered an outdoor recreational activity, in which participants use a Global Positioning System (GPS) receiver or mobile device and other navigational techniques to hide and seek containers, called “geocaches” or “caches”, anywhere in the world (Wikipedia – Geocaching, 2015). Groundspeak Inc. provides the largest site: Geocaching.com. “It is played throughout the world by adventure seekers equipped with GPS devices. The basic idea is to locate hidden containers, called geocaches, outdoors and then share your experiences online” (Groundspeak, 2015).

Figure 57 illustrates major drivers of platform adoption of different user groups: the size of the hunter community is of particular importance to advertisers, whereas the majority of hunters are attracted by a free-real world hunt. Suppliers of the related treasure hunt job are driven by revenue expectations to deliver a high variety of complementary products to hunters. The community of hunters additionally leverages direct network effects as the more hunters participate in the community the more caches are hidden and the more attractive the hunt gets.
10.3. Best practices to leverage network effects and build critical mass

Based on the insight gained throughout chapter 10.2 as well as based on best practises available in literature and (lean) startup marketing (in particular: Gallaugher 2008; Eisenmann et al. 2006; Gaver and Cusumano, 2008; Ries 2011) we summarize a guideline for designing business models in the presence of network effects. Prior to starting the setting needs to be clarified:

- Be sure that your product or service is subject to network effects (Remember: value increases for each user as the number of users grows).
- Consider network structure and check whether your product or service is targeted at a single class of users or to two or multiple distinct classes of users.
- Remember that the value of a product or service exhibiting direct network effects lies in the connection among users and, thus, has little or no value when introduced to the first user.
• Choose the appropriate strategy and follow strategic steps towards market tipping:
  
  o **One-sided market**: Rapid rollout with focus on growing the user base and rapidly scaling business through strong viral and/or network effects.
  
  o **Multisided Markets**: Creation of user balance first; then focus on growing the user base and rapidly scaling business through strong viral and/or network effects.

With regard to section 10.1.4, figure 58 distinguishes different phases to reach critical mass.

![Figure 58: Strategic steps towards critical mass (adopted from Roger, 2010)](image)

In the sequel we will describe the phases in more detail:

**Phase I - Move Early:** The first stage embraces the implementation of a new platform-based business model. Gaining adoption by the first few thousand customers will be a critical component of success, and therefore a challenge.

  • **Try to be the initial occupant of a market segment** in order to benefit from first mover advantages and start the network effects snowball rolling. That way, you might gain control of communities that followers may not be able to match.
  
  • **Establish a vivid community prior to launch** by producing relevant content and fostering interaction among users. Create forums, advisory boards, meet ups and dedicated interaction tools to connect users.
- **Scale and optimize product or service on the fly** by learning from early customer feedback.

  **Example:** Sony’s PS 2 enjoyed an 18-month lead over XBox and succeeded in the market, whereas the technically superior PS3 showed up months after XBox 360 and resulted in losses for Sony.

**Phase II - Create user balance:** Multisided platforms have to overcome the chicken and egg challenge. Users want content and applications before they will use the platform, whereas developers want users before they will provide content and applications. Each side expects the other side to commit before it will spend resources to adopt the platform. Convince one side!

- **Provide high quality content** by seeding the platform with content or applications that is already in high demand or by building up a pool of freelancers or employees to create a sufficient base of content to attract the other side.

  **Example:** At the time of its launch the Apple App store had already 500 apps for iPhone, delivering additional value to the users.

- **Attract marquee users** by providing them with better deals as the participation of "marquee users" such as exceptionally big buyers or high profile suppliers can be especially important for attracting participants to the other side of the network.

- **Signal long-term commitment** to platform success and competitive pricing.

  **Example:** At the time of its launch the Apple App store had already 500 apps for iPhone, delivering additional value to the users.

- **Subsidize initial adoption of early adopters**, such as price reductions, rebates or other give-aways.

  **Example:** PayPal offered users a rebate as a sign up incentive to encourage adoption.

- **Encourage the development of complementary goods** by offering resources, subsidized fees or development kits.

  **Example:** Among others, Force.com is providing developers with dedicated development kits, development support and communities.

- **Provide Seed Funding:** Provide monetary reasons to convince one side to support the platform.

  **Example:** fbFund is a $10M seed fund supporting developers and entrepreneurs on Facebook Platform.
• **Rabbit Strategy**: Target a platform complement with a high probability of success and assist the developer in highly public and visible fashion. Other investors then follow after observing that developer succeed.

• **Articulate Whitespaces**: show ecosystem partners where to invest and provide them with a 12-24 month roadmap of where own new developments are occurring. This indicates what new features are coming so developers know the functions upon which they can build and where the Platform Leader is not going to compete so developers feel safe investing.

**Example**: Intel shares technical information about their own products and platform interfaces or even sends engineers to help complementors build compatible. This way, Intel draws the attention of investors and complementors to a potentially lucrative new market and signals that Intel aims to stay out of the complementary market.

**Phase III - Create critical mass sequentially**: As the platform starts to mature, the demands will grow. Demands based on volumes and usage, but also based on new requirements. So the challenge relates to scaling. The investment to create a very scalable, trustable, proven infrastructure will also be critical. If the system environment fails even once, they can lose confidence. Creating a strong brand, high quality, hiring very experienced employees right out of the gate costs will be much higher than revenue, but it will be critical because a platform like this cannot afford to ever fail.

• **Target a small community**, e.g. a specific geographical location, a demographic or niche interest and reach critical mass before spreading to a second. Eventually, open up to the rest of the world. Envision how to logically expand into larger markets, but only do so, when dominating the community. Recognition and momentum is needed to move into a larger segment. In established markets, focus on a single niche an incumbent is either over- or under-serving. Never drop below 15%.

**Example**: Facebook reached critical mass within a single university before it spread to a second one and so on. This way, Facebook never drop below the critical mass and secured user value. Step-by-step, it built nationwide expectations for critical mass.

• **Actively Manage Expectations to achieve critical mass** by influencing user expectations, e.g. vaporware, heavy advertising, or offering subsidies.

• **Lower entry hurdles** by making the product or service easily accessible to more users.
• Ensure **compatibility with leading standard** by making the product or service compatible with the leading standard in order to benefit from an instant base of add-on content already available for the leading standard.

  **Example:** Microsoft’s Live Maps and Virtual Earth 3D adopted the same KML standard used by Google.

• **Facilitate switch** by providing a better user experience than existing incumbents and facilitate switch of their users in order to piggy back traction from an established incumbent.

  **Example:** Airbnb.com simplified listing for users on www.craigslist.org, while listing these offerings on www.airbnb.com as well. This way, they have been able to create user balance.

  **Example:** Salesforce.com promises customers to «better» integrate with SAP backend systems.

• **Provide complementary benefits** by supporting the product’s / service’s acquisition, installation, usage, maintenance, and disposal.

  **Example:** AirBnB.com offers a Host Guarantee that covers loss or damage caused by theft or vandalism from an Airbnb guest - up to $1,000,000.

• **Piggy back onto existing products, services or communities** by bundling offerings or using joint distribution channels and / or establishing alliances and partnerships.

  **Example:** Java has been bundled with Netscape; MS has bundled the Media Player with Windows.

• **Develop adequate pricing structures** to generate momentum by subsidizing the price elastic side and charging the price inelastic side; or by subsidizing the creators of value.

  **Example:** EBay provides free services to searchers, whereas sellers have to pay a dedicated fee.

  Eisenmann et al. (2006) summarize related pricing rules as follows:

  - Subsidize consumer side when users are highly price sensitive, e.g. Acrobat Reader, streaming audio, streaming video.
  - Subsidize developer side when they are critical for adding value, e.g. applications development, operating systems, computer games or when they are the stronger attractant or gatekeeper, e.g. trend setters, textbooks.

• **Build in viral product or service components** to target the attention of the masses by encouraging individuals to pass on a marketing message to others (word-of-
mouth), creating the potential for exponential growth in the message’s exposure and influence.

Example: Hotmail gave away free email addresses and services and attached simple tag at the bottom of every free message sent out: “Get your private, free email at http://www.hotmail.com”. Other users signed up and propelled the message still wider to their own ever-increasing circles of friends and associates. Example: Dropbox’s referral system lets users get bonus storage space for recommending the service to others.

Example: Most Skype users have been recruited by others to share free and low-cost Internet calls.

- **Continuously innovate** by improving utility and user experience to attract new users.

Example: Amazon came up with a lot of firsts in the industry, innovating its way to an unparalleled buying experience.

- **Foster Exchange between same-sided users** by identifying common themes of interest and enable an exchange environment, provide a sufficiently high volume of content to exchange and establish accurate term of conditions and good governance to foster a vivid community. Don’t forget to establish rules and regulations to protect integrity of exchange and trust and take care for transparent surveillance and monitoring of activities. Continuously improve the exchange function. In certain case, training and certification might help to meet quality expectation.

Example: geocaching.com supports a worldwide geocaching community, wherein more than 400 dedicated volunteers act as reviewers, ensuring that geocaches meet geocaching guidelines; moderators, guiding and monitoring participation in geocaching discussion forums or translators translating geocaching content.

- **Foster Exchange between cross-sided users** by identifying common themes of interest and enable an exchange environment between cross-sided user groups, provide a sufficiently high volume of content to exchange and establish accurate term of conditions and good governance to foster a vivid community. Don’t forget to establish rules and regulations to protect integrity of exchange and trust and take care for transparent surveillance and monitoring of activities. Continuously improve the exchange function. In certain case, training and certification might help to meet quality expectation.

- **Continuously demonstrate the value that users achieve** by showing off the value that is provided by the product or service as publicly as possible to ensure that the message is passed on to others. Photos, leads, connections, friends, “likes” or any other statistic represents a feasible way to encourages others to join in and
to trigger competitiveness amongst some users, further increasing the rate of adoption.

**Example:** Google in its early days frequently its URL index, e.g. in 2000 they announced the first billion-URL index and claimed being the world’s largest search engine. In 2002 the American Dialect Society members vote “google” the “most useful” Word of the Year for 2002.

**Phase IV: Extend business scope** sequentially by leveraging the user base as an asset to expand into adjacent markets! Remember never dropping below critical mass. In example, Amazon expanded away from an online bookstore towards an online retailer of books, movies, music and games etc. Complementation and knowledge sharing are ideally enabled by measures that improve the flexibility and co-learning to cope with changing, loosely coupled partners (e.g. (Gosain, Malhotra, & El Sawy, 2004); (Jacobides, 2005); (Ozcan & Eisenhardt, 2009)). Therefore, the focal firm should avoid relying on fixed structures, partner roles, or relationships in which case it would interfere the process of “[…] learning by bringing together a diversity of partners with different capabilities and experiences” (Williamson & De Meyer, 2012). The orchestrator should proactively link so far unconnected partners from distant parts of the ecosystem (Ozcan & Eisenhardt, 2009).

### 10.4. Rethinking the business model of the iWidget Water service platform

In the sequel, we will rethink the business model of the iWidget water service platform by trying to leverage network effects. The principle platform setting is depicted in figure 59.

![Figure 59: Rethinking the business model - 1](image-url)
Through creative thinking we identify the following sources of network effects that might support driving platform adoption. Our key intention is to:

- Foster exchange between same-sided users;
- Foster exchange between cross-sided users;
- Provide complementary benefits.

Figure 60: Rethinking the business model - 2

Figure 60 depicts the major drivers of direct and indirect network effects:

- **Water utilities**: Water utilities represent the demand side of the platform, requiring consumption data and analytical services to improve their operational efficiencies. The adoption behaviour of water utilities is driven by pricing and the quality of data, depending on the number of householders on the data supply side. A major driver of direct networks represents the ability to compare water utilities among each other, which we consider a key enabler of sustainability in the European water sector, overall.

- **Water consumers**: Water consumers represent the supply side, delivering the required consumption data. For them, the value of the iWidget service platform depends on the variety and quality of services they may access over the platform. This indicates that iWidget Ltd. should partner with payment service providers and even might think about integrating a supplier platform like Alibaba.com into the business model to piggy back onto an existing platform community. Key driver of platform adoption are services that are free of charge.
or considered adequate for the service delivered. Direct network effects may be leveraged by passing on discounts gained through scale effects and e.g. by granting credits points when acquiring an additional household e.g. through word of mouth.

- **Water utilities and water consumers:** Indirect network effects among both platform groups might be leveraged by a joint awareness of achieving sustainability together. E.g. a ranking might compare regions or countries, including e.g. certain infrastructure investments for the region.

### 10.5. Implications of the iWidget water service platform on a water utility’s revenue

This section will discuss the implications of an iWidget Water service platform on a water utility’s revenue. Instead of discussing new strategies for financing and operating public water systems or considering water pricing strategies to encourage water conservation, we envisioned a Water service platform that provides strong value propositions to each participating platform user group. In this section, we will assume that the platform’s water service portfolio and pricing is attractive enough to convince householders to install smart meters and change their behavior towards more sustainable water consumption behaviour. The question that results from this assumption is: What are the platform’s implications on the utility’s operating and non-operating revenues if water consumers use less water?

Figure 61 highlights the implications of the iWidget water service platform on the traditional water utility’s business model:

- **Key partners:** Via the iWidget water service platform water utilities gain access to a business ecosystem of partners, delivering the services, which might be offered by the water utility.

- **Value proposition:** In addition to their traditional services of a reliable water supply and sustainable water sanitation, the iWidget water service platform enables water utilities to provide their customers with additional water related services that might represent a new revenue stream for the water utility.

- **Customer relationship:** By using the iWidget water service platform water utilities are enabled to improve their customer relationship, in particular by becoming a trusted advisor and the local driver and enabler of their customers’ a sustainable lifestyle.

- **Cost structure:** Adequate platform fees need to be included into the cost structure of the water utility.

- **Revenue streams:** By participating in the iWidget water service platform water utilities are enabled to uncover a new revenue stream related to water service fees.
<table>
<thead>
<tr>
<th>Key Partners</th>
<th>Key Activities</th>
<th>Value Proposition</th>
<th>Customer Relationship</th>
<th>Customers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business ecosystem of partners, accessible via the iW Water service platform</td>
<td>Water generation and supply Quality control Waste water treatment</td>
<td>Reliable water supply in high drinking quality at a “socially acceptable” price. Sustainable water sanitation</td>
<td>Trusted advisor Local driver and enabler of a sustainable lifestyle</td>
<td>Households Agriculture Industries Public entities</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Key Resources</th>
<th>Value Proposition</th>
<th>Customer Relationship</th>
<th>Customers</th>
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</thead>
<tbody>
<tr>
<td>Access to water Water Grid Customer base Consumption data</td>
<td>Sustainable water services</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Key Resources</th>
<th>Channels</th>
<th>Costs Structure</th>
<th>Revenue Streams</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access to water Water Grid Customer base Consumption data</td>
<td>Direct sales over the public grid Web page</td>
<td>Supply costs, Water Grid infrastructure costs, environmental costs, Human Resources Platform usage fees</td>
<td>Tariffs, Taxes and public transfers Water service fees</td>
</tr>
</tbody>
</table>

Figure 61: Rethinking the traditional water utility business model - 1

Figure 62 depicts the potential value creation architecture from the water utility’s perspective.
The implications on a water utility’s operating and non-operating revenues, however, move beyond the water utility’s ability to unlock a new revenue stream. Although a demand reduction would lead to reduced water sales in the short run and in turn, for lost utility returns, the iWidget water service platform would allow water utilities to:

- Reduce the variable costs as less water is delivered, in particular:
  - reduced costs of chemicals used in treatment and distribution,
  - reduced energy costs associated with pumping and treatment processes,
  - reduced sludge disposal costs and
  - reduced maintenance expenses, e.g. the replacement of filter-bed material.
• These cost reductions are expected to be less than what is needed to offset lost revenues. The loss might be covered by the additional service revenues in the short run.

• The major cost benefit relates to reducing long term costs that can be avoided as planned new facilities are deferred or cancelled. In addition, water utilities might also incentives their customers to reduce water consumption in peak times, e.g. through credit points (see figure 60). This would allow utilities to downsize or delay construction of planned treatment facilities, thus, providing lower long-term marginal costs.

Overall, we expect the iWidget water service platform to help water utilities cover their full cost, while avoiding implementing higher water tariffs.
11. Conclusions

This document contains in part A the final general framework/guideline for a business case calculation. In part B it focuses on advancing business research in the area of “suitable business models for business network collaborations”, which we pursue at the example of “multisided platforms for smart water networks”. Throughout part A we developed the general framework for a business case calculation, addresses four main sections: (1) introduction (2) qualitative analysis (3) quantitative analysis as well as (4) summary. As a guideline, the document presents for each category tools which can be chosen by the business case author depending on the audience. The guideline is written from a practitioner’s viewpoint based on knowledge accumulated in SAPs business research team as well as on key readings in the area.

Throughout part B of this document we primarily developed a new business model for the water sector we termed “iWidget water service platform”. We consider the change in the water utility’s role from being a provider of reliable water services towards being the local driver and enabler of a sustainable lifestyle as major transformation. The water utility’s role change, thereby, is facilitated by the iWidget water service platform. Therefore, the iWidget platform (a) provides water utilities with advanced analytics to improve their operational efficiencies and (b) enables water utilities to unlock new water related service revenue streams to cover revenue losses occurring through water demand reduction in the short run and improving the water utility’s profitability over a longer period. We consider this business model as novel to the water sector that entails great potential, but also risks. For the time being, the iWidget DSS consists of different widgets that are accessible by water utilities and water consumers, enabling both customer groups to become more resource efficient. Implementing the iWidget water service platform would require further develop efforts and investments. Based on our assumptions made in the business case, we believe that such an investment would be profitable for a private company.
12. References

A


B


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