# USE CASE ANALYSIS AND EVALUATION CRITERIA SPECIFICATION

# D2.1

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# Executive Summary

This document addresses CloudSocket from a business perspective and serves as an entry point for business and IT alignment within the project.

This report (1) shows typical business scenarios performed in start-ups and SMEs and corresponding business processes that could be supported by cloud offerings, (2) describes how a process repository for business processes has been developed and implemented (3) demonstrates the benefits for start-ups and SMEs of using cloud offerings, and (4) provides a strategic instrument to determine the success of CloudSocket from broker perspective.

Two use cases were analysed in order to capture the requirements of start-ups and SMEs: Business Incubator (start-ups) and Cluster Business Process Broker (SMEs). Based on the use case requirements a general repository structure was developed. The repository was then populated with start-up and SME business processes. The final result consists of a business process repository with an initial set of reference processes.

To determine the benefits of using cloud offerings a sample process of the use case partner was used. Several variants of this process have been created, simulated and compared. The results showed that different degrees of automation can have an effect on the process performance. Hence start-ups and SMEs can benefit from cloud based execution of business processes.

The approach of the Balanced Scorecard was used to define evaluation criteria to measure the success of CloudSocket from different perspectives. For this purpose success factors have been collected, which served as a basis to develop goals and corresponding performance indicators. The result consists of a set of criteria with corresponding key performance indicators.

## Project Context

| Workpackage | WP2: Use Case Requirements and Evaluation Criteria |
|---|---|
| Task | T2.1: Use Case Analysis and Evaluation Criteria Specification |
| Dependencies | This deliverable contributes to establish a common understanding which is particularly important for workpackages 3, 4 and 5. |

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# 1 INTRODUCTION

The CloudSocket project has chosen start-ups and SMEs as the primary target groups. These groups are currently excluded from using the cloud due to a lack of competence and high entry barriers. These barriers come in the forms of gaps between pragmatic, legally influenced and well-defined business processes and a gigantic cloud market with numerous offerings.

Start-ups and SMEs typically focus on their core business. Hence, there are several business processes such as customer relationship and campaigning that can only be insufficiently supported by IT by those organizations. Business processes in the cloud enable brokers to offer cloud-based execution of those business processes to support start-ups and SMEs. The goal of this document is to setup a common understanding about the CloudSocket approach and how it is defined and perceived from both business and technical perspective. The overall idea of the project CloudSocket can be formulated as "The Smart Cloud Business Process Broker", comprising of discovery, orchestration, deployment and execution of services in the cloud.

During these phases the level of integration is lifted from the technical to the business level. CloudSocket applies a model-based approach to affect this lifting and integration. A detailed analysis of the business requirements based on the phases - plan, model, manage and measure - is common in business and IT-alignment. On business level we have models such as business processes, rules or cases, which need alignment with models on IT level such as workflows, SLA and architectures.
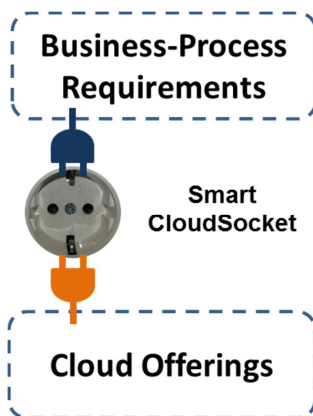
CloudSocket aspires to realise this vision by:

1) supporting the extraction of business- and IT-experts' knowledge in a human and machine interpretable format and enable smart integration and translation between business and IT models,
2) providing smart and intelligent tools to align business requirements to cloud offerings,
3) supporting model-driven and knowledge supported resource allocation of Cloud-based workflows,
4) enabling intelligent execution of models within a smart and adaptive BPaaS middleware and
5) reflecting process monitoring results from Cloud level to business level with the help of semantic enrichment and conceptual analytics.

There are two major challenges to be considered in CloudSocket:

1) Find the appropriate abstraction of cloud offering to be aligned with business process requirements.

2) Identify abstract business processes that can be used across domains, but enable domain-specific context considering special treatments of data, personal issues, branches etc.

The outcome of this document is an initial business process repository describing relevant business processes for the use cases, and a scorecard defining goals and KPIs as the basis for evaluation.

In order to develop the business process repository it is essential to understand challenges and requirements from end-user and broker (CloudSocket use case) perspective. Based on the findings of the use case analysis, relevant business processes and process variants are identified. The evaluation scorecard shall enable the broker to measure the benefit of CloudSocket from different perspectives, such as finance or market and customer perspective. Initial process simulations aim to demonstrate the benefit from a start-up or SME perspective by comparing the actual situation -process without cloud service- with target situation -process using cloud service.
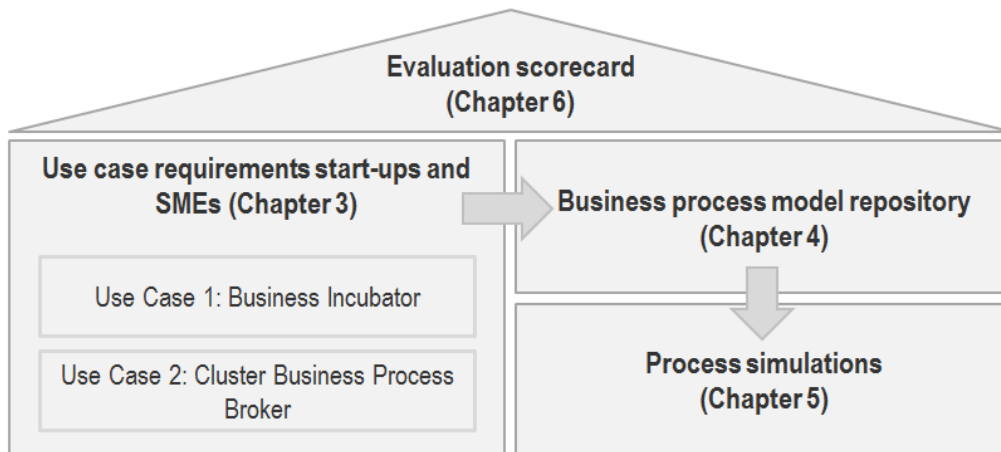
**Figure 1: Overview of the deliverable**

This deliverable is structured as follows:

- Chapter 1: Introduction provides an overview and the objectives of task 2.1.
- Chapter 2: Methodology describes the methodology that has been applied and to reach the defined goals.
- Chapter 3: Use Case Analysis constitutes the gathered use cases that have been obtained within the Business Incubator and the Cluster Business Process Broker use case.
- Chapter 4: Business Process Repository introduces the business process repository, its structure and how it is applied.
- In Chapter 5 Simulating Potential Cloud Effects a selected process example is simulated in order to quantify the benefits of CloudSocket for start-ups and SMEs.
- Chapter 6: Evaluation criteria contain the balanced scorecard structure and key performance indicators that will be applied to the project.
- Finally, chapter 7 Conclusion and Outlook  summaries and concludes the results of task 2.1.

# 2 METHODOLOGY

In this chapter we give an overview of the applied approach in analysing the use case scenarios in five steps:

- In the first phase we captured the requirements and challenges of both start-ups as well as SMEs and described the findings. This has been done in workshops with the use case partners BWCON and MATHEMA.
- In a second step based on the use cases several approaches for structuring the business process repository have been considered and a structure has been suggested, which combines the general process classification framework of APQC with the business model view of the companies.
- In addition to the structure of the process repository the cloud brokering process has been defined as an extension of the existing consulting process of the use case partner BWCON.
- As a support method for deciding on the appropriate level of cloud support for business processes we propose the simulation of different process variants.
- The evaluation criteria and KPIs for CloudSocket have been described in a balanced scorecard (BSC). The initial version of the BSC has been developed in a workshop and then consolidated by considering overall goals of cloud computing.

In this chapter we give a general overview of the approach for each of the subtasks. Details will follow in chapters 3 to 6.

## 2.1 Use Case Requirements

In order to understand the requirements we performed case studies at two CloudSocket use cases: Business Incubator and Cluster Business Process Broker. The business incubator (founder agency) supports entrepreneurs in the pre-start-up, start-up and growth phases. Cluster Business Process Broker addresses the ICT/Robotics cluster in the Tuscany region, where the majority of the members are small and medium enterprises. In order to define the scope of the term "SME" we follow the definition of the European Commission (2003): SMEs employ not more than 250 persons and their annual turnover either doesn't exceed 50 million or the annual balance sheet doesn't exceed 43 million.

Since the balance sheet and annual turnover play a minor role in case of CloudSocket, we consider only the employee thresholds to define SMEs: micro (fewer than 10 employees), small (fewer than 50 employees) and medium-sized (fewer than 250 employees). Start-up companies are also regarded as SMEs, in particular as micro enterprises in the early stages of their business development.

The approach used to develop and describe the use cases builds on the methodology of storytelling. Since this deliverable sets up the scene for business requirements for business and IT alignment, the requirements should be presented in a form that is easily understandable for all stakeholders. Basically a story consists of the following main elements: actors, starting situation, transformation and end situation. The starting and end situation, as the name already implies, describe under which circumstances the story begins and how it ends. It is important to note that in this document the initial situation is an anonymised real case, whereas the end situation is an envisioned scenario which may exist in the future. The transformation stands for events that occur in between (McKee, 2013).
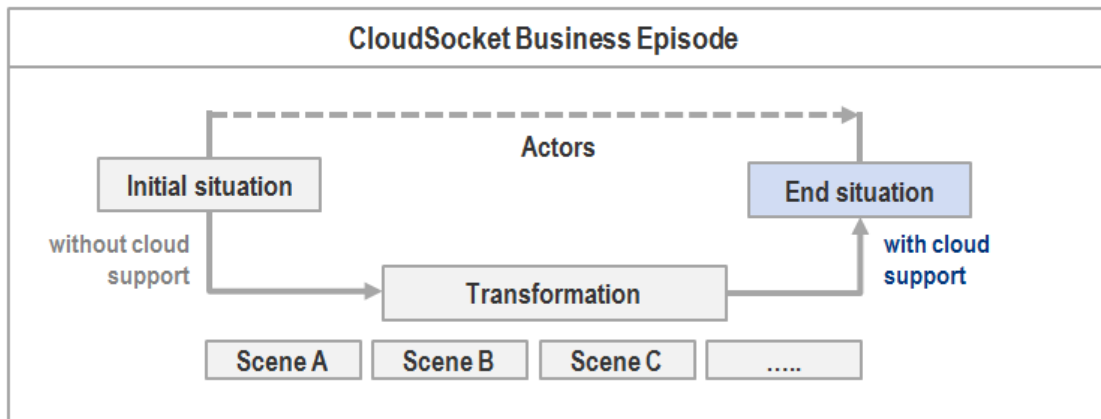
**Figure 2: Concept of Storytelling adapted to CloudSocket business episode**

The concept of storytelling has been applied and adapted for the purpose of CloudSocket (see Figure 2). A business episode (=story) gives a brief overview of the starting situation and first indications, which represent in this case the end situation, of how cloud services could support the enterprise. Then it is described how the enterprise deals with the situation now -means without cloud service support- using the concept of different scenes - transformation. In addition, each scene refers to potential business processes that might be supported with cloud offerings. The business episodes and scenarios are based on true stories as they occur in start-ups. However, the stories have been extended to emphasize typical situations relevant for CloudSocket. The real names of the companies and actors are anonymized.

## 2.2 Development of Business Process as a Service Repository

The goal of the second phase is to build a business process as a Service repository with an initial set of pre-defined business processes. These process collections represent variants of typical processes of an enterprise with different levels of cloud computing support.

In order to manage the process repository a structure is required, which consists of different abstraction layers and serves as a guiding principle to classify the processes. Initially it has been examined from which perspective to derive this structure. Different influencing factors form the starting point of process identification from business perspective, such as competitive strategy, the services and products, customer segments, customer requirements and the business model. Processes are examined from various perspectives following the guiding principle that "the quality of a model is higher the better it serves the purpose of use from the viewpoint of the user" (Becker et al., 2003). Hence the top level hierarchy should be developed with respect to the intended use and purpose of the process repository.

In order to structure the process repository we examined several approaches and frameworks, in particular Porter's value chain, the APQC's process classification framework (PCF) and the Business Model Canvas from Osterwalder & Pigneur (2010).

The process repository should be general enough to be used for any enterprise but also support a specific enterprise to identify and organize the appropriate processes. Based on a general analysis and in consultation with the use case partners we developed a four layer structure with APQC's PCF first three layers and process variants on the fourth layer. Additionally we use the Business Model Canvas as an entry portal, supporting a mapping from the business model elements to processes and process groups of the PCF. Details auf the structure and the rationale are described in section 4.1. Figure 3 summarizes the methodology used to develop the CloudSocket business process repository. The repository has been developed using the ADONIS® toolkit.
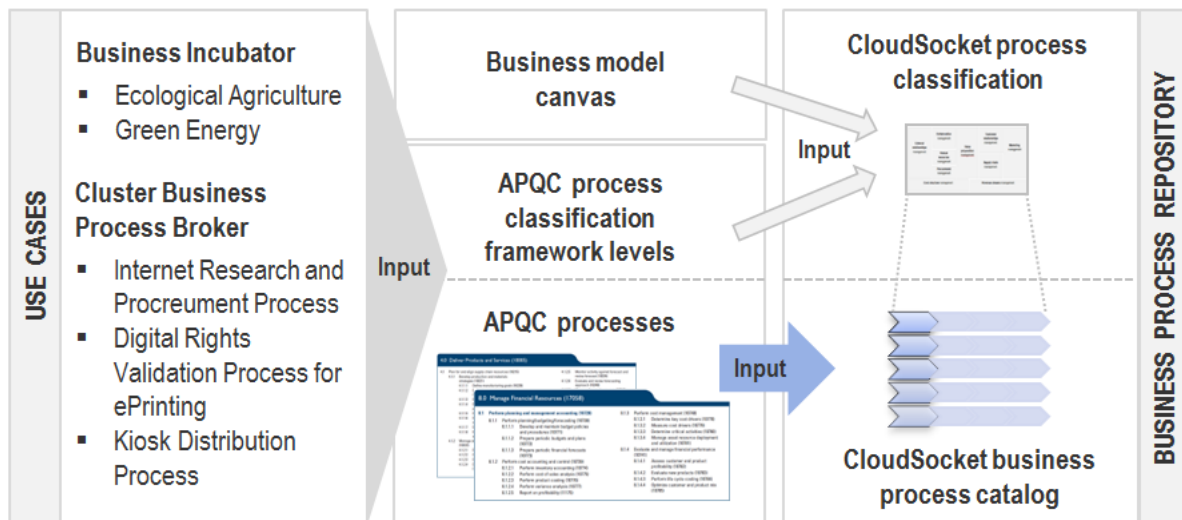
**Figure 3: Approach used to develop business process repository**

## 2.3 Process Simulation

The focus of CloudSocket is on micro, small and medium sized enterprises and on start-ups. Processes, especially support processes, of SMEs often have been historically developed and kept until today. Going into the cloud means to re-engineer the processes in a way that cloud services are used appropriately. Start-ups, however, face the problem to implement the processes for the first time, thus having to choose the appropriate cloud support without having had any previous experience.

We introduced the simulation approach, in order to communicate cloud technology potentials to business people within start-ups and SMEs. Hence the focus is not on business process management and improvement, but on the demonstration which effects can be achieved when using cloud offerings within daily business processes. To demonstrate the simulation approach we propose four variants of the process "Internet Research and Procurement" from a business story of MATHEMA. The variants have embedded different services from of the cloud. See chapter 5 for details of the simulation.

## 2.4 Evaluation Criteria

Purpose of the evaluation criteria is to measure the benefit of the CloudSocket project from broker and hence use case point of view. It is expected that it supports the cost-benefit analysis of a CloudSocket. The principle of a Balanced Scorecard is used to define goals and KPIs aimed to be achieved within the project, as the approach is flexible and adaptable.

The Balanced Scorecard (Kaplan & Norton, 1992) is a strategic instrument which provides organizations with the ability to translate their vision and mission into a set of performance metrics. It allows organizations to link strategic objectives to long term targets, and to monitor its current performance and improvement efforts. The Balanced Scorecard considers four different perspectives: financial perspective, customer perspective, internal process perspective, and learning and growth perspective. The term "scorecard" stands for performance measures and "balanced" means that the system is balanced between: internal and external performance perspectives, financial and non-financial measures, short- and long-term objectives, and legging and leading indicators.

The approach of the Balanced Scorecard has been refined to introduce perspectives relevant for CloudSocket. The evaluation criteria were developed from the viewpoint of the cloud broker, which will use the methods and tools to design, allocate execution and evaluate business processes in the cloud. In a first workshop candidates

for the scorecard perspectives and first success factors for the broker have been identified. After individual reviews the final perspectives have been set and appropriate strategic goals were elaborated. They were then consolidated and extended by general goals of cloud computing and insights from the use case analysis. Based on these findings candidates of key performance indicators (KPI) were derived, reviewed and adapted by the team. The final evaluation criteria are listed and explained in chapter 6. We used the ADO*score*® tool to develop and model the strategic goals and the key performance indicators. Figure 4 depicts an overview of the process how the KPIs have been derived through the Balanced Scorecard creation.
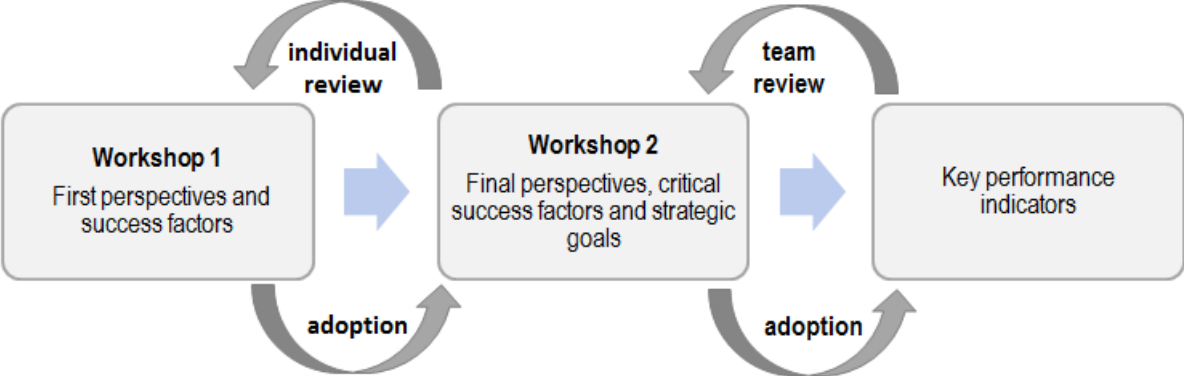


**Figure 4: Approach used to develop the CloudSocket Balanced Scorecard**

# 3 USE CASE ANALYSIS

This chapter introduces the use cases of both use case partners. They have been collaboratively developed by BWCON, MATHEMA, BOC and FHNW using workshops and online sessions.

In a first step we analysed the Business Incubator business case from BWCON. Starting point was the Green Innovation and Investment Forum (GIIF) in Stuttgart that provides start-ups from the green technology and eco-innovation sector with a forum to connect founders with potential investors. The goal was to gain a deeper understanding for the start-up environment and for the challenges and concerns of entrepreneurs. The GIIF is organized as follows: One day before the pitching event takes place, founders benefit from coaching and advice from experts on how to present their business idea and how to convince investors in order to get funding. On the second day, about 20 entrepreneurs present their business ideas in parallel sessions, which are divided in "early stage" (pre- and start-up phase) and "advanced stage" (growth phase) presentation slots.

As CloudSocket has the potential to support both phases the use case analysis was performed with both early stage and advanced stage start-ups. Besides we took the opportunity to observe the environment and to get involved in discussions with founders and investors. The participation in the GIIF enabled us to gain valuable insights into the start-up environment.

After the GIIF a workshop was conducted with participants from BWCON, FHNW and BOC, in which we started to capture the requirements of start-ups. Initially BWCON introduced its business model and the services they offer. In a second step we identified and developed initial use cases, which reflect typical requirements of start-ups. After the workshop an initial set of detailed descriptions of business scenarios and business episodes has been provided by BWCON, following the story telling approach as described in chapter 2.1. The focus of the use cases was on support processes for start-ups.

The descriptions have been analysed and a common structure has been defined that can be applied to the cases of both partners. The structure was commonly agreed in various online sessions between BOC, BWCON, FHNW and MATHEMA. It consists of a template for the description and an overview of the business model based on the Business Model Canvas from Osterwalder & Pigneur (2010).

This structure of the use case description has then been used to describe the use cases of the ICT/Robotics cluster. This was done at a workshop that has been conducted with MATHEMA, BOC and FHNW. During a full-day meeting in Florence MATHEMA introduced the objectives and organization of the ICT/Robotics cluster. Then a set of use cases have been selected and analysed in more detail. It became evident that the overall structure of the use case descriptions can be applied to the use cases of MATHEMA. After this workshop MATHEMA provided descriptions of a set of business scenarios with a focus on brokerable business processes. The descriptions were again discussed and consolidated in online sessions.

As cloud technology can support an enterprise in different ways, the Business Model Canvas has been identified as an appropriate way to demonstrate cloud support. Hence a short introduction into the concept of the Business Model Canvas will be given in chapter 3.1. Chapter 3.2 depicts the two use cases of Business Incubator: Ecological Agriculture and Green Energy. Chapter 3.3 contains the three use cases of Cluster Business Process Broker: Internet Research and Procurement Process, Digital Rights Validation Process for ePrinting, and Kiosk Distribution Process.

## 3.1 Overview Business Model Canvas

The Business Model Canvas has been used to indicate different cloud support for different business episodes. The Business Model Canvas was initially proposed by Osterwalder (2004) and is based on a PhD thesis on business model ontologies. Osterwalder & Pigneur (2010) describe a business model as "the rationale of how an organization creates, delivers and captures value". Following the approach of the Business Model Canvas enables the identification of cloud technology in new and existing businesses by describing their business models – e.g. use of cloud offerings to improve business processes - as well as by elaborating strategic alternatives using cloud offerings – e.g. becoming a CloudSocket broker. Canvas itself is a template, consisting of a visual chart with nine building blocks (see Figure 5), which is used to develop new or to depict existing business models.

The following overview contains a description of the underlying idea of each building block (Osterwalder & Pigneur, 2010).

| | |
|---|---|
| **Customer Segments** | An organization has one or more customer segments. |
| **Value Proposition** | The goal of organizations is to solve problems of customers and to meet their needs with value propositions. |
| **Channels** | Value propositions are delivered through different channels: distribution, communication and sales channels. |
| **Customer Relationships** | "Customer relationships are established and maintained with each Customer Segment". |
| **Revenue Streams** | "Revenue streams result from value propositions successfully offered to customers". |
| **Key Resources** | Key Resources are the assets that enable organizations to offer and deliver aforementioned elements… |
| **Key Activities** | "…by performing a number of Key Activities". |
| **Partnerships** | Activities might be outsourced or acquired outside the organization. |
| **Cost Structure** | "The business model elements result in the cost structure". |

Figure 5 shows the Business Model Canvas template (adapted from Business Model Foundry). The questions and examples in each building block have been used as guidelines for the design process of the use case business models.

## Key Partners 🔗

Who are our Key Partners?
Who are our key suppliers?
Which Key Resources are we acquiring from partners?
Which Key Activities do partners perform?

**MOTIVATIONS FOR PARTNERSHIPS**
Optimization and economy
Reduction of risk and uncertainty
Acquisition of particular resources and activities

## Key Activities ✔

What Key Activities do our Value Propositions require?
Our Distribution Channels?
Customer Relationships?
Revenue streams?

**CATEGORIES**
Production
Problem Solving
Platform/Network

## Key Resources 🏭

What Key Resources do our Value Propositions require?
Our Distribution Channels?
Customer Relationships?
Revenue Streams?

**TYPES OF RESOUCES**
Physical
Intellectual
Human
Financial

## Value Propositions 🎁

What value do we deliver to the customer?
Which one of our customer's problems are we helping to solve?
What bundles of products and services are we offering to each Customer Segment?
Which customer needs are we satisfying?

**CHARACTERISTICS**
Newness
Performance
Customization
"Getting the Job Done"
Design
Brand/Status
Price
Cost Reduction
Risk Reduction
Accessibility
Convenience/Usability

## Customer Relationships ❤

What type of relationship does each of our Customer Segments expect us to establish and maintain with them?
Which ones have we established?

**EXAMPLES**
(Dedicated) Personal assistance
Self-Service
Automated Services
Communities
Co-Creation

## Channels 🚚

Through which Channels do our Customer Segments want to be reached? How are we reaching them now? How are our Channels integrated? Which ones work best?

**CHANNEL PHASES**
1. Awareness
2. Evaluation
3. Purchase
4. Delivery
5. After sales

## Customer Segments 👥

For whom are we creating value?
Who are our most important customers?

Mass Market
Niche Market
Segmented
Diversified
Multi-sided Platform

## Cost Structure 🏷

What are the most important costs inherent in our business model?
Which Key Resources are most expensive?
Which Key Activities are most expensive?

**IS YOUR BUSINESS MORE**
Cost Driven
Value Driven

**SAMPLE CHARACTERISTICS**
Fixed Costs (salaries, rents, utilities)
Variable costs
Economies of scale
Economies of scope

## Revenue Streams 💰

For what value are our customers really willing to pay?
For what do they currently pay?
How are they currently paying?
How would they prefer to pay?
How much does each Revenue Stream contribute to overall revenues?

**TYPES**
Asset sale
Usage fee
Subscription Fees
Lending/Renting/Leasing

Licensing
Brokerage fees
Advertising

**Figure 5: Business Model Canvas (adapted from Business Model Foundry)**

## 3.2 Use Case 1: Business Incubator

In the following concrete use cases from potential end users of the CloudSocket are introduced in order to identify concrete business processes and derive relevant characteristics of the business process repository.

### 3.2.1 Ecological Agriculture

Maja Schmid, 28 year old, biologist, has an interesting and promising business idea. Her father works in a restaurant which reported the problem of waste management. In the restaurant a lot of biological waste has to be managed. Susan, as entrepreneurial biologist, has an idea to take all this biological waste and stimulates a biological decomposition process. Usually such a process takes several years. Susan's idea is to use worm to fasten up this process. After some tests she has managed to transfer the biological waste into high quality humus in 60 days.

| Business Model Canvas Ecological Agriculture | | | | |
|---|---|---|---|---|
| **Key Partners**<br><br>▪ Food companies/organic waste "providers" | **Key Activities**<br><br>▪ Production of fertilizer from organic waste | **Value Propositions**<br><br>▪ Deliver high quality organic fertilizer | **Customer Relationships**<br><br>▪ Communities (mass market)<br>▪ Key accounts (waste provider) | **Customer Segments**<br><br>▪ Amateur gardeners<br>▪ Turf farmers<br>▪ Garden centres |
| | **Key Resources**<br><br>▪ Worms<br>▪ Production facility<br>▪ Human knowledge (decomposition process) | | **Channels**<br><br>▪ Direct selling to large homemade stores | |
| **Cost Structure**<br><br>▪ Production facility<br>▪ Personnel<br>▪ Office infrastructure | | | **Revenue Streams**<br><br>▪ Sales of fertilizer | |

**Table 1: Business Model Canvas ecological agriculture**

| Business Episode Ecological Agriculture | |
|---|---|
| **Initial situation:**<br>Susan has applied with her idea to the Stuttgart Green Innovation and Investment forum (GIIF) managed by BWCON. Her idea has got very positive feedback and she has won the competition. After this the BWCON consultants have discussed with her about how to transfer this business idea into a solid business model.<br><br>**CloudSocket technology intervention:** Maja requires a range of different cloud services depending on whether the company is in the pre start-up, start-up or growth phase. | |
| **Scene A:**<br><br>**Consulting** | In the first sessions with BWCON experts they discussed the type of the business. Here several options are on the table. License model, technology selling, consulting services, own production. In these sessions the operational, legal and marketing specific implications are discussed and several options have been considered.<br>Maja finally said, that the implementation of these business models is complex and she is afraid to invest too much in IT infrastructure and she asked the BWCON experts for help. First, Maja preferred to go for a consulting model. Here, economy of scale effects are not possible, however, it is a solid growth strategy. The BWCON business tools are then used to prepare a solid business plan presented to a bank. |

| | | |
|---|---|---|
| | **Potential Business Processes supported with Cloud offerings:** Communication and / or collaboration processes (incl. email or telephone offerings), marketing and or advertisement processes, financing planning and / or business plan creation processes. | |
| **Scene B:** **Company growth stage** | We imagine that in future the consulting business becomes stable, but Maja is fully convinced, that more can be achieved. During this year she has played in the free time with different worms and a process how to optimize. She has decided to start with humus production and direct marketing of humus. Here clients are all do-it-yourself stores in Germany. The challenge here is to implement the sourcing logistics and the selling logistics, ordering and direct marketing. Further contracts and payment processes are to be implemented in IT. During the BWCON consulting session she realized, that in the first step, only the do-it-yourself stores in Baden-Württemberg can be provided with humus. Further growth strategies require decentralized production plants. | |
| | **Potential Business Processes supported with Cloud offerings:** Procurement processes, marketing and / or advertisement processes, sourcing logistic processes, selling logistic processes, ordering (management) processes, payment processes | |
| **Scene C:** **Company maturity stage** | We imagine that in future Maja has by then four production plants in Germany, two in Austria and one in Switzerland. The sourcing logistics and the sales process is fully implemented in a CloudSocket Infrastructure. Here, a central logistics management of several large waste "provider" is implemented and the different locations producing humus are connected via the CloudSocket infrastructure. The business model applied is direct selling to large homemade stores like OBI, Hornbach and Bauhaus. Each packet leaving a homemade store is directly communicated to the production cloud and is initiating a further production and logistics process. | |
| | **Potential Business Processes supported with Cloud offerings:** Sales processes, taxed based archiving processes, billing processes, cross-country sourcing logistic processes, cross-country selling management processes | |

**Table 2: Business episode ecological agriculture**

## 3.2.2 Green Energy

Mr. Hans Müller is the CEO of a small-scale virtual power plant which connects to a grid infrastructure with power generation from wind, photovoltaic, and biogas. The company serves its customers with environmentally friendly energy for household and provides smart home functions through its remote access capability for turning appliances on or off.

| Business Model Canvas Green Energy | | | | |
|---|---|---|---|---|
| **Key partners**<br><br>▪ Partners with license for running rental facility<br>▪ Payment service provider | **Key Activities**<br><br>▪ Offering local charging stations with sufficient full batteries<br>▪ Management of partners with license for cross-country rental service<br>▪ Customer service | **Value Propositions**<br><br>▪ Range extension for drivers of electric cars | **Customer Relationships**<br><br>▪ Self-service | **Customer segments**<br><br>▪ Drivers of electric vehicles |
| | **Key Resources**<br><br>▪ Charging stations | | **Channels**<br><br>▪ Charging stations | |
| **Cost structure**<br><br>▪ Operation of local charging stations<br>▪ Charging and delivery of batteries for local charging stations<br>▪ Personnel | | **Revenue streams**<br><br>▪ Battery renewal service<br>▪ Licenses for running rental facility | | |

**Table 3: Business Model Canvas green energy**

| Business Episode Green Energy | |
|---|---|
| **Initial situation:** The business goes well. The company is intending to expand its services to include mobile energy sources for recharging electric cars and offer them for rental as range-extending for drivers e.g. for a long weekend trip. With this idea Mr. Müller has contacted BWCON consultants to discuss the plan. | |
| **CloudSocket technology intervention:** Mr. Hans Müller requires a range of different cloud services that support the growth stages of the company taking into account already available IT solutions. | |
| **Scene A: Consulting** | In the sessions with BWCON experts they have analysed the market of electric car charging, potential power suppliers, possible pricing models, and financing planning, and they have used CloudSocket modelling tool to simulate and validate possible business processes. The core discussion in the early stage is how to manage the process of distributing the batteries and how to finally define any kind of business model.<br>In the first plan the batteries are sold to resellers at a given price. Having implemented a pure marketing and sales infrastructure the economic success was not there. The main problem was the margin of the resellers and the lack of market penetration. Due to the fact that the infrastructure has been implemented (just by configuration) in CloudSocket infrastructure the company could survive. |
| | **Potential Business Processes supported with Cloud offerings:**<br>Market analysis processes, financing planning processes, business process design and validation processes, logistic processes, sales management processes |

| | |
|---|---|
| **Scene B:**<br><br>**Inland rental service** | We imagine that the company offers drivers with mobile energy sources as range-extender for rental at motorways. The service is based on a membership model. Members have a membership card which allow for quick and easy identification and payment. Here, members get a long range mobility service and product service system where different subscription services can be booked. A "Gold Service" with a maximum waiting time of 5 minutes at a fuel station and a silver model with a maximum waiting time of 2 hours.<br><br>Key challenge is to manage that all stations are provided with sufficient full batteries. Further, a central identity management is needed in order to implement efficiently authentication and authorization as cloud service. Further, for providing the services to the gold user's CloudSocket infrastructure has a resource planning infrastructure where a supercomputer calculates the different needs in terms of batteries at the different stations and a logistics process distributes the batteries in time. This ensures a logistics process and a global resource planning needed provide each stations with sufficient fully charged batteries as needed.<br><br>All the booking and logistics is done via the green energy app which gets real time data from the CloudSocket infrastructure. The IT services are implemented in the CloudSocket infrastructure. |
| | **Potential Business Processes supported with Cloud offerings:**<br>Membership management processes, payment processes, billing processes, contract management processes, compute resources for global selling resource planning, authentication/authorization process, logistic processes |
| **Scene C:**<br><br>**Cross-country rental service** | Years later, the company has built successful business and wants to expand to make cross-country motorway rental service. Drivers can rent range-extender at a motorway station and drop it off at a station at the end of the trip in the target country. Billing is based on driving distance. In this model the range extenders are given away for free and the charging service can be purchased as a subscription and maintenance package.<br><br>This model is considered as most innovative because of the permanent cash flow to the company compared to a "one time business".<br><br>The company issues licences for partners running rental facilities in different countries. Here all processes are placed to the cloud infrastructure and on top a large billing infrastructure is placed. |
| | **Points of attention for CloudSocket technology:**<br>Partner organization, license, insurance, cross-country identity management, billing |

**Table 4: Business Episode green energy**

## 3.3   Use Case 2:  Cluster Business Process Broker

### 3.3.1   Internet Research and Procurement Process

The Santilla S.R.L sells software and integrated appliances/electronic components that make devices "internet ready" in a few seconds and employs 10 persons. From Santillas perspective at least for the next ten years most of the electronic devices will not be able to connect directly to internet services. Enterprises don't replace assets, unless a clear and compelling business case is defined, or the equipment lifecycle has ended. However, Santillas products enable enterprises to connect their electronic devices quickly and cost effectively to the internet.

| Business Model Canvas Santilla S.R.L | | | | |
|---|---|---|---|---|
| **Key Partners**<br><br>▪ Strategic business partners<br>▪ Certified installer | **Key Activities**<br><br>▪ Connect electronic devices to internet applications<br><br>**Key Resources**<br><br>▪ Human knowledge<br>▪ Software<br>▪ Hardware | **Value Proposition**<br><br>▪ Make electronic devices "internet ready" in a few seconds | **Customer Relationships**<br><br>▪ Dedicated personal assistance<br>▪ Self-service<br><br>**Channels**<br><br>▪ Daily delivery by vans<br>▪ Facebook private group | **Customer Segments**<br><br>▪ Small enterprises<br>▪ Large enterprises |
| **Cost Structure**<br><br>▪ Personnel<br>▪ Office space<br>▪ Logistics<br>▪ Research | | **Revenue Streams**<br><br>▪ Product revenue software<br>▪ Product revenue hardware<br>▪ Service revenue | | |

**Table 5: Business Model Canvas Santilla S.R.L**

| Business Episode Internet Research and Procurement |
|---|

**Initial situation:** The company continuously verifies prices of the electronic and mechanic components in the market and buys only products that match specific requirements in terms of customer needs and pricing. Monitoring the prices and the quality is a costly activity, which requires an ongoing analysis and trade-off between quality and price.

**CloudSocket technology intervention**: The company needs a solution that reduces the costs for procurement activities by improving the effectiveness of the procurement process. This could be achieved through an IT service that automatically checks the required components and prices, and decides (based on pre-defined rules) whether to buy or not.

| | |
|---|---|
| **Scene A: Research** | In this phase of the process all steps necessary to retrieve and query information from sources with respect to pricing and quality are considered. Within the company, Francesca and Giorgio are responsible for this phase. On a daily basis, each of them logs into the most relevant web-sites and directories for required electronic equipment in the context of projects and product lines that are currently progressing. The resulting specification documents and pricing information are stored and analysed. At noon they meet up to discuss their results and provide a daily report to Antonia, who is the team leader of the procurement department. |
| | **Potential Business Processes supported with Cloud offerings:**<br>Product and pricing research process, product management processes |
| **Scene B: Procurement** | In this scene, Antonia is responsible to take a decision on the analysis results and triggers the procurement process. This relates to establishing provider communication, running the negotiations on price, quality, and delivery options. She is supported in this task by her procurement specialist Giuseppe who has been active in this field since the foundation of the company. |
| | **Potential Business Processes supported with Cloud offerings:**<br>Procurement processes, , ordering management processes |
| **Scene C: Logistics** | The actual logistics on delivery and storage/inventory management are performed in the production unit of the company. Giuseppe informs the department on the order note that was sent and hands over the responsibility to the plant manager Claudia. Claudia is responsible to track the delivery, perform quality check and add the parts to storage and inventory. |

| | Potential Business Processes supported with Cloud offerings:<br>Logistic management processes |
|---|---|

**Table 6: Business episode internet research and procurement**

| **Business Episode Installer Acquisition and Certification** ||
|---|---|
| **Initial situation:** Santilla continually expands its network of certified installers. Certificated installers are expected to have a deep knowledge of Santillas solutions, and the installation and customization of the products. Installers obtain the certification through the partner (AP) program.<br><br>**CloudSocket technology intervention:** The company needs a solution to manage the identification and acquisition of installers, and to plan and manage training activities and certifications. Furthermore a cloud service should enable them to manage all activities relating to partnership management. ||
| **Scene A: Installer identification and acquisition** | We imagine that Luca is the coordinator of the AP Program. He deals with searching, selecting and contacting potential interested installers. He uses several information sources, like Yellow Pages, to get profile and contact information. This is a time-consuming daily activity. Luca uses Excel as a database to manage the contacts. Once he identifies the right contact through internet research, he adds the data (name, address, phone, email) from the webpage to the Excel sheet. |
| | **Potential Business Processes supported with Cloud offerings:**<br>Partner relationships processes, partner identification processes, partner management processes |
| **Scene B: Installer training** | Matteo deals with the training activities. The training course lasts two days and is held at the Santilla headquarter. Sometimes events are organized close to the area where a number of interested installers are identified. He organizes the classes according to the availability of the participants, distance of residence and business area of reference (industry, small business, families, etc.). In many cases Matteo has to contact the participants due to different incidents, such as last minute withdrawal, date changes, and missing confirmations. Overall the management of the training activities is time-consuming and requires a continuous trade-off between attendees' needs. |
| | **Potential Business Processes supported with Cloud offerings:**<br>Training participant registration processes, training management processes |
| **Scene C: Installer certification and activity tracking** | Once the training is completed the installers receive the Santilla certification. This means that they are entitled to provide technical support to Santilla customers. However, the activities of installers need to be tracked, since they are not done by the employees of Santilla. Hence for each maintenance/recovery activity on the electronic and mechanic components it is required to collect a report from the installer and to get customer feedback.<br>Reports are collected through MS Word templates sent by email, while customer feedbacks are collected through emails or telephone calls. The effort required for customer care and installer reporting is rising dramatically. The problem is that the training program and the related capillary service provided might be suspended, because of the management costs of the entire process. |
| | **Potential Business Processes supported with Cloud offerings:**<br>Partner contract management processes, ,document management process, customer feedback  management processes |

**Table 7: Business episode installer acquisition and certification**

### 3.3.2 Digital Rights Validation Process for ePrinting

The KETTA S.R.L developed an authoring platform that enables authors to produce ebooks and to distribute them quickly across digital retail marketplace. Their solutions cover the whole lifecycle of published material: from creation to use, from intelligent management to distribution. The company employs 40 persons and supports their customers during the stages of analysis and design, content management, and publication.

| Business Model Canvas KETTA S.R.L | | | | |
|---|---|---|---|---|
| **Key partners**<br><br>▪ Content owners (rights/license management) | **Key Activities**<br><br>▪ Development and maintenance of web platform for ebook publication | **Value Proposition**<br><br>▪ Efficient management of publication process for ebooks | **Customer Relationships**<br><br>▪ Personal assistance<br>▪ Self-service | **Customer Segments**<br><br>▪ Authors of ebooks |
| | **Key Resources**<br><br>▪ Software developers<br>▪ IT infrastructure for web platform | | **Channels**<br><br>▪ Web platform for ebook publication management | |
| **Cost structure**<br><br>▪ Specialized personnel (software engineering)<br>▪ IT infrastructure | | **Revenue Streams**<br><br>▪ Annual license<br>▪ Pay per use | | |

**Table 8: Business Model Canvas KETTA S.R.L**

| Business Episode: Verification and Acquisition of Rights and Licenses | |
|---|---|
| **Initial situation:** Verification and acquisition of rights and licenses for digital content are ongoing activities managed by dedicated personnel. When the amount of content tends to grow over hundreds of objects, these activities become time-consuming and inefficient.<br><br>**CloudSocket technology intervention:** The company needs a solution that simplifies the rights/license management. This could be achieved through an automated IT service that allows to check the intellectual property rights as well as the range of available rights/licensing market offers and costs. | |
| **Scene A:**<br><br>**New ebook** | We consider that Eta is going to deliver a new ebook for the lower level schools. They have opened the platform to several authors who contribute to the book and provide digital contents in a collaborative fashion. For this ebook there are six authors engaged. Each of them has the responsibility for a chapter of the ebook.<br>The platform basically allows the search, discovery and re-use of contents that are already stored in an internal repository in OAI-ORE format. Moreover, authors can upload contents from external enriching the content repository. The authors don't have any expertise in digital rights management and intellectual property rights (IPR). Most of them don't know, for instance, that using the same content for several times requires a specific license or authorization |
| | **Potential Business Processes supported with Cloud offerings:**<br>Collaboration processes, web platform, content repository, knowledge management processes |
| **Scene B:**<br><br>**Intellectual property rights** | Due to the existence of many different cases related to intellectual property rights, dedicated personnel spent days to verify new content uploaded from external. Research activities are related to the content owner, the content format, the distribution channels used to deliver the content, and so forth. Alessio und Riccardo start their revision work on the contents on Monday. |

| | |
|---|---|
| verification | Alessio is responsible for chapter one to three, while Riccardo should revise chapter four to six. Starting from page one Alessio gets the metadata of a picture and tries to find this picture on Google. In case he finds the picture, he tries to understand who the owner is, the rights associated, and the eventual costs of the license for content re-use. This activity usually requires from 30 minutes up to two hours depending on the availability of the information. |
| | **Potential Business Processes supported with Cloud offerings:** Information retrieval processes |
| **Scene C:** **Intellectual property rights acquisition** | This time the number of the pictures that Alessio and Riccardo need to verify is quite high, due to the target of the book (lower level school). This means that the ebook publication is stopped until verification is finished. Thus the ebook delivery rate is affected not only by the authors but also by the intellectual property rights validation. After two hours Alessio is able to determinate the intellectual property rights associated to the picture mentioned in scene B. The Alinari archive holds the intellectual property rights over the picture. In order to get the license for the publication a fee needs to be paid. Alessio lands on the Alinari webpage where he can select the picture and pay for it according to the re-usage level required. Alessio selects the 1) ebook format, and 2) commercial usage options. Then he pays with the credit card of the company to obtain the license. Once the transaction is completed, he receives an e-mail confirmation with the license attached. |
| | **Potential Business Processes supported with Cloud offerings:** Information retrieval process, payment process |

**Table 9: Business episode verification and acquisition of rights and licenses**

| Business Episode Customer Acquisition |
|---|
| **Initial situation:** The company needs to acquire new clients. Their target groups are basically publishers and editorial companies. Unfortunately the internal processes and the tools currently used don't allow an efficient exploitation of internal marketing resources. This situation puts the company at risk of product obsolescence and hence loss of investment in product development. |
| **CloudSocket technology intervention**: The company needs a solution to handle the whole customer acquisition process and that goes beyond traditional customer relationship management solutions. Moreover a cloud service should enable them to 1) identify relevant target groups/customer segments for their product, 2) to collect automatically relevant information of potential customers from different sources. |

| | |
|---|---|
| **Scene A:** **Task from CEO** | We imagine that Francesco is the head of the marketing division. He has received the task from the CEO to scale up the current market towards the EU. So far, the marketing has worked using the Excel file as a database for the contacts. Francesco coordinates a team of two colleagues (Marco and Chiara), who are in charge of key account management and business development. Their daily activities are a) extending the Excel file with new contacts, b) doing research on prospective customers by collecting profiles, turnover, market share, owners, products, clients etc., c) contacting potential customers, and d) arranging appointments with potential customers. |
| | **Potential Business Processes supported with Cloud offerings:** Contact management processes, human resources processes, marketing planning processes |
| **Scene B:** **Identification of potential customers** | In order to extend the Excel contact list, Chiara spends days on the internet to find suitable companies that might be interested in their products. She focuses on a specific country, and does research on Google by using keywords. In particular she checks the Facebook webpage and the LinkedIn profiles of the members of each identified company. She tries to find out if there are some positive or negative comments about the company and its employees on the internet. This assessment of each company usually lasts about 45 min to |

| | | |
|---|---|---|
| | 1h. Then she decides whether a company has the potential to become a customer. If yes, the contacts, a description/note and the website are registered in the Excel file and classified with an internal taxonomy. It is worth to notice that only 50% to 60% of the analysed companies are registered in the list. This means that 4 hours of work result in only 2 to 3 new potential contacts. | |
| | **Potential Business Processes supported with Cloud offerings:** Lead/contact management processes, market research processes | |
| **Scene C:** **Potential customer contact** | Once Chiara has spent the morning on this activity, in the afternoon she tries to contact the companies in the list. The internal workflow is structured as follows: <br> ▪ first step: mail contact -> to obtain a telephone appointment <br> ▪ second step: telephone appointment -> to obtain a physical appointment <br> ▪ third step: on-site appointment <br> For each contact she registers the status: contacted by email- waiting for replying / mail reply / not interested / mail reply – interested / telephone call – interested / telephone call – not interested / telephone call – to be recalled <br> There is not a fixed taxonomy, thus sometimes different notations/comments are used to depict the same status. Each e-mail/call requires about 45 minutes. This means that at the end of the day she hasn't been able to contact more than two to three companies. Moreover, this is not the main activity marketing is in charge of. Actually they need to do market research on their clients and to shape the offer accordingly. | |
| | **Potential Business Processes supported with Cloud offerings:** Process management, lead/contact management, e-mail, market research | |
| **Scene D** **Presentation preparation** | Once a telephone call succeeds, an appointment is booked. Further elements emerged during the call are annotated in the Excel file. <br> Then a folder on the internal server is created with the name of the potential customer. The folder contains all information needed to create a tailored presentation. This means that a second, in depth assessment on the company has to be done through Google research, but many of the information retrieved during the first assessment can be re used again. Web pages, pdf documents, images and the like are saved in the company folder. Once all needed information is available, Chiara can start to create an individual presentation for the potential customer. | |
| | **Potential Business Processes supported with Cloud offerings:** Telephone, e-mail, presentation tools, market research, information retrieval | |

**Table 10: Business episode customer acquisition**

### 3.3.3 Kiosk Distribution Process

Antonio Antonelli S.R.L is a company with 180 employees, established in 1920 in Florence, Italy, aimed at distributing newspapers and magazines to kiosk and, in general, points of sales in Florence and in the Florence area. Every day, about 250 different Italian and foreign newspaper are delivered to 600 points of sales. Yearly, about 6,000 different kinds of items are delivered for a total of around 50 millions of copies. The company has been the Tuscany's newspaper distributor of choice for over 30 years because it makes sure that kiosks get all the newspaper titles customers are looking for.

## Business Model Canvas Antonio Antonelli S.R.L

| Key partners | Key Activities | Value Proposition | Customer Relationships | Customer Segments |
|---|---|---|---|---|
| ▪ Newspaper publisher | ▪ Distribution of newspapers to kiosks | ▪ Delivery of newspapers and magazines on a daily basis<br>▪ Delivery of other products to be sold at a kiosk (phone cards, bus tickets etc.) | ▪ Personal assistance<br>▪ Co-creation | ▪ Kiosks<br>▪ Shopping centres<br>▪ Shops |
| | **Key Resources**<br><br>▪ Vans<br>▪ Warehouse<br>▪ Personnel<br>▪ IT infrastructure | | **Channels**<br><br>▪ Daily newspaper distribution (vans)<br>▪ Facebook private group | |

| Cost Structure | Revenue Streams |
|---|---|
| ▪ Newspaper delivery<br>▪ Personnel<br>▪ IT infrastructure | ▪ Percentage on items sold by customers<br>▪ Sale wholesale |

**Table 11: Business Model Canvas Antonio Antonelli S.R.L**

## Business Episode Customer Care through Social Media Channels

**Initial situation**: Customer care is a critical task that needs interactions, problem solving and information delivery in due form and time. In order to remain competitive and to reach target groups it is necessary to activate online channels (e.g. live web-chat, social media). Social networks offer new opportunities for customer care.

**CloudSocket technology intervention:** An IT service should enable the company to manage new orders and handle returns through online channels. Furthermore the service should allow to better understand customer needs and to continuously adapt their newspaper range according to these needs.

| | |
|---|---|
| **Scene A: Private Facebook group** | We imagine that Nicoletta is the new owner of the "Blue Ink" kiosk located in the centre of Florence. Nicoletta agreed upon to continue with the delivery plan that the former kiosk arranged with Antonio Antonelli. In the delivery the quantities of newspapers and magazines to be delivered for each day of the week have been specified. Furthermore it contains the general delivery conditions. The kiosk owned by Nicoletta has been assigned the number 221. In addition the #221 kiosk has been added to the Facebook private group named [Kiosks of Tuscany]. |
| | **Potential Business Processes supported with Cloud offerings:**<br>Partner management process |
| **Scene B: Newspaper order** | We consider the following situation: It is a Thursday, 6pm. Fiorentina – the beloved soccer team of Florence – has just won the Europe League match against Rome for 3-0. It is an easy guess to imagine tomorrow more copies of the local newspaper "La Nazione" and the sport newspaper "La Gazzetta dello Sport" will be sold. Nicoletta – kiosk #221 – connects to the Facebook private group and asks: "Is it possible to have tomorrow morning 20 more copies of "La Nazione" and 15 more copies of "La Gazzetta dello Sport"? Thank you very much. I wait for the confirmation from Gabriella. After one minute or two event kiosk #313, #25, #127 post analogous requests. The Facebook private group had the effect of amplifying requests. |
| | **Potential Business Processes supported with Cloud offerings:**<br>Social media monitoring and response process |
| **Scene C:**<br><br>**Order** | We imagine the potential situation: Thursday, 6.18pm. Rosario - the man in charge of the Antonio Antonelli CRM – has been informed that requests for more copies of "La Nazione" and "La Gazzetta dello Sport" have been issued for tomorrow. The tidy Rosario takes |

| | |
|---|---|
| confirmation | charge of these requests and inputs them in the web-based Antonio Antonelli intranet to insert new orders. At 19pm Rosario posts on the Facebook group: "Dear News Vendor, Here is the complete list of the additional orders done so far: <the list follows>. We are closing the service. If any other request will be accomplished, please refer directly to following internet address [..] See you tomorrow. Rosario" |
| | **Potential Business Processes supported with Cloud offerings:** Order management processes |
| **Scene D:** **Customer complaint** | Friday 5.02am. Nicoletta posts on [Kiosk of Tuscany]: "Thank you very much Rosario. I received the newspaper copies as ordered. Good work to all". 5.10am The #313 kiosk posted: "I am very disappointed. Not only I have not received the extra copies I ordered yesterday but also I have received a reduced number of copies of the ordinary order for Friday? What is the matter? " |
| | **Points of attention for CloudSocket technology:** Customer request management, social media monitoring and response process |
| **Scene E:** **Complaint handling** | Gabriella, head of logistics, urgently called for Rosario. A bad mistake happened yesterday. Rosario in the hurry to update orders exchanged the #313 (that is located in an area with strong Fiorentina's supporters) with #331(that is located in an area of Juventus's supporters). A van is at once organized and the appropriate delivery to #313 while #331 will return back the extra copies on the delivery of Saturday morning. |
| | **Potential Business Processes supported with Cloud offerings:** Return management processes, quality management processes |

**Table 12: Business episode customer care through social media channels**

| | |
|---|---|
| **Business Episode Procurement and Social Media** | |
| **Initial situation:** Kiosks often order more copies of editorial products from Giorgio Giorgi that they can sell. Therefore there is a need to size in advance the number of the copies to be ordered from the publishers in order to reduce the number of unsold products. | |
| **CloudSocket technology intervention:** An IT service should enable the company to 1) better understand customer requirements (customers of kiosks) and market developments, 2) and to use aforementioned insights to order editorial products that meet the needs of end-customers of the kiosk owners. They can improve the effectiveness and efficiency of Antonio Antonellis procurement process. | |
| **Scene A:** **New idea** | We consider that Maria is a product manager and has been contacted by the RCS1 publisher representative in Milan, Dario Brambilla. Mr. Brambilla suggests launching a new initiative about "The Queen", the well-known rock group that is target to middle-age nostalgic fans of the group. The items to be promoted are publications on the story of "The Queen" with attached CD-ROM with selected song from the rock group. Maria agrees with Mr. Brambilla that this could be a stimulating initiative. |
| | **Potential Business Processes supported with Cloud offerings:** Partner relationship management processes |
| **Scene B:** **Purchasing department** | Maria posts on Facebook whether someone of the kiosk owners would be interested in a series of 7 "The Queen" magazines with attached CD-ROM. She receives many enthusiastic responses and informs Rosario to prepare the order. Basically the order is defined by the purchasing department looking at the replies/comments on the kiosk owner on the Facebook channel. In order to estimate the needed number editorial products, an operator has to read all the related posts and filter only those where the required amount of copies is mentioned explicitly. |
| | **Potential Business Processes supported with Cloud offerings:** Business analytics, reporting, customer analysis, order management process |

| Scene C:<br><br>Feedback from kiosk owners | Maria receives about 40 posts on the Facebook group which are similar to the following message: "Dear Maria, I am so sorry and disappointed. I didn't sell any copy of the awesome Queen. It is with personal regret that I have to abort my following orders".<br><br>Maria receives only 5 posts from satisfied kiosk owners, like the following:<br>"Dear Maria, Thank you very much for your initiative about Queen. At 9.30 am I had already sold my 5 copied of the awesome Queen. May you send me more copies for tomorrow? Of course, I confirm also my first order". |
|---|---|
| | **Potential Business Processes supported with Cloud offerings:**<br>Customer complaint management process |

**Table 13: Business episode procurement and social media**

## 3.4 Derived requirements

This chapter reports on the requirements that are based on an analysis of all use cases. The collection of the requirements has been performed with the goal to provide a basis for the development of the business process repository With regard to the purpose of the repository we focused on two types of requirements: business process and functional requirements. Business process requirements represent the essential process areas from start-up and SME perspective that should be covered. Functional requirements refer to the CloudSocket platform.

The business episodes depict typical situations, where cloud offerings could make a substantial contribution to improve the effectiveness and efficiency of business processes. Overall the analysis of the use cases showed that a broad range of business processes possesses the potential to be supported through cloud offerings. Starting from the business model perspective in each building block of the Business Model Canvas relevant process areas have been identified and grouped (see Table 14). The business process requirements should not be considered as complete. They are further elaborated and described in chapter 4 (Business Process Repository).

| Nr. | Business Process Requirements |
|---|---|
| 1 | Processes for order management and invoicing |
| 2 | Processes for financial planning, financial accounting, management of accounts payable, management of accounts receivable, tax accounting |
| 3 | Processes for partner relationship management, partner contract management, partner collaboration, partner reporting |
| 4 | Processes for knowledge management, innovation management, product management, new product development |
| 5 | Processes for business modelling, strategic planning, strategy development, marketing planning, sales planning |
| 6 | Processes for customer relationship management, customer acquisition, customer lead/opportunity management, customer retention, customer contact management, customer feedback management, customer complaint management |
| 7 | Processes for marketing campaign management, campaign tracking, social media management, market research, customer research, marketing reporting |
| 8 | Processes for procurement, sourcing logistics, selling logistics, purchase order management, return management/handling, quality management |
| 9 | Processes for internal collaboration, communication, project management |

**Table 14: Business process requirements**

Beyond the process perspective, findings from the uses cases analysis revealed also functional requirements on the CloudSocket platform. These requirements refer mainly to flexibility, customization, scalability and usability. When an SME, for instance, enters new markets or the business model changes over time, this often goes along with the introduction of new business processes. Scalable solutions allow extending currently used cloud services flexibly and rapidly. This is especially important for start-ups, as their development occurs in different phases.

The role of business processes related cloud offerings are to enable start-ups to get started and to make quickly first steps towards the implementation of their business idea. The use case Ecological Agriculture (chapter 3.2.1) is a typical example of how a business model changes over time.

Customization means that start-ups and SMEs need cloud offerings that cover whole business episodes. The business episode "customer care through social media channels" (chapter 3.3.3), for instance, demonstrates how

the company uses social media to communicate with customers and to support their procurement process. A "customized" business process in the cloud is required that not only allows managing procurement processes with an ERP system, but also integrates social media channels into these activities. This might result, for instance, in cost savings and/or competitive advantages due to procurement forecast improvements. Table 15 shows the most important functional requirements.

| Nr. | CloudSocket Platform Requirements |
|-----|-----------------------------------|
| 1 | The interface of the platform is user friendly and doesn't require technical knowhow. |
| 2 | The platform is usable without high training effort, tools are self-explaining. |
| 3 | The platform provides "basic cloud offerings" based on pre-defined processes of the business process repository. |
| 4 | The platform offers the ability for the broker to customize reference processes according to start-up and SME requirements. |
| 5 | When a customer buys a cloud offering, it is provided rapidly. |
| 6 | Cloud solutions for business processes are scalable if an enterprise grows fast. |
| 7 | Cloud solutions can be adapted flexibly if the business of the company changes (in particular important for start-ups). |
| 8 | The basic support processes, including the order and invoicing process, can be fully automated. |
| 10 | The order and invoicing process is transparent and easily understandable for non-technical users. |
| 11 | The business process repository covers all relevant business processes of start-ups and SMEs. |
| 12 | The platform provides interfaces to integrate already available applications, cloud services, databases etc. |
| 13 | The platform should enable start-ups and SMEs to obtain cloud services for a whole business episode. |

**Table 15: CloudSocket platform requirements**

In order to run business processes as executable workflows in the cloud, it is necessary to align either for (i) each activity (blue box), or (ii) for a process part (a sequence of boxes) or (iii) for the entire process an executable workflow in the cloud. Relying on previous research results this can be achieved by bridging the so-called "semantic gap" between aforementioned business processes and executable workflows represented with an end point for a workflow engine.

This requires a so-called semantic annotation of the either (i) each activity, (ii) process parts or (iii) the entire process. Assuming that also each executable workflow is annotated, there are inference mechanisms that identify – through semantic service discovery – the appropriate workflow.

This alignment is not only on functional requirements, which is a pre-condition for business managers, but to identify business relevant properties of a cloud broker such as:

o  Legal reliability and trust of the cloud operator
o  Safe handling of organization relevant data
o  Flexibility on contracting the services
o  Price

This topic is dealt with in task 2.3 and shown in deliverable D2.3.

# 4 BUSINESS PROCESS REPOSITORY

This chapter presents the results of the business process repository analysis. In a first step the principles for the organization of the repository and its four layer structure are introduced. After then, the concept of the process groups and processes variants is described in order to create a process catalogue. The business process repository has been initiated using the business process management tool ADONIS®. The organization of the process repository is based on APQC's process classification framework (PCF). In this section we describe the rationale for this structure and show, how it can be combined with the Business Model Canvas. The chapter business process repository depicts the relevant CloudSocket processes that have been developed based on the reference model structure.

## 4.1 Structure of the Business Process Repository

The goal was to define the top level building blocks of the reference model, which reflect the needs of start-ups and SMEs from business perspective regardless of industry and company size. The challenge was to analyse findings from the use cases, to consolidate these findings and to lift them on a higher abstraction level. In order to structure the process repository we examined several approaches and frameworks, in particular:

- The process classification frameworks (PCF) from APQC is a taxonomy of cross-functional business processes
- The distinction of core processes, support processes and management processes based on Porter's value chain
- The Business Model Canvas of Osterwalder & Pigneur (2010) which allows identifying processes specific for an enterprise.

### 4.1.1 The Process Classification Framework as Structuring Principle

We were looking for a general structure, enabling to create a catalogue of processes. Existing process classification frameworks have been analysed, such as Process classification framework (PCF) of APQC, ITIL, etc. In order to populate the repository with existing reference processes APQC had been found most appropriate in case of CloudSocket, since it provides a cross industry framework, which covers a wide area of process categories. The APQC process framework organizes management and operating processes into 12 enterprise level categories that include more than 1000 processes and associated activities. Figure 6 depicts the hierarchy levels of APQC.

**Figure 6: Hierarchy of APQC's process classification framework**

Because of its broad usability we chose the top 3 levels of APQC's Process classification framework as the overall structure for the process repository. On the fourth level different variants of the processes can be added, because depending on the requirements of start-ups and SMEs a process can be implemented in different ways.

Figure 7 shows how the Process classification framework (PCF) has been implemented in ADONIS®. The first two levels are represented as model groups with process maps containing the processes. The numbering of the model groups and process maps is taken from the numbering in PCF. In Figure 7 the process maps for process groups "4.2.2 Select suppliers and develop/maintain contracts" and "8.2.2 Invoice customer" are highlighted.

The processes and process models themselves are stored in model groups representing the third level. In Figure 7 we drew a frame around the processes which have already been modelled in the process groups "4.2.2 Select suppliers and develop/maintain contracts" and "8.2.2 Invoice customer".

APQC PCF (Cross-industry)
├ A. Operating Processes
│ ├ 01.0 Develop Vision and Strategy
│ ├ 02.0 Develop and Manage Products and Services
│ ├ 03.0 Market and Sell Products and Services
│ │ ├ 03.1 Understand markets, customers and capabilities
│ │ ├ 03.2 Develop marketing strategy
│ │ ├ 03.3 Develop sales strategy
│ │ ├ 03.4 Develop and manage marketing plans
│ │ ├ 03.5 Develop and manage sales plans
│ │ └ 03.0 Market and Sell Products and Services
│ ├ 04.0 Deliver Products and Services
│ │ ├ 04.1 Plan for and align supply chain resources
│ │ ├ 04.2 Procure materials and services
│ │ │ ├ 04.2.1. Develop Sourcing strategies
│ │ │ ├ 04.2.2 Select Suppliers and develop/maint contracts
│ │ │ │ ├ Internet Research and Procurement
│ │ │ │ ├ Internet Research and Procurement - Variant A - Human Research
│ │ │ │ ├ Internet Research and Procurement - Variant B - On-demand Research
│ │ │ │ ├ Internet Research and Procurement - Variant C - Supported Search
│ │ │ │ ├ Internet Research and Procurement - Variant D - Nightly-Search
│ │ │ │ └ Supplier Selection 1
│ │ │ ├ 04.2.3 Order materials and services
│ │ │ ├ 04.2.4 Manage suppliers
│ │ │ ├ 04.2.1 Develop sourcing strategies
│ │ │ ├ 04.2.2 Select suppliers and develop/maintain contracts
│ │ │ ├ 04.2.3 Order materials and services
│ │ │ └ 04.2.4 Manage suppliers
│ │ ├ 04.3 Produce/Manufacture/Deliver product
│ │ ├ 04.4 Deliver service to customer
│ │ ├ 04.5 Manage logistics and warehousing
│ │ └ 04.0 Deliver Products and Services
│ └ 05.0 Manage Customer Service
└ B. Management and Support Services
  ├ 06.0 Develop and Manage Human Capital
  ├ 07.0 Manage Information Technology
  ├ 08.0 Manage Financial Resources
  │ ├ 08.1 Perform planning and management accounting
  │ ├ 08.2 Perform Revenue accounting
  │ │ ├ 08.2.2 Invoice customer
  │ │ │ ├ Credit card payment
  │ │ │ ├ Invoicing
  │ │ │ ├ Monthly payment
  │ │ │ └ Prepayment
  │ │ ├ 08.2 Perform Revenue Management
  │ │ ├ 08.2.1 Process customer credit
  │ │ ├ 08.2.2 Invoice customer
  │ │ ├ 08.2.3 Process accounts receivable (AR)
  │ │ ├ 08.2.4 Manage and process collections
  │ │ └ 08.2.5 Manage and process adjustments/deductions
  │ ├ 08.3 Perform general accounting and reporting
  │ ├ 08.4 Manage fixed asset project accounting
  │ ├ 08.5 Process payroll
  │ ├ 08.6 Process accounts payable and expense reimbursements
  │ ├ 08.7 Manage treasury operations
  │ ├ 08.8 Manage internal controls
  │ ├ 08.9 Manage taxes
  │ └ 08.0 Manage Financial Resources
  ├ 09.0 Acquire, Construct, and Manage Assets
  ├ 10.0 Manage Enterprise Risk, Compliance, Remediation and Resiliency
  ├ 11.0 Manage External Relationships
  └ 12.0 Develop and Manage Business Capabilities
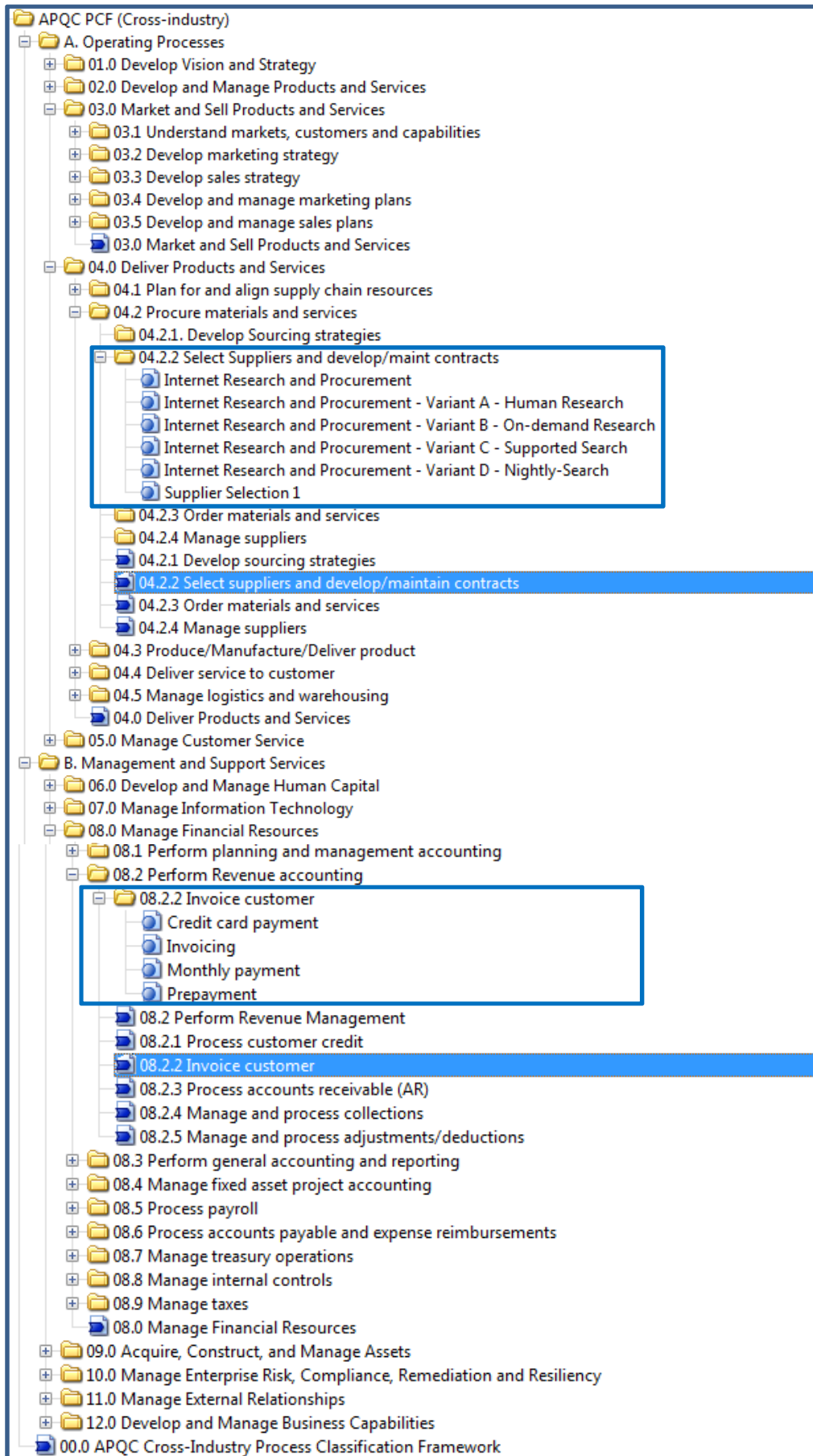00.0 APQC Cross-Industry Process Classification Framework

**Figure 7 Implementation of APQC's process classification framework in ADONIS®**

In Figure 8 you can see an example of a process map. On the left there is a part of the 3-layered hierarchy and on the right part there is the process map for "4.2.2 Select suppliers and develop/maintain contracts" with some process variants for the identification of potential suppliers. The models of the process variants are stored in the corresponding model group (see frame). The process variants were created for the business bpisode "Internet Research and Procurement". The individual process variants are described in more detail when explaining the simulation approach in Chapter 5 Simulating Potential Cloud Effects.
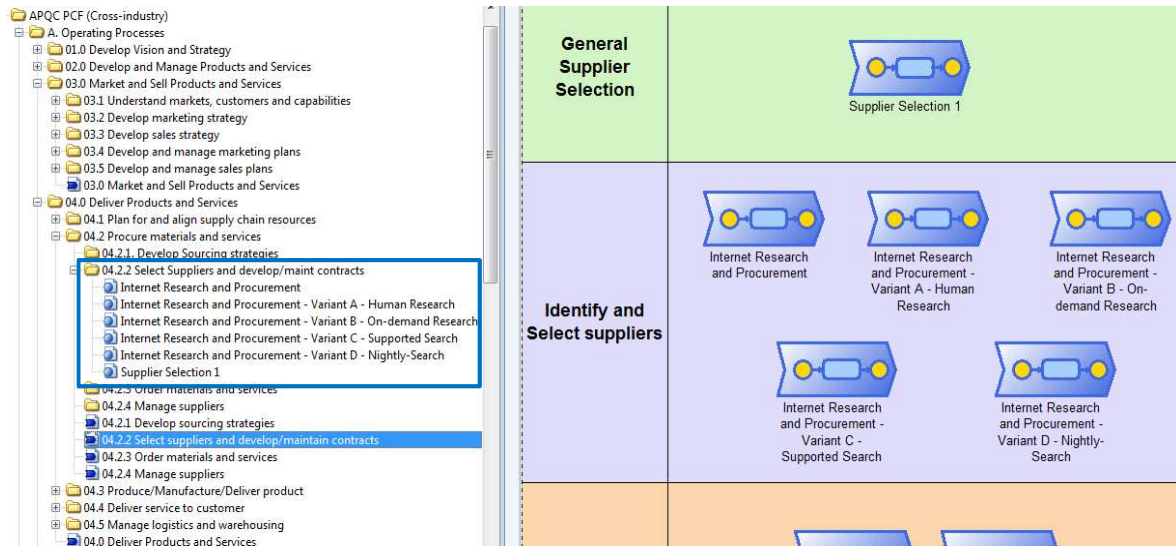


**Figure 8: Structure of the process repositories with process variants**

## 4.1.2   Limitations of the Value Chain as Structuring Principle

For completeness reasons we discuss the value chain approach as an alternative way to structure the reference process repository. Porter's value chain (2008) is an established approach, which is used as a conceptual framework to derive and structure processes of a company. The value chain divides processes into primary activities and supporting activities, whereas former create value (core processes) and latter (support processes) support execution of core processes. The value chain starts from the premise that processes, which reflect primary activities of a company, constitute competitive advantage. Often the core and support processes are extended by management processes (see Figure 9).
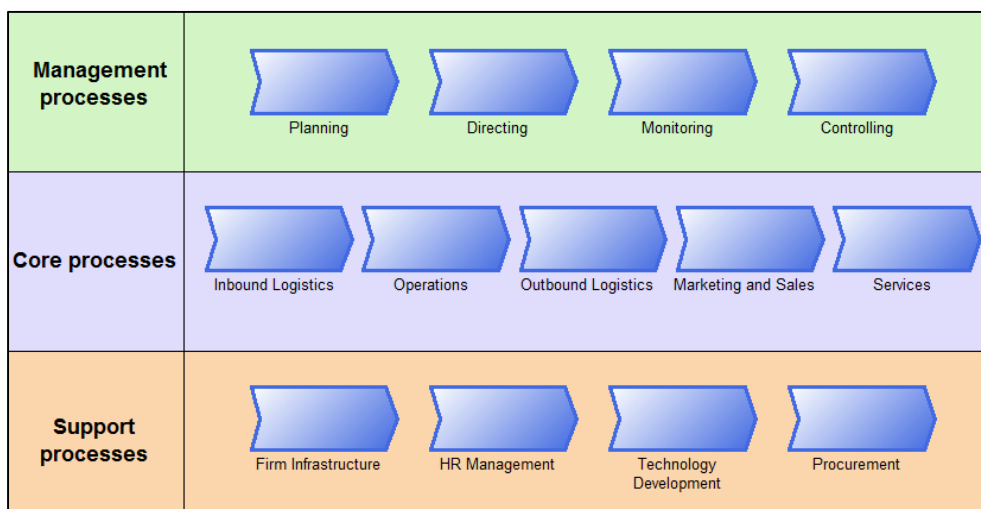


**Figure 9: Typical process landscape of an enterprise**

From an enterprise perspective it makes sense to distinguish between core processes and support processes. With respect to the intended purpose of a generic repository, however, the value chain approach has some limitations. Depending on how a company creates value, one can regard the same process either as core process for one company, while it is a supporting process in another company. For example, recruiting employees is a typical support process for most companies, but it is a core process for a recruiting company.

Furthermore, the distinction of core processes and support processes does not help in identifying appropriate processes for cloud support. There are a wide range of cloud services available on the market, which support both core processes and support processes. Representative studies on SMEs have shown that companies use components of business software mostly for supporting processes (Schubert & Leimstoll, 2008). (Therefore a more general structure is needed, which we found with the process classification framework of APQC.

### 4.1.3 The Business Model Canvas as Entry Point to the Repository

It turned out that the process classification framework is appropriate for organization process variants, but additional guidance is needed to support enterprises in selecting the appropriate reference processes. In particular start-up companies have difficulties in identifying the processes, which fit to their business.

As start-ups are concerned with defining their business model, we have investigated the Business Model Canvas as means for process identification, too. Our analysis showed that the business model of a company is well suited to for this task. For this purpose initially the Business Model Canvas and the business episodes/scenes of each use case have been analysed (see Chapter 3). Commonalities and contradictions between the different use cases have been examined.

It turned out that the business model has an impact on the choice of the process. For example, the invoicing process (Number 8.2.2 in the PCF) depends on the type of the revenue stream. It makes a difference whether invoices are issued for an asset sale, a subscription fee or a leasing. The marketing strategy (number 3.4 in the PCF) depends on the customer segmentation. The key resources and key activities determine the appropriate procurement activities. As a result, we established links from the Business Model Canvas to the repository (see Figure 10).
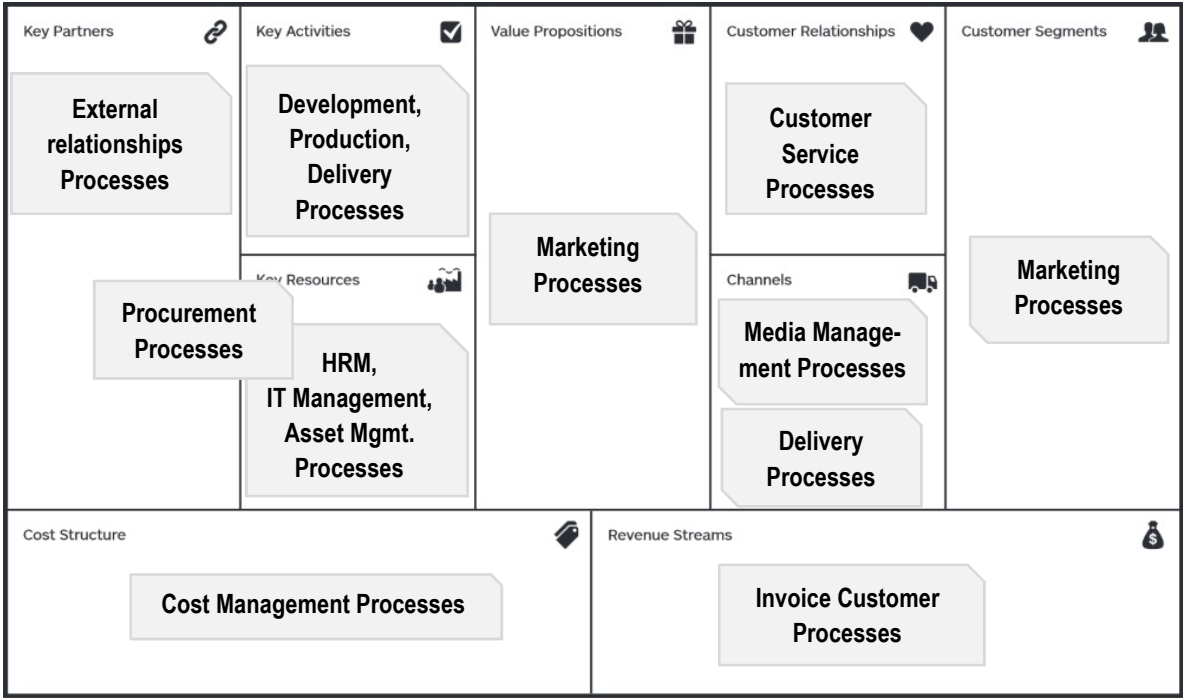


**Figure 10: CloudSocket processes**

The Business Model Canvas introduces a high level process catalogue for CloudSocket broker. It is expected that for each of those high level viewpoints the CloudSocket broker offers several business processes, whereas each business process can be differently realized. We call those different realizations of the same business process so-called process variants. Following the links from the building blocks of the Business Model Canvas to the repository, the corresponding process variants can be identified. For this, the process variants in the repository are organized with respect to the categories of the building block entries, i.e. the business model works as a second index for the process variants.

Thus, we have developed a process repository with an initial set of business processes, which are categorized by two structures. First, the process models are structured according to the process classification framework of APQC. Additionally they are referenced from landscapes in the business models structure. Figure 11 depicts the PCF structure of the repository at the top left and the structure of the Business Model Canvas at the bottom left.

In order to demonstrate the usage of the process repository, Figure 11 gives an example of the business repository structure. The example shows the process of invoicing customer (number 8.2.2). This process has been identified as very important in the use cases. All variants of the process are stored in model group "8.2.2. Invoice Customer" according to APQC's process classification framework. This is highlighted in the upper left part of Figure 11. The appropriate realization of the process for a specific company, however, depends on the type of revenue stream. Figure 11 shows how the process variants for invoicing a customer can be grouped by the 7 types of revenue streams, which are distinguished in the business model. This landscape is stored in section "5 Revenue Streams" of the Business Model Canvas structure at the bottom left of Figure 11.
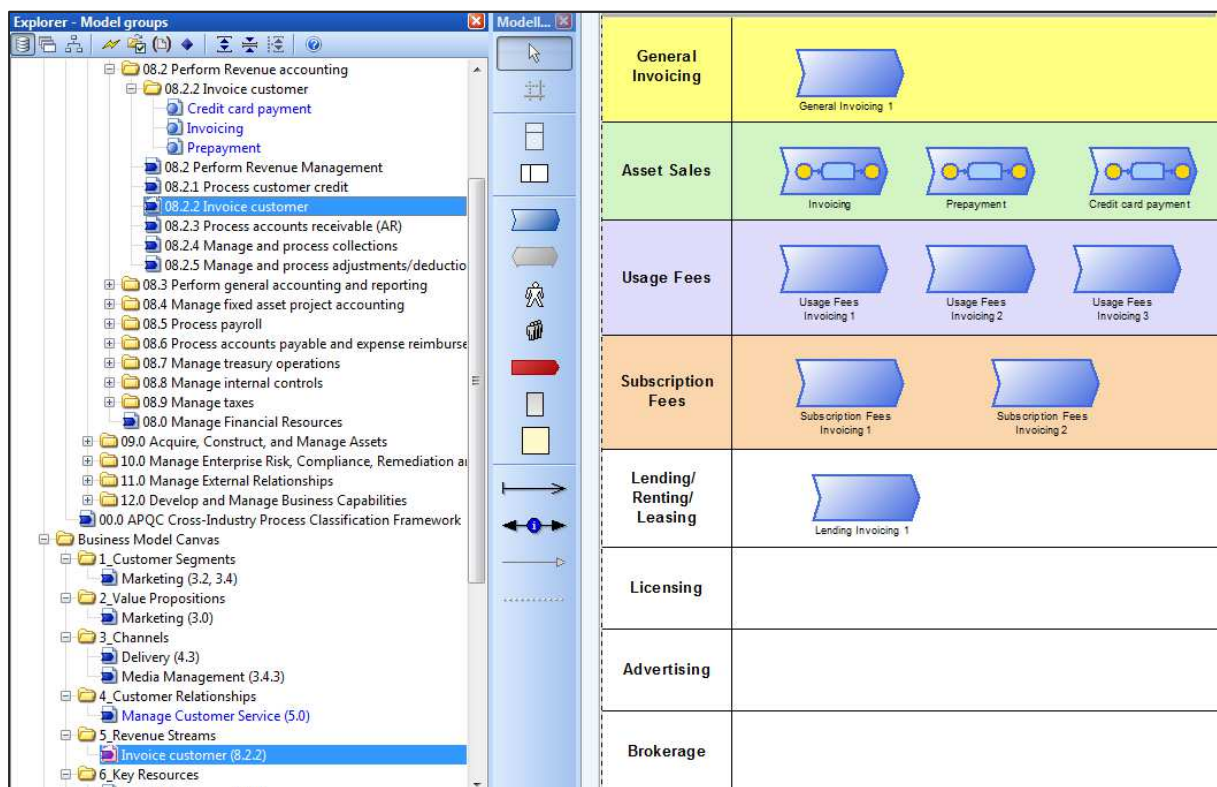


**Figure 11: Referencing process variants in PCF from business model structure**

Looking at the use case and Business Model Canvas of Ecological Agriculture (section 3.2.1) we see that the revenue comes from selling the fertilizer. Thus, it is of type asset sales. This means that for this scenario the process variants in the lane Asset Sales are of primary relevance. The cloud broker will therefore look at the process variants that are listed in the lanes Asset Sales. This is how the Business Model Canvas guides the identification of process variants.

Figure 11 shows three process variants for invoicing a customer for the revenue type asset sales. The first variant shows a process where the invoice is sent after the order is processed. All three tasks of the process could implemented by a cloud service. The second variant realizes a prepayment. The order is only processed when the payment is received. The first three tasks can again be implemented as cloud services, while the order processing is a separate subprocess. The third variant realizes payment by credit card. Generating the bill data and processing the payment can be realized as cloud services again. The fourth variant issues a monthly bill for several orders.

A start-up or SME will decide for the appropriate process variant. If it offers online orders, variants 2 or 3 might be an option. For regular customer it might choose variant 4 for monthly payment.

## 4.2  The CloudSocket Consultation Process

The success of CloudSocket depends strongly on the context in which business processes are offered. Hence to ensure a safe uptake of CloudSocket a wider consultation process needs to be taken into account. In order to embed the CloudSocket into a wider SME and start-up consultation process, we rely on the long-term experiences of BWCON and their guideline to develop business ideas and establish companies. The business process repository is used by the CloudSocket broker to provide cloud offerings that correspond to business processes needs of their clients. According to BWCON's Venture Development System the development of a business plan consists of three steps:

- Idea: the vision of the enterprise
- Concept: the business model, describing how the business idea could look like in reality
- Business Plan: tasks for implementing the business model

Figure 12 shows the three phases of the business plan development. The concept phase is very important to develop the business plan. In this phase, the business model is developed.

| BWCON Business Plan | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **IDEA** | | | **CONCEPT** | | | **PLAN** | | |
| 2 | Product idea | | 2 | Product idea | | 2 | Product idea | |
| 3 | Customer need | | 3 | Customer need | | 3 | Customer need/problem | |
| 4 | Market | | 4 | Market | | 4 | Market | |
| | | | +5 | Competitors | | 5 | Competitors | |
| | | | +6 | Unique position | | 6 | Unique position | |
| | | | +7 | Management team | | 7 | Management team | |
| | | | +8 | Market entry strategy | | 8 | Market entry strategy | |
| | | | +9 | Organisation | | 9 | Organisation | |
| | | | | | | +10 | Realisation planning | |
| | | | | | | +11 | Financial planning | |
| | | | | | | +12 | Opportunities and risks | |
| | | | | | | =1 | Management summary | |

**Figure 12: Venture development model - developing a business plan (adapted from BWCON)**

Figure 12 gives an overview of the content of the business plan. Although not all phases are relevant for CloudSocket, it is important to state that the cloud broker offers business processes for the phase 9 to 10. Hence CloudSocket enables the realization of a business organization and executes the processes within the cloud.

The CloudSocket reference process repository and additional CloudSocket broker tools can be used to find the appropriate level of abstraction between business processes and cloud service providers. The CloudSocket consulting process distinguishes four different actors within a full running Cloud Socket.

- End User:
    - Focus groups are start-ups and SMEs with less possibility to intensively investigate different cloud offerings.

- Cloud Broker:
    - Designing, tagging and offering business processes
    - Designing, tagging and providing executable workflows
    - Maintaining business and IT alignment ontology
    - Business Process Consultant
    - Workflow Consultant

- Operator
    - Allocating cloud services to workflows
    - Maintaining and hosting the marketplace
    - Executing and monitoring workflows in the cloud
    - Cloud Service Consultant

- Cloud Service Provider
    - Creating and packaging software packages
    - Maintaining interfaces

# 5 SIMULATING POTENTIAL CLOUD EFFECTS

In order to quickly demonstrate the possible benefits of using cloud offerings, we consider the simulation of business processes as an appropriate form to communicate with business people. Although the following simulations are based on estimations in that phase of the project, they demonstrate how key arguments of CloudSocket will be demonstrated to business manager.

A concrete sample of the business episodes – the Internet Research Process for Procurement – is used, to explain how different cloud offerings can be used to enable executable processes. Hence this chapter shows several variants of the process and shows via simulation the possible effect of different levels of automation of using cloud offerings. The objective of the simulation is to demonstrate, how simulation could be used to evaluate different variants of a process. We made assumption on times and costs and varied the degree of automation. The results show that different degrees of automation can have an effect on the process performance. The simulation was performed using the simulation component from ADONIS® Business Process Management Toolkit.

## 5.1 Setting of the Simulation

The simulation is demonstrated with the "Internet Research and Procurement" process of Santilla S.R.L., a potential client of the Cluster Business Process Broker MATHEMA. The initial process description is based on the information that has been provided in a meeting at MATHEMA.
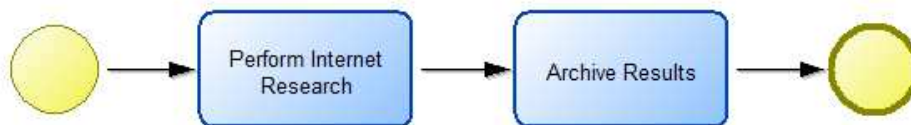


**Figure 13: Internet research and procurement process**

The process was initially performed without technical infrastructure (see Figure 13). We have analysed and improved the process by applying possible cloud offerings to it along with an increasing automation. The following sections show the simulation results of each variant and the associated changes.

- Section 5.2 Variant A: Human Research describes the initial process that deals without non-technical infrastructure.
- Section 5.3 Variant B: On-demand Research builds upon the initial variant, where the research process is executed independent of actual demands for equipment (quantities and quality).
- Section 5.4 Variant C: Supported Search - Recommended Link Directory builds upon variant B where the research process is enhanced by a directory of recommended links that are used frequently.
- Section 5.5 Variant D: "Nightly-Search Analysis" Builds shows a scenario where the search and retrieve task is out-sourced to an automation engine.

The activities of each process variant were filled with estimates for processing time, waiting time, idle time, transport time and costs. For the simulation we used the path analysis algorithm from ADONIS® and evaluated the results in terms of overall times and costs. The parameters used for the each of the simulation have been: number of runs: 1000, working days per year: 170 days, and working hours per day: 8h. Similar settings may be used by real CloudSocket clients, if they want to assess the usefulness of proposed cloud offerings.

## 5.2  Variant A: Human Research

The first process variant (Table 11) is completely performed without technical infrastructure. The only means needed for collaboration between the researchers are an internal file share that is used to store the results of the daily actions as PDF and the summarizing PowerPoint slide deck.

The tasks have the following time and cost values:

| 5.2 Activity | Processing time | Waiting time | Idle time | Transport time | Costs |
|---|---|---|---|---|---|
| Specify needed products | 5 min | 20 min | 30 min | 5 min | 5 |
| Search using search engines | 60 min | 30 min | 30 min | 10 min | 10 |
| Collect price/quality information | 30 min | 20 min | 20 min | 0 min | 10 |
| Analyse results | 20 min | 0 min | 0 min | 0 min | 5 |
| Compile report | 30 min | 10 min | 20 min | 0 min | 10 |
| Review report | 10 min | 30 min | 30 min | 10 min | 7 |

**Table 16: Variant A – Human workflow**

The decision "Results satisfactory"is expected to be satisfying in 70% of the cases and not satisfying in 30% of the cases. The decision "Report complete/comprehensive?" is expected to be 80% appropriate and 20% inappropriate. The outcome of the simulation draws the following picture of the current process:

- Processing time:       4h 05 min
- Waiting time:          2h 36 min
- Idle time:             2h 58 min
- Transport time:        34 min
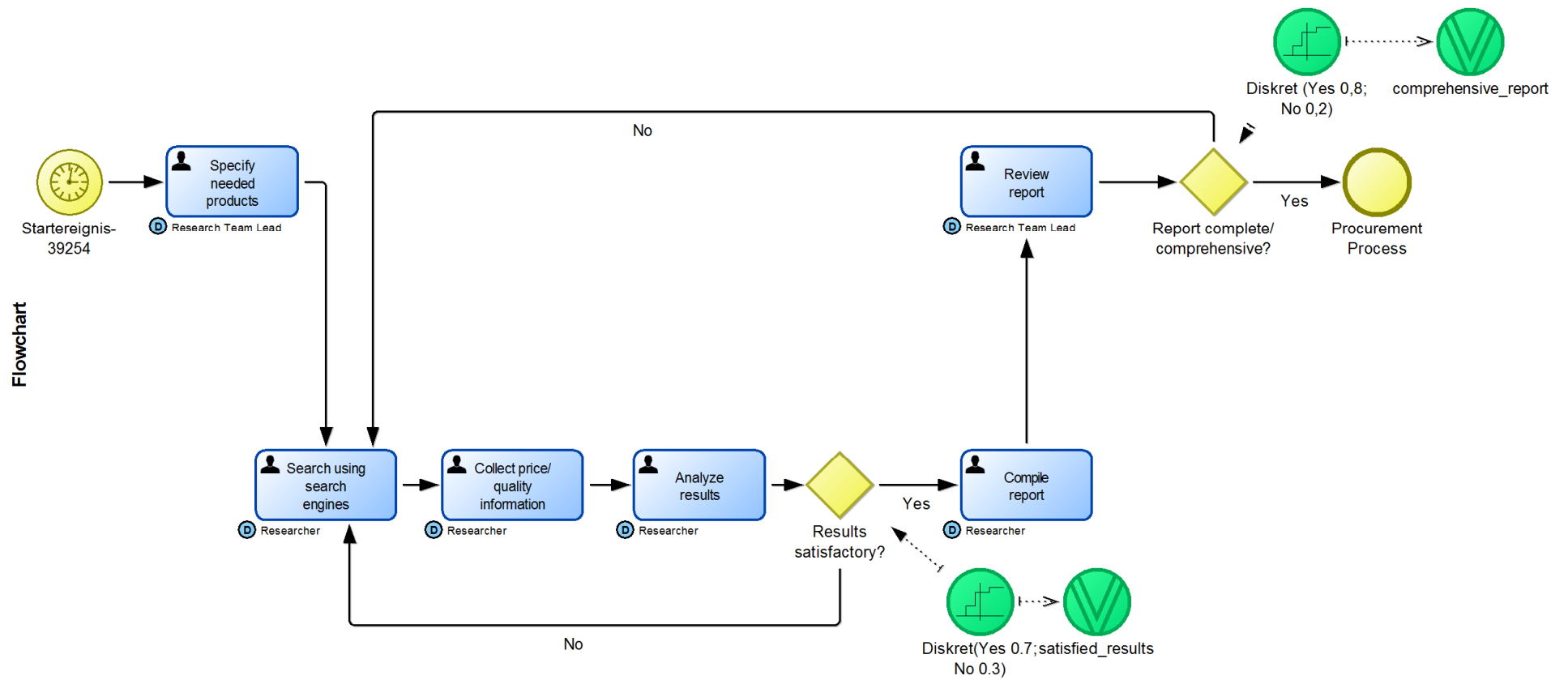- Lead time:             1day 02h 16min
- Costs:                 69,55

**Figure 14: Variant A - Human research**

## 5.3 Variant B: On-demand Research

The second variant (Table 17) builds upon the initial variant-A. Now the research process is executed independently of actual demands for equipment (quantities and quality). This variant includes integration with the inventory management and project execution environment. A notification in the form of a ticket triggers the researchers to start their lookup. The experience for performing the research is not explicit and cannot be traced. Therefore, we introduced a cloud-based ticketing system, where the team leader can supervise the research activities and resources on an instance level. This new task does not replace the human search task but makes documenting more efficient. Additionally, the accessibility of the local file share is increased, independent of the device used.

The tasks have the following time and cost values:

| Process | Processing time | Waiting time | Idle time | Transport time | Costs |
|---|---|---|---|---|---|
| Create ticket and assign responsibility | 5 min | 20 min | 30 min | 0 min | 5 |
| Change ticket state to "in progress" | 2 min | 10 min | 10 min | 0 min | 1 |
| Search using search engines | 60 min | 30 min | 30 min | 10 min | 10 |
| Collect price/quality information | 30 min | 20 min | 20 min | 0 min | 10 |
| Analyse results | 20 min | 0 min | 0 min | 0 min | 5 |
| Store results as ticket content | 15 min | 0 min | 0 min | 0 min | 5 |
| Compile report | 30 min | 10 min | 20 min | 0 min | 10 |
| Change state of ticket to "completed" | 2 min | 0 min | 0 min | 0 min | 1 |
| Monitor state and results | 5 min | 0 min | 0 min | 0 min | 0 |
| Review report | 10 min | 30 min | 30 min | 10 min | 7 |

**Table 17: Variant B – On-demand research**

As in Variant A, the decision "Results satisfactory" is expected to be satisfying 70% of the cases and not satisfying in 30% of the cases. The outcome of the simulation draws the following picture of the current process:

- Processing time:        3h 48 min
- Waiting time:        2h 19 min
- Idle time:        2h 39 min
- Transport time:        24 min
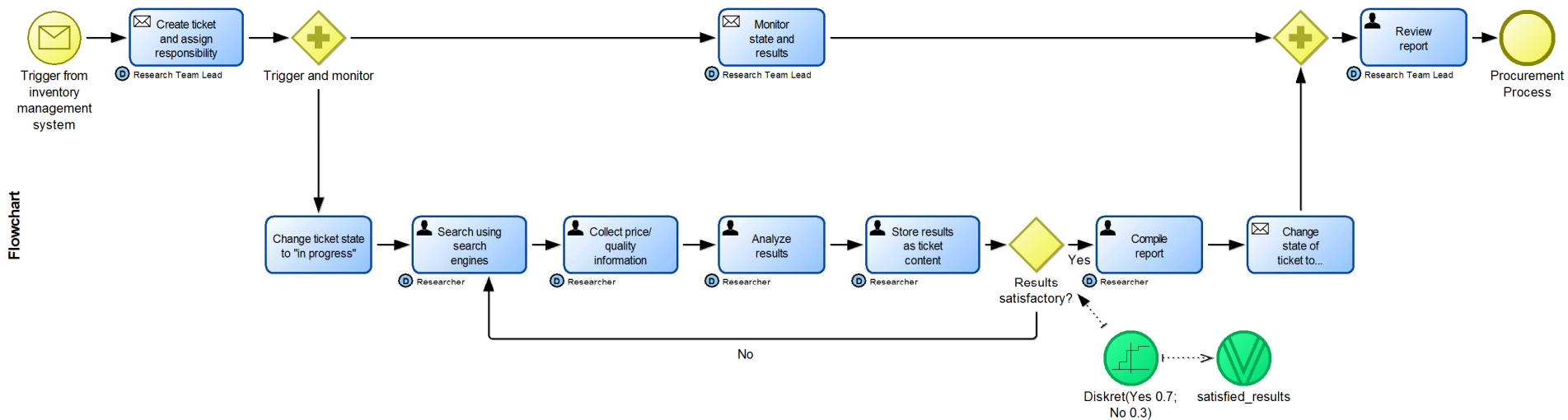- Lead time:        1day 01h 7min
- Costs:        65,97

**Figure 15: Variant B - On-demand research**

## 5.4   Variant C: Supported Search - Recommended Link Directory

Building upon variant B, the research process is enhanced by a directory of recommended links that are used frequently. Through tagging and annotation of the directory entries, the researchers quickly search for important and not worthy links to find good information on the internet.

The tasks have the following time and cost values:

| Process | Processing time | Waiting time | Idle time | Transport time | Costs |
|---|---|---|---|---|---|
| Create ticket and assign responsibility | 5 min | 20 min | 30 min | 0 min | 5 |
| Change ticket state to "in progress" | 2 min | 10 min | 10 min | 0 min | 1 |
| Retrieve first entry by recommender engine | 10 min | 10 min | 10 min | 0 min | 5 |
| Search using recommended link | 30 min | 15 min | 15 min | 0 min | 5 |
| Collect price/quality information | 30 min | 20 min | 20 min | 0 min | 10 |
| Analyse results | 20 min | 0 min | 0 min | 0 min | 5 |
| Store results as ticket content | 15 min | 0 min | 0 min | 0 min | 5 |
| Compile report | 30 min | 10 min | 20 min | 0 min | 10 |
| Change state of ticket to "completed" | 2 min | 0 min | 0 min | 0 min | 1 |
| Monitor state and results | 5 min | 0 min | 0 min | 0 min | 0 |
| Review report | 10 min | 30 min | 30 min | 10 min | 7 |

**Table 18: Variant C - Supported search - recommended link directory**

Again, the decision "Results satisfactory" is expected to be satisfying 70% of the cases and not satisfying in 30% of the cases. The outcome of the simulation draws the following picture of the current process:

- Processing time:        2h 7 min
- Waiting time:           1h 43 min
- Idle time:              2h 03 min
- Transport time:         10 min
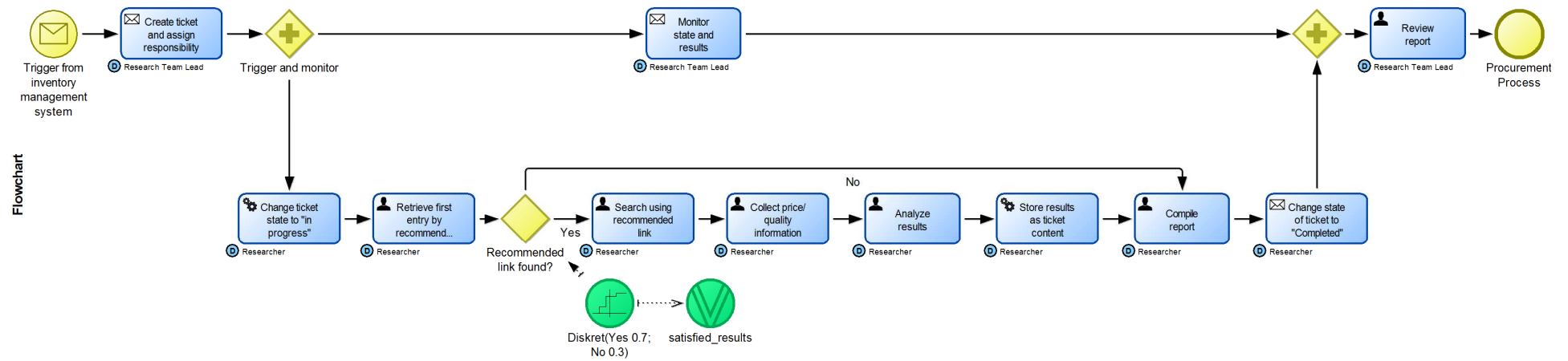- Lead time:              06h 00min
- Costs:                  45,75

.

**Figure 16: Variant C - Supported search - recommended link directory**

## 5.5 Variant D: "Nightly-Search Analysis" Builds

In this variant, the sub process of "search and retrieve" is out-sourced to an automation engine. The recommended link repository is used as an input and filtered by the annotations for equipment. A nightly crawl/search for all possible combination is performed and stored accordingly. The input of a pre-analysis is supported by the system so that the researchers can have a look at this initial report first thing in the morning to brief their team lead on current market trends. The match-making of the analysis results to actual needs is done by all team members.

The tasks have the following time and cost values:

| Process | Processing time | Waiting time | Idle time | Transport time | Costs |
|---|---|---|---|---|---|
| Create ticket and assign responsibility | 5 min | 20 min | 30 min | 0 min | 5 |
| Change ticket state to "in progress" | 2 min | 10 min | 10 min | 0 min | 1 |
| Retrieve first entry by recommender engine | 0 min | 0 min | 0 min | 0 min | 0 |
| Search using recommended link | 0 min | 0 min | 0 min | 0 min | 0 |
| Collect price/quality information | 0 min | 0 min | 0 min | 0 min | 0 |
| Analyse results | 0 min | 0 min | 0 min | 0 min | 0 |
| Store results as ticket content | 0 min | 0 min | 0 min | 0 min | 0 |
| Compile report | 0 min | 0 min | 0 min | 0 min | 0 |
| Change state of ticket to "completed" | 2 min | 0 min | 0 min | 0 min | 1 |
| Monitor state and results | 5 min | 0 min | 0 min | 0 min | 0 |
| Review report | 10 min | 30 min | 30 min | 10 min | 7 |

**Table 19: Variant D - "Nightly-search analysis" builds**

Again, the decision "Results satisfactory" is expected to be satisfying 70% of the cases and not satisfying in 30% of the cases. The outcome of the simulation draws the following picture of the current process:

- Processing time:   24 min
- Waiting time:   1h
- Idle time:   1h 10 min
- Transport time:   10 min
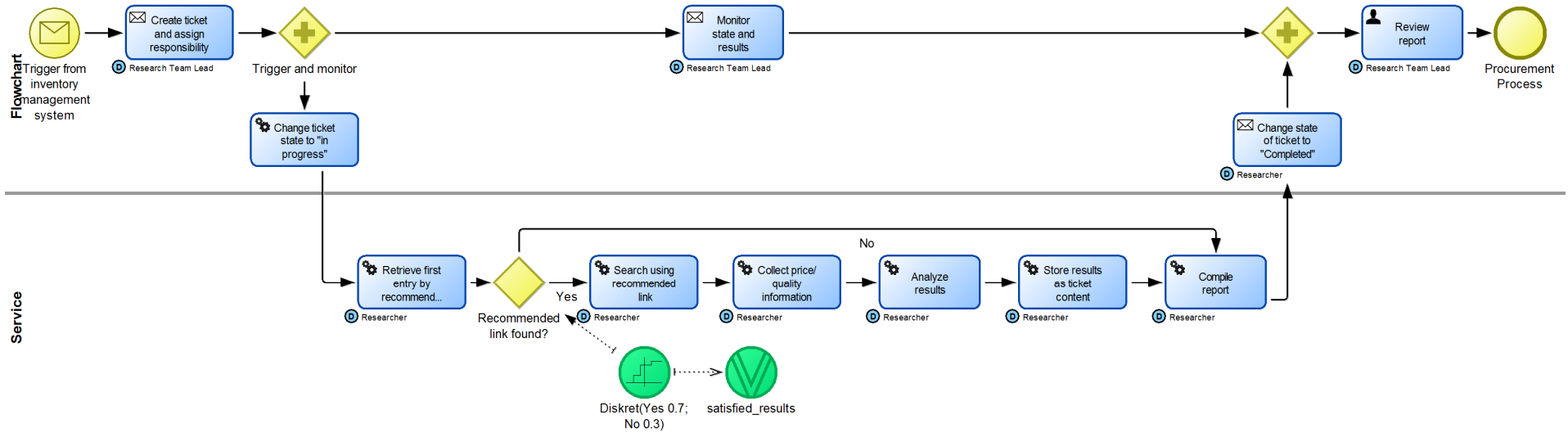- Lead time:   02h 39min
- Costs:   14,00

**Figure 17: Variant D - "Nightly-search analysis" builds**

## 5.6 Interpretation of the Simulation Results

Comparing the results of the process variants simulation, the reduction in terms of time and costs is visible as shown in Figure 18.
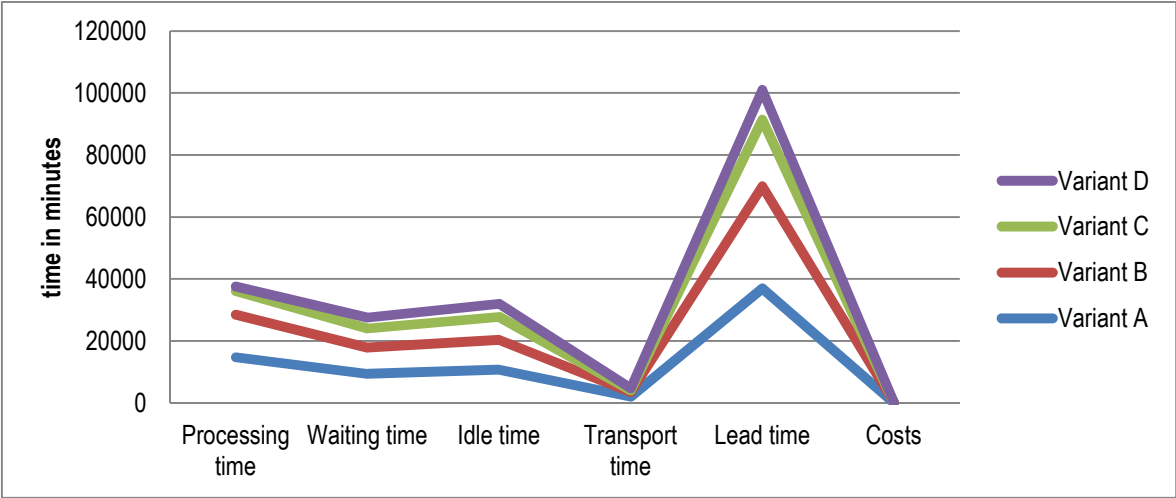


**Figure 18: Process variants simulation results**

The results show that with each automation step the processing, waiting, idle, transport, lead times and also the costs of the research process are reduced. The exact improvements in terms of time and costs are shown in Table 20.

|  | Variant B | Variant C | Variant D |
|---|---|---|---|
| Processing time | 6.91% | 48.09% | 90.24% |
| Waiting time | 10.60% | 33.92% | 61.67% |
| Idle time | 10.62% | 31.01% | 60.88% |
| Transport time | 31.05% | 71.25% | 71.25% |
| Lead time | 11.10% | 41.65% | 74.20% |
| Costs | 5.15% | 34.22% | 79.87% |

**Table 20: Reduction results of process variants simulation compared to variant A**

This chapter shows how different process variants can be simulated in order to assess, prior to the concrete choice of the variant, the effect of moving services into the cloud. This can support the consultants and cloud brokers. If there are different cloud service solutions available, with the simulation a pre-selection of an appropriate combination of services can be made. The assessment abstracts from any technical details. These have to be considered in the next step of the CloudSocket.

# 6 EVALUATION CRITERIA

This chapter introduces the developed KPIs for CloudSocket using the Balanced Scorecard approach. We adapted the balanced scorecard approach to define the goals and corresponding KPIs. The input for the criteria came from different project partners. The evaluation criteria were developed from the viewpoint of the cloud broker, which delivers value for the cloud users (i.e. the start-ups and SMEs represented by the use case partners) by appropriate selection and orchestration of the services offered by the cloud providers. In a first internal workshop we determined candidates for the scorecard perspectives and first goals that the cloud broker has to achieve.

After individual reviews and a second workshop the final perspectives have been set and appropriate strategic goals were elaborated. They were then consolidated and extended by general goals of cloud computing and insights from the use case analysis. Based on these findings candidates of key performance indicators (KPI) were derived, reviewed and adapted. We used the ADO*score*® tool to model the strategic goals and the key performance indicators. Chapter 6.1 depicts the four identified Balanced Scorecard perspectives and chapters 6.2 – 6.5 describe for each perspective the strategic goals and key performance indicators.

## 6.1 Balanced Scorecard for CloudSocket

Four perspectives have been identified that are regarded as relevant for CloudSocket: financial perspective, market and customer perspective, functionality perspective, and learning and development perspective.
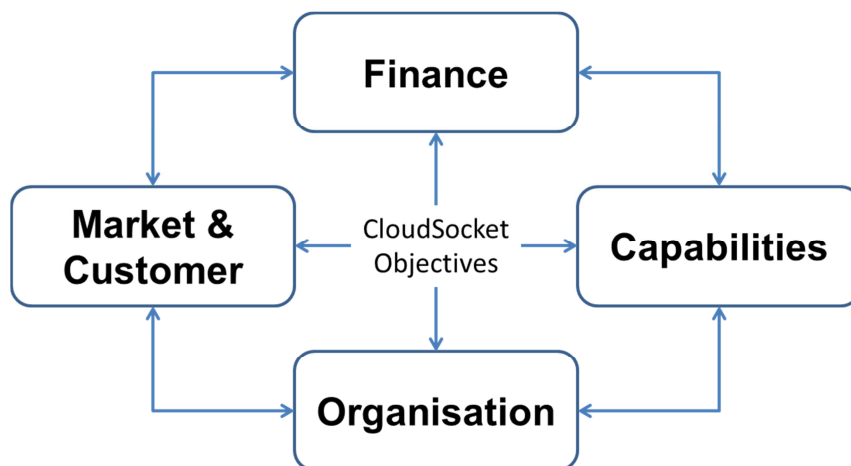


Figure 19: Balanced scorecard for CloudSocket (adapted from Kaplan & Norton, 1992)

**The financial perspective** covers monetary aspects for cloud users (in particular SMEs and start-ups), broker and cloud providers.

**The market and customer perspective** addresses the target customer groups from the broker viewpoint. This means it covers both the cloud user and the cloud provider. Moreover goals in terms of market coverage and market positioning have been identified.

**The capabilities perspective** reflects goals in terms of the brokerage platform, which should offer functionalities that meet needs of future customers. Hence the goals have been derived primarily based on information received during workshops with BWCON and MATHEMA and the use case analysis.

**The organisation perspective** represents the goals, which deal with the continuous adaptation of the cloud services to changing environment of the cloud user.

## 6.2 The Finance Perspective

| Goal | Performance indicator | Description - Success factors |
|---|---|---|
| **Delegate IT related Complexity to Broker** | ▪ Business and IT alignment | ▪ Map executable workflows with business processes<br>▪ Smart mechanisms supporting the correct selection<br>▪ Semantic correctness of bridging the gap between business and IT |
| | ▪ Reduction of end user specific IT know how | ▪ Reduce cloud specific know how for the end user<br>▪ Abstract cloud specific parameters into business context<br>▪ Map business criteria into cloud specific technology requirements |
| **Reduced IT related costs and investments** | ▪ IT related investments | ▪ Reduce spending on technology infrastructure<br>▪ Minimize licensing new software<br>▪ Pay as you go (weekly, quarterly or yearly) |
| | ▪ IT related costs | ▪ Reduction of fix costs<br>▪ Costs based on demand<br>▪ Increase volume output or productivity with less IT costs |
| **Attractive price model for brokerage and end users** | ▪ Attractive costs business process | ▪ Price-sensitive choice of cloud services<br>▪ Attractive price model for brokerage<br>▪ Prices of services and bundles should not be too high in comparison to competitors |
| **Sustainable business relationship between end user and broker** | ▪ Duration of business relationship with customer<br>▪ Revenue per customer | ▪ Continuous revenue for customer service, e.g. monitoring of cloud services<br>▪ The business model should enable the broker to achieve quick wins (new customers and sales revenue) at an early stage |

**Table 21: The finance perspective**

## 6.3 The Market and Customer Perspective

| Goal | Performance indicator | Description - Success factors |
|---|---|---|
| **Broad Process Coverage** | • Coverage of industry processes<br>• Coverage of process categories | • Broker covers all relevant industries: to address a broad variety of customers it is important that the broker offers processes for different industries<br>• The broker has to consider industry specific compliance and regulatory hurdles, because compliance issues are often seen as a "no-go" to the cloud |
| **Raised Flexibility in Business Process Usage** | • Flexible use of business processes | • Simple registration and execution of business processes<br>• Simple search and selection of business processes<br>• No vendor or tool lock<br>• No preparatory actions or requirements |
| | • Adaptation of business processes | • Simple change to another pre-defined business process<br>• Adaptation of business process for a business request<br>• Support in finding, mapping or allocating executable workflows |
| **Reducing needed IT know-how** | • Cloud parameters are transparent to clients<br>• Business related abstraction of IT settings | • Since, the cloud provider is responsible for service maintenance, operations and development, and internal know-how can be reduced |
| **High trust in broker** | • High trustworthiness score by customer | • Because customers have to disclose data about its business, it is very important that the broker ensures a high data security to its customers<br>• High trustworthiness ranking compared to competitors |
| **High provider satisfaction** | • Net promoter score (NPS)<br>• Provider satisfaction survey | • High motivation for provider to offer its products on CloudSocket: providers see the CloudSocket broker as an additional business opportunity<br>• The more customers' use the brokering services, the more providers will be attracted to offer its services through the broker. This leverages the market power of the broker, since it enables the broker to offer more and better.<br>• Providers can implement their services easily and efficiently into CloudSocket and use it as an additional sales channel |
| **High cloud user satisfaction** | • Net promoter score (NPS)<br>• Customer satisfaction survey | • Customer satisfaction and recommendation<br>• Loyal and recurring customer base: customers use the services of the broker every time they need cloud services |

**Table 22: The market and customer perspective**

## 6.4 The Capabilities Perspective

| Goal | Performance indicator | Description - Success factors |
|------|----------------------|-------------------------------|
| **Adequate alignment capabilities** | ▪ Minimum of clarification needed to align business to IT services. | ▪ Business user can easily specify their requirements<br>▪ No technical knowledge needed by business users<br>▪ Models allow to express requirements in "business language" |
| **Adequate process portfolio** | ▪ Number of reference processes<br>▪ Number of APQC PCF process groups covered | ▪ The broker offers a broad reference process portfolio, based on in-depth analysis of customer requirements, and KPIs for the processes<br>▪ The process repository covers the needs of a broad variety of industries.<br>▪ The reference process repository covers the many categories of APQC's process classification framework |
| **Adequate Cloud offerings proposed by the broker** | ▪ Customer satisfaction of business process offerings.<br>▪ Number of re-re-engineered services | ▪ Customers are getting good recommendations: to offer a good support to customer for their decision making the broker and other clients should give hints and references, for example, based on already obtained services<br>▪ Broker understands customers' requirements: in terms of selecting the right services, the broker has to have a clear picture what the customer needs<br>▪ Broker makes proactive suggestions<br>▪ Ratio of "good" rated recommendations to total of rated recommendations. |
| **Appropriate configurations of executable business processes** | ▪ Appropriate Number of interfaces<br>▪ Appropriate diversity of different providers | ▪ Covers entire business process: offered services should cover process activities where possible<br>▪ The broker is able to customize reference processes according to user requirements<br>▪ Service integration: used services should be able to exchange data to each other<br>▪ Service orchestration: the broker has to be able to arrange, coordinate, and manage offered services on process level<br>▪ The offered services bundles create an added value for the customers |
| **Flexible activation of new services** | ▪ Average time needed to activate a service | ▪ Service adaptation when processes are changed: the broker is responsible to make sure that process changes are reflected within the offered services<br>▪ Quick reaction to new demands<br>▪ Change of business model must be implemented fast |

**Table 23: The capabilities perspective**

## 6.5  The Organisation Perspective

| Goal | Performance indicator | Description - Success factors |
|---|---|---|
| **Scalability of business processes** | <ul><li>Technical scale up of a business process</li><li>Know-how transfer in business process execution</li></ul> | <ul><li>Services have to be adapted to new requirements, e.g. increase of volume</li><li>Discovering weak points due to continuous improvement of the broker</li><li>The broker should be able to detect weak points, e.g. unattractive services or service bundles</li><li>Managing of service versioning: ability of the broker to manage different versions of the same offered service</li><li>Cloud services have to cope with growing speed of start-ups</li></ul> |
| **Automation Degree** | <ul><li>Automation in deploying new business processes</li><li>Automation in scaling business processes</li><li>Automation in billing business processes</li><li>Automation in monitoring business processes</li></ul> | <ul><li>Process automation increases efficiency</li><li>Process automation ensures that processes are executed in a uniform way</li><li>Automating the process scaling and monitoring helps to continuously improve and adapt the processes to a changing business context.</li></ul> |
| **Business Process agility** | <ul><li>Adaptation of business processes</li><li>Reaction time on change requests</li><li>Reduction of technical, vendor or tool dependency</li></ul> | <ul><li>Change direction without serious people or financial restrictions</li><li>Reaction on changes in the market environment</li><li>Reaction on changes in technology development</li></ul> |
| **Detecting demands for change** | <ul><li>Process performance</li><li>Technology performance</li><li>Consultation performance</li></ul> | <ul><li>Monitoring of cloud orchestrations to detect deficiencies</li><li>Interaction with customer</li><li>Interaction with knowledge worker</li></ul> |

**Table 24: The organisation perspective**

# 7  CONCLUSION AND OUTLOOK

It was a primary objective of workpackage 2 to establish a common understanding and define evaluation criteria that determine the success of the CloudSocket project. The understanding with respect to business processes is described in this report - together with the evaluation criteria. The understanding concerning terminology is described in deliverable D2.2. In addition, in task 2.3 a cloud transformation framework is developed, which enables enterprises to perform a self-check about their cloud-readiness, define their business processes and provide an approach that guides them towards.

In order to gain a common understanding of the business processes we present typical use cases and business episodes, which were identified in workshops with the use case partners from the Business Incubator and the Cluster Business Process Broker. We identified typical business processes of start-ups and SMEs, for which a cloud support makes sense. It turned out that these processes primarily are supporting processes.

Based on the process identification and analysis we developed a structure for a business process repository as a basic infrastructure for CloudSocket. The business process repository allows storing variants of business process models with different levels of cloud support. This can guide the cloud broker in identifying the appropriate cloud support for an enterprise. The structure of the business process repository combines the APQC's process classification framework (PCF) with the Business Model Canvas. The PCF provides a general structure which allows categorising any kind of business processes. The Business Model Canvas offers a second entry point to the repository from the point of view a concrete enterprise. In particular in the start-up phase, enterprises have to identify which business processes to focus on. Since there is little or no infrastructure available, the Business Model Canvas can guide them in determining appropriate business processes.

Simulation was identified as a further tool to support the appropriate cloud offering for a business process. We demonstrated its usage with a scenario from the Cluster Business Process Broker. Finally, we derived evaluation criteria for CloudSocket from the point of view of the cloud broker. The criteria are represented as a balanced scorecard and for each of the criteria KPIs were determined.

The results presented in this deliverable serve as the basis for the future work in the CloudSocket project. The discussion with use case partners allowed us to identify correct abstraction level for bridging the semantic gap between the business people and the technically oriented view of the cloud providers. This is an important input for the design, allocation and execution of the framework which will be developed in workpackage 3. The structure of the business process repository is an input for the development of the CloudSocket infrastructure in workpackage 4. The business processes which are modelled in the CloudSocket demonstration (workpackage 5) will be stored in the business process repository and categorized both by the process classification framework and Business Model Canvas.

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# ANNEX A:    LIST OF TOOLS

ADONIS®          Business Process modelling tool, http://www.boc-group.com,

ADO*score*®      Balanced Scorecard modelling tool, ww.boc-group.com