# Master Thesis

## No. 156

Business Model Handbook of a Software Company in the Field of Mechanical Engineering

Konstantinos THEOLOGITIS

I assure that I have written this work autonomously and with the aid of no other than the sources and additives indicated.

# Master Thesis

## No. 156

of Mr. Konstantinos THEOLOGITIS
matriculation number: 3673230

**Title (English): Business Model Handbook of a Software Company in the Field of Mechanical Engineering**

**Title (German): Business Model Handbook eines Softwareunternehmens im Maschinenbau**

**Initial situation:**

Startups are not like established companies. The organization, strategy and business are not fully known and need to be developed. Nevertheless, they often grow at a high pace requiring, in turn, defined processes and organization to cope with that speed. Hence, a very flexible and lightweight definition of the business is required avoiding re-orientation when it is necessary.

**Goals:**

This thesis aims at developing a business model handbook that brings clarity and transparency to the business, especially for new employees but also for other stakeholders, like investors. Furthermore, models should be included that allow for accountability of the progress and growth of the startup.

**Contents of this thesis:**

- Familiarize with the startup:
  - Business model
  - Market and customers
  - Products and technology
- Literature review:
  - Startup methodology
  - Business architecture
  - Process modeling

  - Business analytics
- Development of the handbook
  - Business architecture
  - Processes and associated KPIs

An accurate elaboration, a comprehensible and complete documentation of all steps and applied methods, and a good collaboration with industrial partners are of particular importance.

The work remains a property of the Institute of Product Development.

| | |
|---|---|
| **Supervisor:** | Dr. Bergen Helms |
| **Partners in industry** | Soley GmbH |
| **Started on**: | 05.10.2016 |
| **Submitted on**: | 05.06.2016 (extended by 2 months) |

Garching, 05.06.2016 _____

Signature of supervisor

Garching, 05.06.2016 _____

Signature of student

**Restriction notice for the participation of industry partner**

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**Publication**

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# CONTENTS

# 1 Introduction

"A startup is a human institution designed to create a new product or service under conditions of extreme uncertainty." (RIES, 2011, p. 27)

Elaborating on Eric Ries' definition of a startup, one could say that a startup is a team of people brought together and driven by a common goal of creating a new product or service, while conditions are uncertain. Uncertainty could be described as a situation where the current stage of knowledge is such that:

- The order or nature of things is unknown.
- The consequences of events are unpredictable.
- Credible probabilities to possible outcomes cannot be assigned.

What characterizes most startups is that they dive deep into the unknown trying to create a business out of something new and innovative. That could be a new innovative product or service. If we were to characterize startups in a stereotypical way, we could say that: Startups' behavior can be difficult to predict, having many ups and downs happening quickly, due to the dynamic environment in which they operate. Key people (if not all) are trying to develop the product, and at the same time are dedicated to uncovering a new source of value for customers, while setting the whole business. There are no departments like marketing/sales, human resources or accounting. There are only people who are hard-working, action-oriented and visionary, and their working hours are certainly not nine-to-five. There might not even be an "office" apart from the founder's home address. Personnel are hired from the general to the specific; the first employees have many different tasks, at least until the workload requires specialized staffing. Startups are not staffed with people who only work for paychecks, but also for making an idea come true. These innovative people are usually called entrepreneurs.

That said, every startup varies, with the nature of the business and the main incentive determining the operating styles and practices of the company.

## 1.1 Situation

Some of the aforementioned characteristics of startups also apply to Soley, the startup in which the thesis was carried out.

Soley is an early-stage startup, founded in 2013 ago by four graduates of Technical University of Munich (TUM), two of whom hold a PhD in Engineering, thus having a strong research background. Soley is considered a spin-off of the Institute of Product Development of TUM, and that is why its office was first located inside the campus of the University.

Moreover, Soley is a software startup, focusing on data analytics for engineers, and is based on graph-based data analysis. The software is mainly addressed to other companies, a fact

that renders the company a part of the Business-To-Business (B2B) marketplace. The B2B marketplace differs from Business-To-Consumer (B2C) marketplace in many ways. To begin with, B2B involves a much longer sales cycle due to the fact that buyers are not individuals, but companies. That entails a slower decision-making process. One reason for that, among many others, is that the people who will actually use the software are usually lower in the hierarchy, and need permission from the executives in order to do so. This process can take months, and the bigger the company the longer the sales cycle. In addition, being involved in the B2B marketplace results in a smaller amount of products being sold per month, since the amount of companies is significantly smaller than that of consumers.

Additionally, one of Soley's aims is to adopt the Software as a Service (SaaS) business model. SaaS refers to software that is hosted on online servers and is provided as a service. SaaS applications are provided over the web, which means they can be accessed from any computer without any special software installed. Unlike traditional software applications that require an upfront purchase, SaaS applications typically offer subscription-based pricing and are usually licensed on a per-user basis. (DEYO, 2008) The main benefit of the SaaS model that makes it appealing to Soley is the subscription-based pricing, which offers recurring revenue. Having said that, Soley is not yet espousing that model, and the founders are still uncertain about which is the right one for Soley's case.

As one may understand, like any early-stage startup, Soley does not, yet, have a strict business structure, let alone departments such as marketing/sales, human resources, accounting etc. On the other hand, there is a high level of trust, communication, respect and professionalism between the founding members and the early employees. This allows for simple efficient communication and a clear distribution of tasks, which in turn compensates, to some extent, for the lack of organizational structure.

Furthermore, the company is growing fast in terms of improving the product, and learning from past mistakes gaining valuable experience. Soley has now two main products – Soley Studio and Soley Desk – with a third one – Soley Server – being developed as we speak. After two years in the market, and having analyzed the competition, the founders are confident about the quality of the product, but still see huge potential for further improvement.

Nevertheless, the fast pace of growth as described above, does not come without hard work and increased workload. The pressure and tasks per person have escalated since last year, necessitating new hires. After receiving an investment recently, Soley expanded its team by two full-time employees, eight part-time working students, and three freelancers, while hiring interviews are being conducted regularly. Although the company is making steps forward, the founding members are still eager to achieve more. A bigger investment is one plausible goal to drive further growth, as long as the company is not yet profitable.

Last but not least, it is important to mention that Soley's founding members are inspired by and implementing the Lean Startup Methodology. The Lean Startup is a method for developing businesses and products first proposed in 2008 by Eric Ries. According to RIES (2011), startups can shorten their product development cycles by adopting a combination of business-hypothesis-driven experimentation, iterative product releases, and what he calls validated learning. Ries' overall claim is that if startups invest their time into iteratively

building products or services to meet the needs of early customers, they can reduce the market risk and sidestep the need for large amounts of initial project funding and expensive product launches and failures.

## 1.2 Problem statement

As every startup at its beginning, Soley faces upon several challenges that need to be overcome, with its main challenge being that of proving that the company has the:

- Right product
- Right market
- Right sales channels
- Right pricing
- Right marketing strategy

It was clear for investors that the idea is worth investing in, but now they need to see that this idea can be implemented successfully into an operating and profitable company. Being able to prove that would acquire Soley another, probably bigger, investment, which in turn would allow further expansion and growth.

**Problem 1.** Absence of strict business structure

What made that difficult so far was, first of all, the absence of a strict structure as was also mentioned above. Until recently, the company consisted of only the four founding members, making difficult or even pointless to define departments. The tasks were so many, that one person worked inevitably on many different kinds of things. One day it could comprise administrative, sales and product management tasks. Apart from that, defining a strict structure would not be a priority issue for a startup that has just launched its product.

**Problem 2.** Undefined business processes

Subsequently, without a strict business structure the company cannot define the key business processes that emerge from its operations. According to FAILTE IRELAND (2013), a process is an interdependent and linked set of work activities, which translate inputs into outputs in order to deliver something of value for the business and/or the customer. Key business processes are the critical processes that are fundamental to how people plan and manage the business. A business structure is necessary for defining the key business processes because it allows for a clear specification of inputs and outputs of every department. Having specified the above would allow for a clarification of the set of activities that turn the inputs into outputs; these would be the processes.

**Problem 3.** Undefined Key Performance Indicators

Due to the absence of defined processes, Soley cannot also clarify which process-related metrics and Key Performance Indicators (KPIs) to use. KPIs are a set of quantifiable measures that a company or industry uses to gauge or compare performance in terms of meeting their strategic and operational goals. Additionally, KPIs can be used to track and assess the performance of a specific business process. Having mentioned the above, one can

realize that without defined KPIs it is very difficult to measure and prove either growth or progress. Therefore, not being able to show each of these makes it impossible to prove that the company is on the right track, which means growing and progressing at the same time.

**Problem 4.** Complicated business model

Furthermore, in Soley's case there is no standard business model in literature that can describe its operation. According to INVESTOPEDIA (2016), a business model is the plan implemented by a company in order to generate revenue and make profit from its operations. The initial goal of Soley was to adopt the SaaS business model, according to which revenue is generated from web-based subscriptions. Nevertheless, the B2B market makes that difficult to achieve, since some companies would rather pay for Soley to use its software and deliver the results to them, instead of buying the software to use it on their own. The aforementioned way of creating revenue resembles the business model of consulting, according to which revenue is generated from professional services rather than selling a product. The main difference in these two business models is not the profit margin, as one may think, but the fact that SaaS allows for a recurring revenue, unlike consulting. This contradiction creates a complicated business model, due to which Soley cannot easily prove its progress, because different criteria of progress/growth apply to the two models.

**Problem 5.** Limited resources and experience

Finally, a major problem, which occurs in most startup cases, is that of the limited resources and experience. Soley lacks the liquidity needed for further growth and this is why it has to convince investors that the company is operating successfully making profit. Due to the lack of resources, the company is forced to hire younger people who are willing to work for less money, but lack the experience of an older professional that has been several years in the market.

## 1.3 Motivation

Soley's founders, like most entrepreneurs, often wonder how would the situation of their startup be and what could they achieve if some of their company's problems were solved. There is no obvious answer to that question, but one thing is certain: they would be able to focus on much more important issues, like improving the product.

**Motivation 1.** Easier distribution of tasks & clear definition of roles

In Soley's case, solving critical problems would mean that the organization of the enterprise is properly defined, having a strict business structure and departments. Having defined specific departments and divisions, it would be easier to distribute the tasks according to the subject. So, specific tasks would be assigned to every department and everyone would know what his part-role in the company is. Apart from that, a defined organizational structure would allow for an easier and successful clarification of inputs, outputs and goals of every department.

**Motivation 2.** Optimization of performance

Consequently, the clear definition of inputs and outputs of every department would facilitate

the definition of business processes, as was mentioned earlier. The identification of processes would render the analysis of every process possible, which in turn would help in measuring their performance. Thereafter, Soley would be able to attempt to optimize the key business processes involved in its operation, thus minimizing execution time and costs, while maximizing performance.

**Motivation 3.** Quantitatively measuring progress & growth

Furthermore, having resolved some of the problems mentioned in the previous section, one could assume that there would be certainty about being on the right track. That kind of situation would create trust from the perspective of the investors, but also from the employees' perspective. Investors would be convinced that the concept of Soley is not only good as an idea, but could also be implemented and operate successfully. Thus, future investments could be bigger, easier to gain and also at a higher valuation, meaning that Soley's overall value would increase. In addition, certainty of being on the right track would create confidence and satisfaction among the employees, knowing that the company is making steps forward and their work is paying off. That would also assure them that the founding members-executives are doing a good job managing the company, and in turn show dedication and commitment to their job. Therefore, with trust, confidence, satisfaction, dedication and commitment being present in the company, Soley could easily align the whole team under a common goal.

**Motivation 4.** Ability to "tune" the organization

Another motivation for solving Soley's problems is the challenge of controlling and optimizing the complicated business model. To begin with, having solved some of the critical problems could mean that Soley would have established an efficient web-based subscription funnel for making revenue. That would mean that the company has a standard business model, which would be SaaS. Thus, with a non-complicated business model being clarified, it would be easier for the executives of the company to try to control or "tune" the organization according to the strategic goals. Moreover, a standard business model that is easy to control would also allow for an attempt to optimize it. Optimizing the business model could mean lowering the cost of acquiring a customer, decreasing the time needed for a specific process to be carried out, or improving the effectiveness of a marketing campaign.

**Motivation 5.** Easier and faster way to resolve less critical issues

While the aforementioned changes are really important motivations, and would make a big difference in Soley, there are also some other less important that are worth mentioning. For instance, a less critical motivation for solving some of the company's problems is the fact that the onboarding process would be easier and faster. It would be easier and faster for new employees to set everything up, get to know what the company deals with, their role and tasks in the company, and also the goals, vision and way of working in Soley. Additionally, the hiring process would also be easier and faster.

## 1.4 Objectives

The superordinate objective of this thesis is to create a business architecture for Soley.

However, tackling this objective in its entirety presents a scope too extensive for this thesis. Emphasis is given on the fundamental elements of designing the business architecture of the company, such as creating a business structure, clarifying business processes and defining KPIs.

A graph-based overview of the scientific reasoning of this thesis is depicted in Figure 1-1.

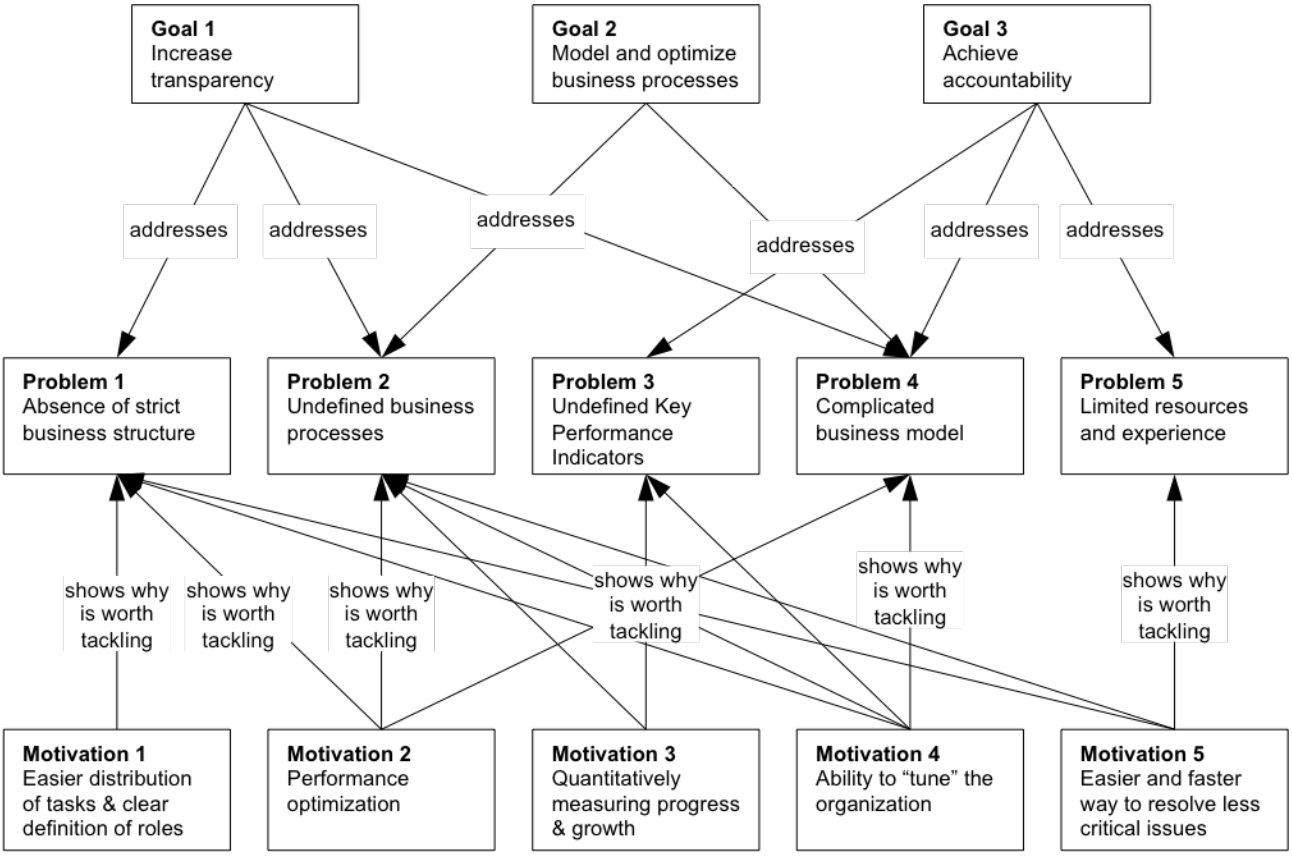



*Figure 1-1: Overview of the argumentation structure of this thesis*

**Goal 1.** Increase transparency

One of the goals of this thesis is to increase the transparency of the company. Being transparent would mean that there is a clear organizational structure, dividing people into departments according to their tasks. In addition, having achieved transparency would mean that everyone knows the goal of the department for which he or she is working, and the way to achieve that goal. Also, it would be easier for managers to map each individual goal to the overall goal, since transparency would allow for that. Thus, the first and most important step to accomplish all of the above would be to define and model the general business structure of the company.

**Goal 2.** Model and optimize critical business processes

After having achieved to increase the transparency in the company, the next goal would be to model the critical business processes of Soley. In order to do that, the inputs and outputs

of every department should be clarified first, and then the processes that transform the inputs into the outputs. Thence, each process can be modeled and broken down to steps, allowing for a clear overview of costs and time needed for each step. That facilitates the improvement of the execution of the processes, in a way that redundant time and costs can be obliterated.

**Goal 3.** Achieve accountability

Finally, the last goal of this thesis is to help Soley become more accountable. This means that the managers would be able to measure, and quantitatively show either the progress or the regression of the company to the investors. Moreover, achieving accountability means being able to control the business model, and, subsequently, being able to steer or pivot towards progress. In the end, being accountable is also an effective way to convince the investors of the progress of the company, because as the quote goes: "Past performance is best predictor of future performance".

## 1.5 Approach and thesis structure

This thesis aims to develop a business case handbook for Soley. That handbook should describe every department of the company by clearly stating the input, output and goal of every department, the processes in which each department is involved in, and the KPIs that are influenced by or used to measure the performance of these processes.

In order to achieve that, the approach was the following. The first step was getting familiar with the company and the current situation; what is the vision, the goals, the way of making revenue, the marketing and sales channels, the competition, the characteristics of startups and the SaaS business model and others. Next was defining a business structure, and starting to model some departments such as the sales and marketing channels. Afterwards, what was done was interviewing the founding members of the company, with a view to clarifying the inputs, outputs and goal of every department. Then, having defined a business structure, and clarified the inputs and outputs of every department, the following step was finding a way to measure the performance of every department and of the company overall. In the course of that effort, KPIs were defined from the literature, and processes that emerged from the operations of Soley. Finally, quantitative models linking business processes to KPIs were developed.

The structure of the thesis corresponds to the approach mentioned above in order to achieve the objective of this project. Chapter 2 presents the literature review that gives the reader an idea of the current state of the art. The chapter starts with an introduction to modeling and modeling standards and notations presented in Section 2.1. In this section, two of the most common process modeling languages are presented and described. The reason for that is because some modeling was involved in the course of implementing this project. Next, with the scope of understanding the existing approaches in literature that are used to design and structure a business, an approach to business architecture is presented in Section 2.2. This approach is described and the steps implemented in the course of designing a business architecture are stated and described. Then, the current state of the art regarding metrics and

Key Performance Indicators is explored in Section 2.3. This section starts with an introduction to metrics, also giving a definition to KPIs. It continues with a discussion on startup metrics, clarifying how good metrics should be. Furthermore, several SaaS metrics are presented and described at the end. Chapter 2 ends with a conclusion which states if and how can the aforementioned literature be used in the course of implementing the approach of this thesis.

Chapter 3 introduces the approach implemented in order to carry out the objectives of this project. The approach consists of four steps which, in turn, constitute the four main sections of this chapter. The chapter starts with a graphic representation of the approach implemented in order for the reader to get a clear overview of what he or she is about to read. Each section includes a graphic representation of the steps implemented and the sections in which they are found. In Section 3.1 the first step of the approach is described, which is getting familiar with the company. Section 3.2 describes the method used to develop a business structure for the company. That includes defining the departments of the company, identifying the inputs and outputs of every department, clarifying the interactions between them, specifying their purposes and lastly, modeling the general business structure of the company. In Section 3.3 the next step of the approach is presented, which is measuring the performance of the company. In the course of implementing this step, the method called *goals waterfall* method is introduced. According to this method, first, the business goals of the company are identified, then metrics are determined, followed by a definition of business processes. The last step goes back to the metrics and identifies the KPIs. The fourth and final step of the approach is presented in Section 3.4. That is, conducting a quantitative analysis in order to correlate business processes and KPIs. In order to do that, the first step is to analyze each process in smaller activities, then determine the attributes of each activity, and finally, develop a quantitative model that connects the process to the KPI. This chapter ends with a discussion on some disadvantages and setbacks that occurred during the implementation of the aforementioned approach.

Chapter 4 aims to present and describe the results that came out from the implementation of the approach introduced in the previous chapter. The chapter starts with a quick overview on the contents, providing insights to the reader on what he is going to read. Section 4.1 presents and describes the business structure that was developed. Moreover, it provides results of some intermediate steps of developing the business structure that correspond to the steps presented in Section 3.2. Section 4.2 presents the results from the implementation of the third step of the approach, which was measuring performance. These results include the metrics that were determined to be Key Performance Indicators for the company. Furthermore, the results include a presentation of the business processes that were defined. In Section 4.3 the quantitative models relating processes to KPIs are presented and discussed. Additionally, insights on how these models can help Soley are given. Section 4.4 describes the business handbook that was developed by putting all the previous results together. Finally, this chapter concludes with a discussion and an evaluation of the results.

Chapter 5 presents an overall discussion on the contributions achieved by the implementation of this project. Furthermore, it discusses limitations and potential work that can be done in the future. This work includes things that were left open during the implementation of the approach. In addition, it consists of results that were not done that

well and a better approach could be attempted.

# 2 State of the Art

The main purpose of this chapter is to present and describe the current state of the art on the field of structuring and measuring the performance of a startup. It also includes a literature review on process modeling languages, because during the implementation of the approach of the project, process modeling was involved.

Section 2.1 provides the reader with an introduction to modeling. In addition, it presents and discusses the use of two modeling languages to model business processes. These are IDEF0 and Business Process Modeling Notation (BPMN).

Section 2.2 introduces the business architecture approach developed by GHARAJEDAGHI (2011). According to that approach, in order for someone to design a business architecture he or she must follow some steps. These include determining the environment of the company, clarifying its purpose, identifying its functions, designing its structure and defining its processes.

Section 2.3 presents a literature review on metrics and KPIs. It starts with providing a definition for KPIs. Then it presents some essential characteristics for good startup metrics and finally describes SaaS metrics and KPIs.

Chapter 2 ends with a conclusion on the aforementioned state of the art and its use for the implementation of this project.

## 2.1 Introduction to modeling – Modeling standards and notations

According to MARIA (1997), modeling is the process of developing a model; a model is a representation of the construction and operation of a system. It is generally simpler than the system it represents, depicting the most important functions of the system. One purpose of the model is to predict the behavior of the real system, after changes are applied to it. Although a model could be capable of reproducing past history, it may not be able to predict future behavior. In order to do that, it must consist of equations that are in accordance with reality; it must take into account plausible extreme conditions, inputs and outputs, and must be able to answer what-if questions (HOMER, 1996, p. 2). While a model must have a close resemblance to the real system showing its most important features, it should not be too complex, so that it is understandable and easy to experiment with. In other words, a good model achieves a balance between realism and simplicity. Expert modelers suggest that it is best to increase the complexity of the model iteratively, while going deeper into the operations of the real system. An important issue in modeling is model validity. Model validation techniques include simulating the model under known input conditions and comparing model output with system output. (MARIA, 1997, p. 7)

According to SCHWARZ ET AL. (2009), models are also generative. They are used to give explanations and predictions for natural phenomena. Analysis of the phenomenon provides data for structuring the model, and clarifying potential elements, relations, rules and

operations inside the model. The model, on the other hand, explains and predicts the behavior of the phenomenon. It is important to mention that while models are defined as representations of natural phenomena, not all representations are models. "Models are specialized representations that embody aspects of mechanism, causality, or function to illustrate, explain and predict phenomena" (SCHWARZ ET AL., 2009, p. 634).

Creating a model inevitably involves multiple rounds of revision and evaluation. Evaluation initially focuses on the representation of reference behaviors, and afterwards on the robustness, flexibility and clarity of the model. Model revision results in increased complexity, up to the point that the model remains understandable. The iterative process of creating a model may, in theory, continue as long as the model fails to fulfill some evaluation criteria. (HOMER, 1996, p. 2)

In the framework for modeling presented by LESH & DOERR (2003), a model consists of "elements, relations, operations and rules governing interactions that are expressed using external notation systems". These external notation systems are usually called modeling languages. According to HAREL & RUMPE (2000), a modeling language "is used for specifying and documenting properties of a system in different abstractions and from different points of view". There are many different modeling languages; some are specialized in modeling a whole organizational structure, some in modeling just business processes and others.

As HAREL & RUMPE (2000) describe in their paper, a modeling language consists of a syntax and its semantics. The syntax or syntactic notation is the "façade" of the language, containing all the elements, the user will encounter while using or reading the model. Many different terms are used for the elements of the syntax, such as: words, sentences, diagrams, models, modules and others. The semantics, in turn, "defines the meaning of a notation: what information do the expressions in the notation describe". So, in other words the syntax defines and describes the expressions of the language, and the semantics clarifies the meaning of these expressions.

One can separate languages in two different kinds: textual/symbolic languages and visual/diagrammatic ones. Quoting HAREL & RUMPE (2000), a textual/symbolic language "is a language consisting of linear strings of characters and symbols (words, sentences, etc.)", while a visual/diagrammatic one "is a language based mainly on graphic (topological/geometric) elements; it can employ textual elements too". A visual language can be easier to understand, because of its graphical and thus more descriptive content, but it can also confuse the user if the graphics are overused. Nevertheless, both types need a properly defined syntax, as well as a strictly precise semantics. (HAREL & RUMPE, 2000)

Some of the most common process-modeling languages, found in literature, are briefly described below.

### 2.1.1 Business Process Modeling Notation (BPMN)

"BPMN defines a Business Process Diagram (BPD), which is based on a flowcharting technique tailored for creating graphical models of business process operations. A Business Process Model, then, is a network of graphical objects, which are activities (i.e., work) and

the flow controls that define their order of performance." (WHITE, 2004, p. 1)

As WHITE (2004) describes, a BPD is composed of graphical elements, which were chosen to be different from each other, and to use shapes and symbols that are recognizable by most modelers. BPMN was developed with the scope of creating a simple mechanism for creating business process models, while at the same time being able to cope with the complexity of business processes. Having that in mind, the developers of BPMN came up with some easy and understandable notation categories. The four basic categories of elements are:

- Flow Objects
- Connecting Objects
- Swimlanes
- Artifacts

Figure 2-1 presents an overview of the BPMN's set of graphical elements.

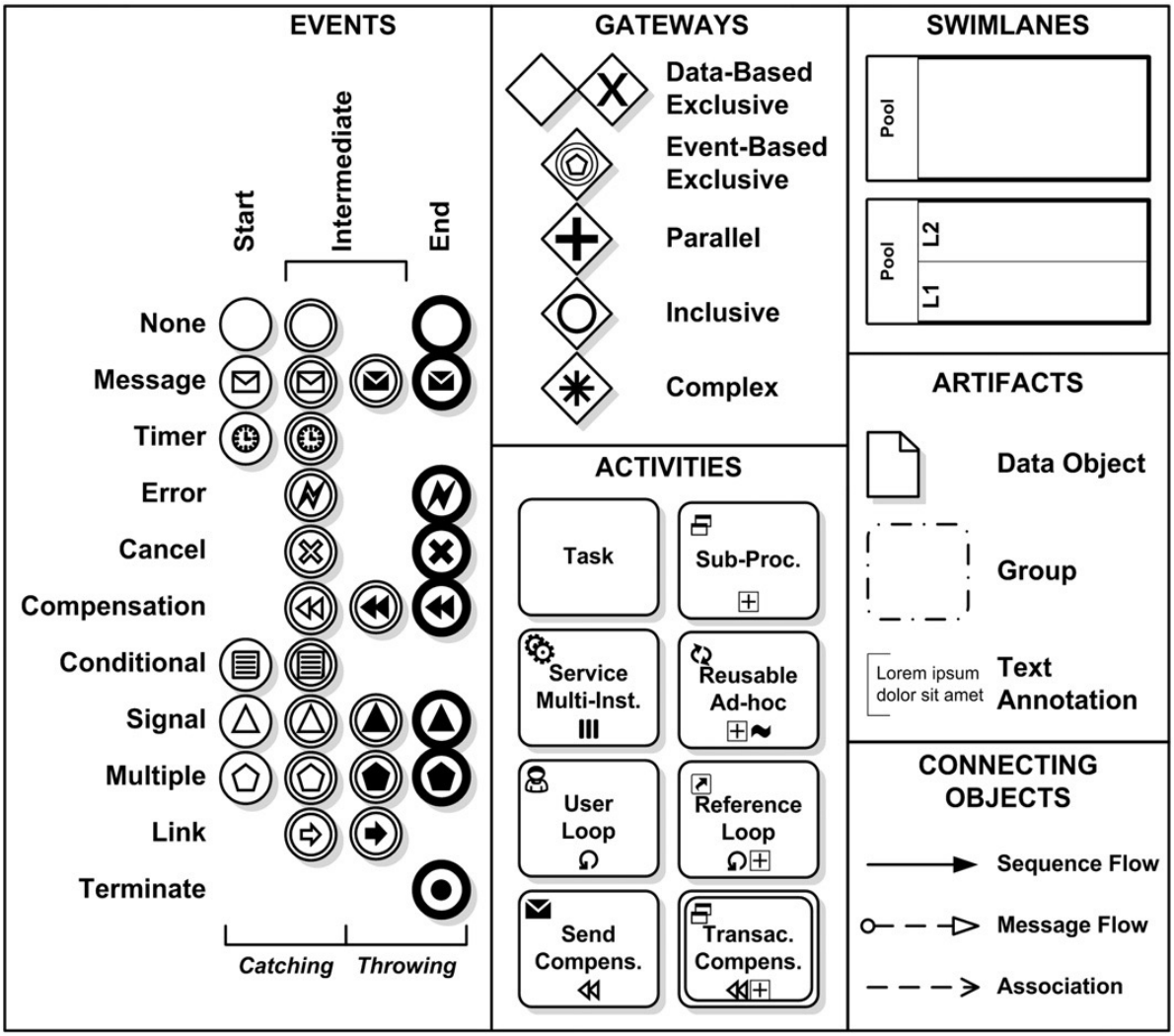



*Figure 2-1: Overview of the graphical elements of BPMN (CHINOSI & TROMBETTA, 2011, p. 128)*

The *Flow Objects* are the core elements of the BPD. These are *Events*, *Activities* and *Gateways*. An *Event* is something that happens during the execution of a business process and it usually has a cause (trigger) and an impact (result). There are three different types of *Events*, depending on when they happen: *Start*, *Intermediate* and *End*. An *Activity* is used to describe an event or item of work performed by people or software. *Activities* are split into two types: *Task* and *Sub-Process*. A *Gateway* "is used to control the divergence and convergence of Sequence Flow. Thus, it will determine traditional decisions, as well as the forking, merging and joining of paths". (WHITE, 2004, p. 2)

In order for the *Flow Objects* to be linked to each other, and create the structure of the business process, some connecting elements are required. These elements comprise the *Connecting Objects* of the BPD, and consist of *Sequence Flow*, *Message Flow* and *Association*. The *Sequence Flow* shows the order of which the activities of the process take place. A *Message Flow* clarifies the sender and the recipient of a message in a process, while an *Association* associates *Artifacts* with *Flow Objects*, and usually clarifies the inputs and outputs of activities. (WHITE, 2004, p. 3)

*Swimlanes* are used to demonstrate different functional capabilities or responsibilities by sorting activities in two or more separate visual groups. There are two types of *Swimlanes* in BPMN, which are: *Pools* and *Lanes*. A *Pool* is used to separate different participants in the diagram, whenever two or more are involved in a process. On the other hand, a *Lane* resembles the common swimlane process of modeling, used to differentiate activities linked to different departments of a company. (WHITE, 2004, p. 4-5)

*Artifacts* constitute the additional notation used to fill any needs for extra, non-core elements appropriate for a special situation. A modeler can add as many *Artifacts* he likes to the diagram, but there are only three types of them: *Data Object*, *Group* and *Annotation*. A *Data Object* is connected to activities through *Associations* and shows how information is created by activities. A *Group* is usually used for documenting or analyzing a part of a process, but does not affect the *Sequence Flow*. An *Annotation* is used for adding a text, which the reader of the diagram will read. (WHITE, 2004, p. 6)

Figure 2-2 shows an example of a process modeled using BPMN.

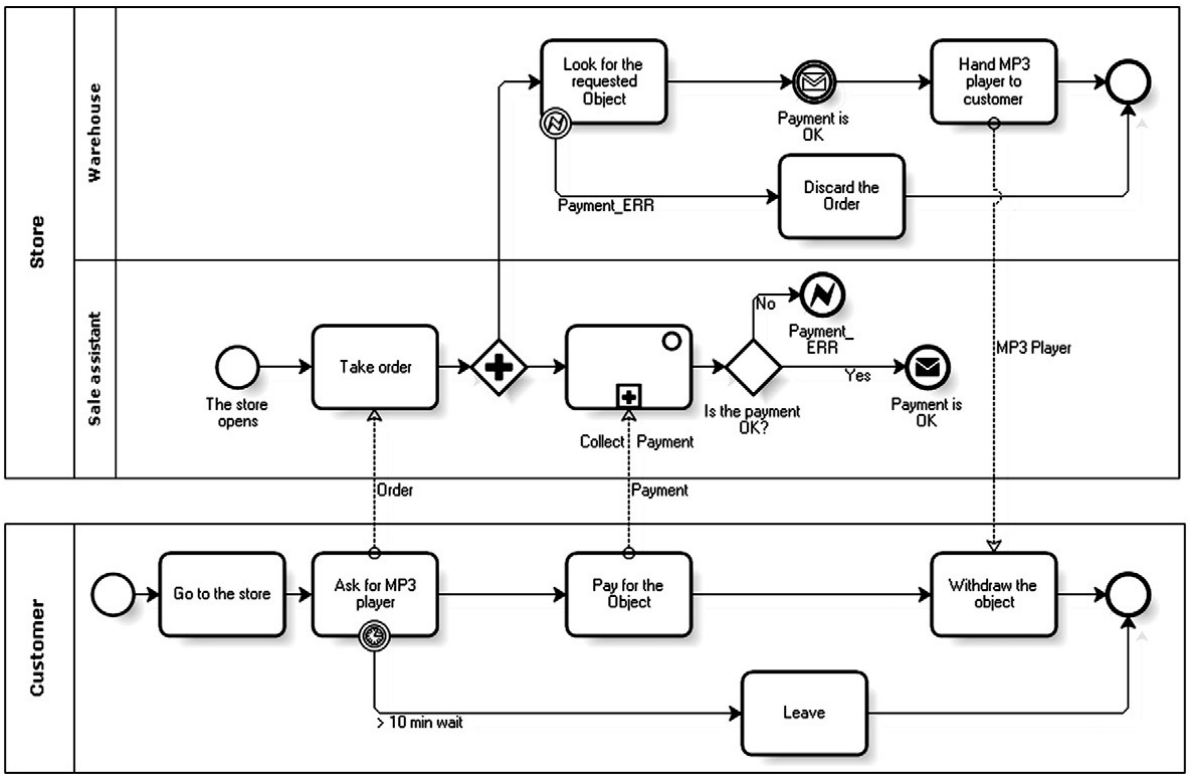



*Figure 2-2: Sample example of a process modeled with BPMN (CHINOSI & TROMBETTA, 2011, p. 129)*

From this general description of the BPMN, one could realize that using BPMN is mostly appropriate for larger companies with well defined business and organizational structure, as well as clarified business processes that are analyzed and detailed in depth. Thus, a modeling methodology as such would be difficult and too complex to implement in a small startup company, that needs flexibility and quick iteration. To conclude, BPMN is a very useful modeling language, as far as modeling business processes is concerned, but would not be the best choice when it comes to simplicity and flexibility.

### 2.1.2 Integrated DEFinition Methods: IDEF0 and IDEF3

IDEF is a group of modeling languages in the field of systems and software engineering. These languages cover a wide spectrum of modeling methods, such as:

- Function Modeling Method (IDEF0)
- Information Modeling Method (IDEF1)
- Data Modeling Method (IDEF1X)
- Process Description Capture Method (IDEF3)
- Object-Oriented Design Method (IDEF4)
- Ontology Description Capture Method (IDEF5)

In the course of this project, only IDEF0 and IDEF3 will be discussed.

#### 2.1.2.1 IDEF0

As it is described by (MAYER ET AL., 1992, p. 10), IDEF0 has its routs in the graphical language of Structured Analysis and Design Technique (SADT), and is used to model the decisions, actions and activities of a system (i.e. the functional framework of a system). IDEF0 models improve the organization of the analysis of a system and the communication between the analyst and the reader.

In order to build up communication, IDEF0 models use: diagrams based on simple notations, text labels and a glossary to describe these notations, and a structure that progressively decomposes into a hierarchical structure from generic to more detailed levels. In addition, IDEF0 concepts include a "node chart" used to locate details in the structure, and a limit in the number of sub-functions that appear in the hierarchical structure. (IDEF, 2016)

As far as the organization of the analysis is concerned, according to IDEF (2016), IDEF0's rules need to be rigorous and precise in order to cover the needs of the analyst. These rules involve a specific number of details in each level of the function, syntax rules for notations, no recurring names of labels and a purpose statement for the model.

PRESLEY & LILES (1995) state that IDEF0 models consist of five elements, which are:

- The *activity* or *process* – represented by a box
- The *input* – represented by an arrow coming into the left of the activity (box)
- The *output* – represented by an arrow going out of the right of the activity (box)
- The *constraint* or *control* – represented by an arrow coming into the upper side of the activity (box)
- The *mechanism* – represented by an arrow coming into the bottom of the activity (box)

The Inputs, Controls, Outputs and Mechanisms could also be defined as ICOM. Figure 2-3 depicts a representation of the IDEF0 functional model.

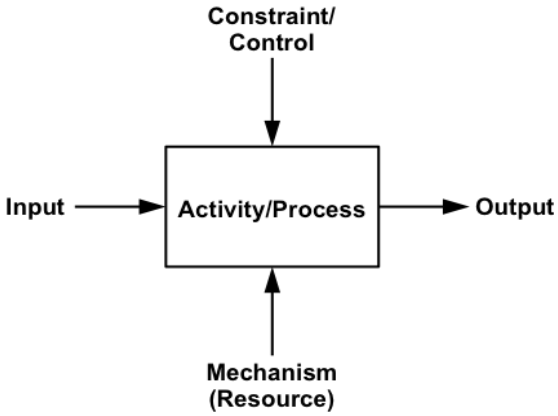



*Figure 2-3: IDEF0 representation*

Figure 2-4 shows how an activity or ICOM can be decomposed and broken down to more detailed levels in the hierarchy structure.

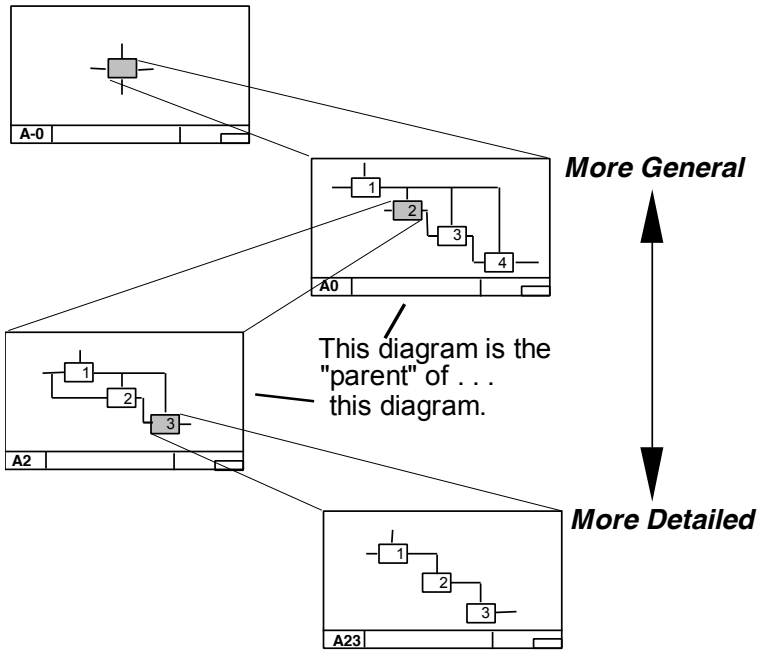



*Figure 2-4: Overview of the decomposition of an IDEF0 model (PRESLEY & LILES, 1995, p. 2)*

According to IDEF (2016), the primary advantage of IDEF0 is its effectiveness in describing, in detail, the system activities for function modeling. The activities can be characterized by their inputs, outputs, constraints and mechanisms (ICOMs), while each one of these elements can be broken down to a very detailed level until it is as detailed as necessary. However, using IDEF0 entails disadvantages as well. One of these is that it could be easily confused with a depiction of a sequence of activities. Although, it is not made to represent sequences of activities, some readers or users might interpret it that way or even use it for that purpose. For instance, some users might find it convenient to place the activities (boxes) from left to right, instead of placing them in a decomposing or top-down order. That is because many times the output of one activity might be the input of another activity, and placing these activities from left to right makes things clearer. The problem is that when activity sequences are not included in the model, a reader might be confused and interpret them as such. Attempting to solve that problem would corrupt the basic principles on which the IDEF0 was based, thus confuting its advantages. This specific problem is addressed by the IDEF3 method. (IDEF, 2016)

#### 2.1.2.2 IDEF3

IDEF (2016) describes the IDEF3 Process Description Capture Method as a mechanism used to collect and document processes. It is stated that the IDEF3 has the ability to detect which event has priority over the others, and which event is causing a certain situation. Then, it can create a structure, based on those relations between the events, which accurately represents

the way the system, organization or process works.

Furthermore, IDEF (2016) states that the IDEF3 can track the behavior of a system when provided as a written scenario, and structure that scenario creating a detailed model with descriptions of every step. “The resulting IDEF3 descriptions provide a structured knowledge base for constructing analytical and design models” (IDEF, 2016). Unlike common simulation modeling tools that develop mathematical models based on predictions, IDEF3 develops structured descriptions.

There are two modes of IDEF3 descriptions as presented by MAYER ET AL. (1992); the Process Flow and the Object State Transition Network (OSTN). The first describes “how things work” in a system or organization (e.g. the description of what happens to a part as it flows through a sequence of manufacturing processes), while the second “summarizes the allowable transitions an object may undergo throughout a particular process” (MAYER ET AL., 1992, p. 40). Both modes consist of units of information, that comprise the system description, and constitute the basic units of the IDEF3 description. The main difference from the other IDEF methods is that the outcomes produced by IDEF3 make up for, what is called, a *description* rather than a *model*.

According to MAYER ET AL. (1992), an IDEF3 Process Flow Description consists of the process description and the network of relations between the processes. Its purpose is to show the way that things work in a system or organization, while the development of that *description* involves expressing facts – that are collected from domain experts – using five descriptive building blocks. Figure 2-5 depicts a graphical representation of a sample scenario (process) in a paint shop.

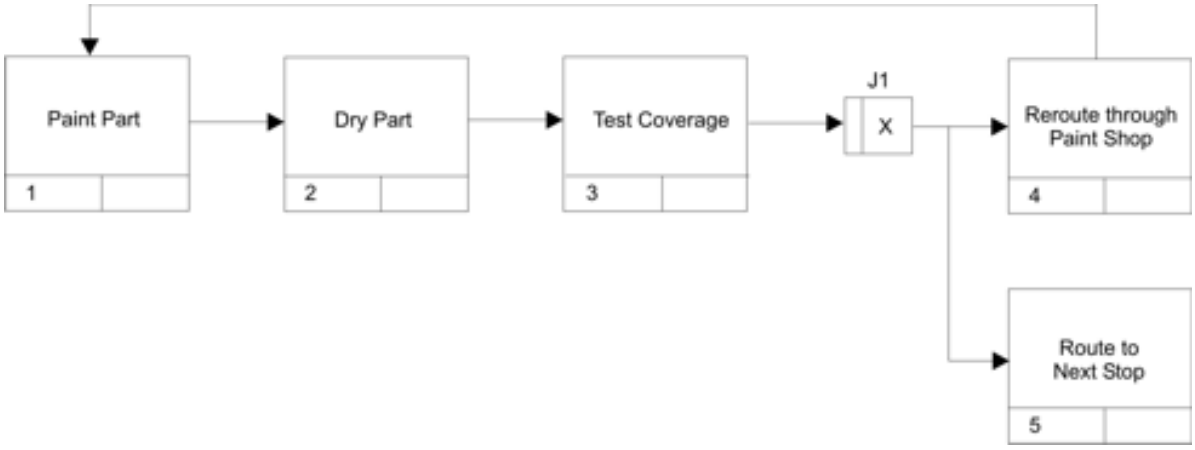



*Figure 2-5: Example of an IDEF3 Process Flow Description Diagram (IDEF, 2016)*

Elaborating on Figure 2-5, IDEF (2016) describes three of the basic building blocks of the Process Flow Description, which are:

- *Activities* – represented as labeled boxes, and termed as Unit of Behavior (UOB)
- *Logical flows* – represented as arrows (links)
- *Junctions* – represented as smaller boxes

There are two more basic building blocks used in the Process Flow Description mode that are not shown in the above figure. These are:

- *Decomposition* – offers a deeper and more detailed look at a UOB
- *Elaboration* – an element that shows the participating objects in an activity, and the facts and constraints that come with these objects

As far as the second IDEF3 description mode is concerned, the Object State Transition Network (OSTN) depicts an object-centered view of a process. This view goes beyond the process diagrams and shows the transition that an object can go through. (MAYER ET AL., 1992. p. 43) Figure 2-6 shows an example of an Object State Transition Network Diagram.

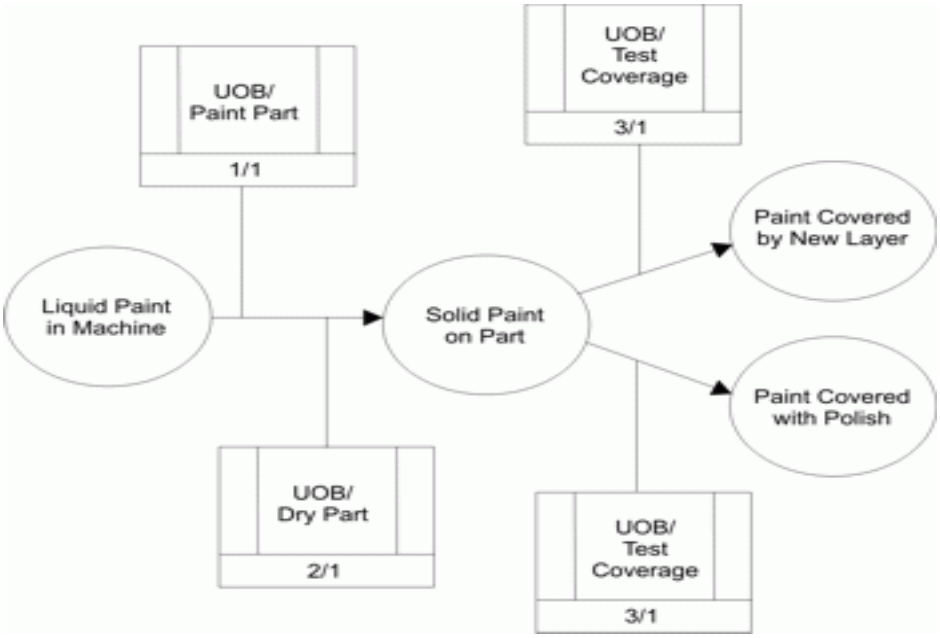



*Figure 2-6: IDEF3 Object State Transition Network Diagram (IDEF, 2016)*

According to MAYER ET AL. (1992), the entities of an OSTN diagram are the following:

- *Object States – represented by circles*
- *State Transition Arcs – represented by lines connecting the Object States*

In order to define an *Object State*, three types of requirements are necessary. These are 1) *entry conditions* (for an object state) that must be specified before an object can transition into a state; 2) *exit conditions* (for an object state) that clarify the conditions to be met in order for an object to transition out of a state, and 3) *state description* that describes the conditions while an object is in a state. *State Transition Arcs* represent the transitions allowed between the object states. The third notation that appears in the diagram is called a *Referent*, and is used to show the participation of a Scenario, UOB or another OSTN diagram in the transition from one state to another. (MAYER ET AL., 1992, p. 44)

The IDEF3 process-modeling technique enables the capture and graphical representation of

both transition from state to state in a system and the activities related to those transitions. However, like BPMN, IDEF3 offers a quite complicated and in-depth approach to modeling. This kind of meticulous analysis would be most appropriate for well-structured and defined companies that know the exact steps of each process. In the course of this project, a modeling language like IDEF3 could not be used to model the business processes of a really young and small company like Soley.

## 2.2 Business Architecture

"Business architecture is a general description of a system. It identifies its purpose, vital functions, active elements and critical processes, and defines the nature of the interaction among them. Business architecture consists of a set of distinct but interrelated platforms creating a multidimensional modular system. Each platform represents a dimension of the system signifying a unique mode of behavior with a predefined set of performance criteria and measures." (GHARAJEDAGHI, 2011, p. 181)

As GHARAJEDAGHI (2011) states, the first thing that one has to do, in order to design a business architecture, is make the assumption that the existing system is demolished, while everything else remains the same. In other words, a designer must realize that the system should be designed from the beginning. Figure 2-7 depicts the process of designing a business architecture.

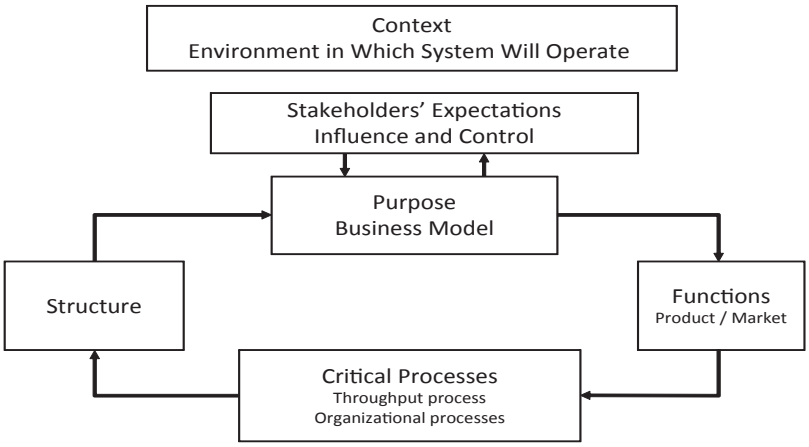



*Figure 2-7: Process of designing business architecture, adapted from (GHARAJEDAGHI, 2011, p. 182)*

### 2.2.1 System's Boundary & Business Environment

The process of designing the business architecture starts with the definition of the system's boundaries and the clarification of the environment in which it operates. According to GHARAJEDAGHI (2011), in order to define the boundaries of a system one must understand the interest and level of influence of the stakeholders. The business environment in which the system will operate, on the other hand, cannot be affected by the decisions of the stakeholders, so one could say that it constitutes a constant in the equation, and the company

must find out what that is.

As GHARAJEDAGHI (2011) claims in his book, today's workers are required to be multi-skilled, being aware of the total context of the system and the overall process to which they contribute. That is because modern problems – unlike old ones that could be solved inside one single department – are increasingly complex and interrelated. So, today's businesses should consist of disciplines or departments that are correlated, and collaborate with each other.

### 2.2.2 Purpose

The purpose of an organization is defined by its exemplar. For instance, the purpose of a business in a mechanistic mode would be to serve the purpose of its owner, while the purpose of a business operating in biological mode would be to survive. Thus, since most organizations consist of many purposeful members, their purpose would be to serve their members by doing more and more with less and less. (GHARAJEDAGHI, 2011, p. 184)

As stated by GHARAJEDAGHI (2011), the most important things in defining the purpose of a business is understanding its desired future and business model. Vision gives a sense of direction for the enterprise; without a vision all scenarios would be equally possible. Meanwhile, the business model clarifies the way of creating value and revenue.

In the course of realizing the purpose of a business, business architecture designers should know that a business could be defined in terms of three dimensions. According to GHARAJEDAGHI (2011), these three dimensions are: "a know-how or *technology*, which is transformed into a set of tangible *products* or services and delivered via an access mechanism to its target customers or *markets*." The role of business architecture is to define what kinds of relationships exist between the three dimensions of technology, product and market. Most commonly one dimension is appointed as primary, and the other two as secondary.

According to the aforementioned dimensions, three different approaches can be distinguished, in terms of defining the business. These are the following:

- *Product-oriented* approach
- *Market-oriented* approach
- *Technology-oriented* approach

In the *product-oriented* approach, the product defines the business, so technological requirements and markets to be served are determined by the characteristics of the product. In the *market-oriented* approach, on the other hand, the market is used as a basis of defining the business. So, the characteristics of the product and the technological requirements needed to produce it are determined by the characteristics of the market. Finally, in the *technology-oriented* approach, the business is technologically defined, meaning that the products are developed based on a specified technology, and then sold in different markets. (GHARAJEDAGHI, 2011, p. 185-187)

The success or failure of each approach is strongly related to the challenge that the

enterprise is facing each time. The environment in which the companies operate is highly competitive, forcing them to make strategic changes that alter the dimension on which they emphasize. Since business strategies usually relate to organization, changes in strategy affect the organizational structure as well. As competition becomes more intense, these changes take place more frequently, and this unidimensional approach becomes less effective. According to GHARAJEDAGHI (2011), shifts from one dimension to another in search of the best strategy against the competition cause disorder and strategic confusion. The waste and disappointment because of the frequent restructuring have rendered a search for alternative solutions necessary.

As GHARAJEDAGHI (2011) states, an effective solution to that problem is given by the interactive system architecture. According to that, product, market and technology are used interactively. Its objective is to generate combined effort from all the three dimensions, and is based on managing the interactions among them. What comes out from this kind of approach is a multidimensional modular structure, as GHARAJEDAGHI (2011) terms it, with a distinct business model and reward system for each dimension. Thus, all three dimensions are considered primary, eliminating, in turn, the periodic restructuring, and the changes from one dimension to another.

### 2.2.3 Functions

According to GHARAJEDAGHI (2011), defining a business' function starts with finding the intersection of product and market. In order to do that, the following questions must be answered:

- Whose problem is the company trying to solve?
- What solutions does the company offer?
- How will the target customers be accessed?
- Will the targeted customers be able to pay for that solution?

Finding a product-market intersection requires segmenting the market into customer cohorts. Each cohort is differentiated from the others according to its nature, the user characteristics and their purchasing habits. According to GHARAJEDAGHI (2011), the most effective segmentation of the market is the one that points out:

- The cohort, whose product needs are compatible with the company's capabilities.
- The group of customers that is relatively new in the market, therefore displaying more action, and is easier to approach.

### 2.2.4 Structure

As GHARAJEDAGHI (2011) states, there are two kinds of relationships in organizational theory: *responsibility* (who is responsible for what), and *authority* (who reports to whom). According to that theory, structure can be represented by "a two-dimensional chart in which boxes represent responsibilities and levels, and lines represent the loci and flow of

authority". Figure 2-8 depicts that chart.

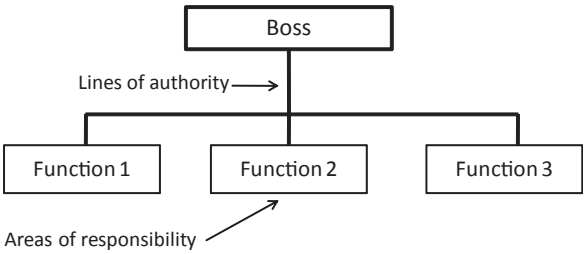



*Figure 2-8: Representation of structure showing responsibility and authority (GHARAJEDAGHI, 2011, p. 191)*

The criteria used to develop this structure are mainly based on three components of the system: input (technology), output (product), and environment (markets). As described previously when defining the purpose of a system, the multidimensional structure recognizes these three components as complementary, thus eliminating the need for shifting from one dimension to another. (GHARAJEDAGHI, 2011, p. 191)

In order for an enterprise to be viable, it must be able to adapt to the changing requirements of the competition. As GHARAJEDAGHI (2011) states, "the ability to adapt requires some form of flexibility and responsiveness, which in turn demands that some degree of redundancy be built into the system". The development of a modular structure integrated in a multidimensional system can achieve this kind of flexibility, creating an adaptive learning system, by focusing in macro-managing the interactions (power-to-do), rather than micro-managing the parts (power-over). Power-over is about domination, unlike power-to-do, according to which modules are independent and self-controlling as long as they meet the system's requirements. (GHARAJEDAGHI, 2011, p. 191)

Having accomplished to create such structure renders the organization capable of redesigning its structure and redefining its functions. This ability allows the organization to modify its strategy and behavior, thus producing different outcomes depending on the characteristics of the environment. (GHARAJEDAGHI, 2011, p. 192)

### 2.2.5 Processes

According to GHARAJEDAGHI (2011), processes play an important role in designing a business architecture. They are divided into throughput and operational. Throughput processes are related to the output of the organization, while organizational processes deal with creating integration, alignment and synergy among the enterprise's parts.

The decision-making process of a business is manifested in its planning, learning and control system. That system is the executive function of the enterprise. Its role is to oversee the operation of the system, manage the interactions between the dimensions, create vision, and making sure that leadership achieves the organizational mission. Moreover, it is responsible for financial viability, technological ability, and human effectiveness. (GHARAJEDAGHI, 2011, p. 202)

In the process of designing business architecture, business designers must take into account that the outcome should be an organization capable of surviving in the existing environment. GHARAJEDAGHI (2011) states that the assessment of the viability of an organization necessitates a measurement system, and the definition of its characteristics is the last step of designing the business architecture.

According to GHARAJEDAGHI (2011), the development of an efficient measurement system requires an iterative approach using two elements: performance criteria and performance measures. Performance criteria show what is to be measured and clarify the reason for that. Moreover, selecting these criteria includes realizing which dimensions, and/or variables are associated to an organization's effective operation. Performance measures express the way each variable (mentioned below) is to be measured specifically. What is important when defining performance measures is simplicity, meaning that the cost of producing a measurement should be less than the value of the information it yields.

GHARAJEDAGHI (2011) has developed a framework that identifies the relevant dimensions (performance variables) for measuring the viability of a business or the distinct aspects of an operation. That framework is defined as a viability matrix, and is presented in table 2-1. The first dimension of this matrix depicts the variables that define the whole organization:

- Structure (inputs)
- Function (outputs)
- Environment (markets)
- Process (technology)

The second dimension of that matrix shows the processes that define the system as a whole:

- Throughput (creation of outputs)
- Synergy (management of interactions, adding value)
- Latency (recognizing problems and building solutions)

*Table 2-1: Viability Matrix, adapted from (GHARAJEDAGHI, 2011, p. 205)*

| | Structure (inputs) | Function (outputs) | Environment (markets) | Process (know-how) |
|---|---|---|---|---|
| Throughput | Capacity utilization | Attributes of the outputs:<br>Cost<br>Quality<br>Availability | Access mechanism | Throughput capability<br>Waste<br>Cycle time<br>Safety<br>Control |
| | Profitability | | Reliability of demand | |
| Synergy | Default values of the culture | Compatibility of performance criteria | Credibility in the marketplace<br>Relations with:<br>Suppliers<br>Creditors<br>Customers | Value-chain analysis<br>Reward systems<br>Value-added ratio |
| Latency | Bench strength | Product potency | Market potential | Early warning system |
| | Core knowledge | | Intensity of competition | Planning process |

Recapping the main points of this section, business designers use interactive design for creating a new architecture of their system-business, which will replace the existing one. Business architecture is a very useful approach to structuring a business, identifying its processes and developing a measurement system.

## 2.3 Metrics - Key Performance Indicators

*"Measurement is the first step that leads to control and eventually to improvement. If you cannot measure something, you cannot understand it. If you cannot understand it, you cannot control it. If you cannot control it, you cannot improve it."*

H. James Harrington

One of the most important objectives of managers and executives is to make the organization's vision tangible. According to MELNYK ET AL. (2004), managers attempt to do that by converting the organization's mission into a set of goals and performance criteria that clarify the meaning of success for everyone in the company. As MAGRETTA (2012) states, a company's executives must answer the following question: "Given our mission, how is our performance going to be defined?". What can be concluded from that quote is that measuring performance and using metrics are essential in converting a business' vision, or strategy into reality. Metrics and strategy are strongly related to each other; "strategy without metrics is useless, and metrics without a strategy are meaningless" (MELNYK ET AL., 2004, p. 209).

In the course of defining metrics, MELNYK ET AL. (2004) argue that metrics are verifiable measures, and could be either quantitative, or qualitative. That suggests that metrics must be based on a set of data, and a well-understood and well-documented process, that is used to turn the data into the metric. Moreover, metrics are defined with respect to a reference point. That reference point could be a relative or absolute value that assists in the comparison between the actual and the desirable performance.

"A set of measures focusing on those aspects of organizational performance that are the most critical for the current and future success of the organization" is represented by Key Performance Indicators (KPIs) (PARMENTER, 2010, p. 4). Many companies work with the wrong metrics, while most of the times they term those wrong metrics as KPIs. The reason for that is that very few companies have actually looked into what a KPI really is. That said, KPIs are usually not new to a company, but they are either not yet recognized or not used.

According to PARMENTER (2010), KPIs share seven characteristics. Those are the following:

- They are nonfinancial
- They are measured frequently
- They are acted on by the CEO and senior management team
- They clearly indicate what action is required by staff
- They are measures that can be tied to a team or a KPI owner
- They make significant impact
- They encourage appropriate action

There are many different types of metrics, such as: operational, safety, health, leading, lagging, top down, bottom up, CXO level, plant level and others. Nevertheless, in the course of this project, a focus is given on the metrics that are most important to startups.

### 2.3.1 Startup Metrics

As CROLL & YOSKOVITZ (2013) describe in their book, startup founders can't be sure of which metrics are KPIs for their business. That is because they are not sure of which activities to analyze, what is the right product and the right target audience. So, it is very difficult to define what successful performance means. However, there are some standard rules for what makes a good metric.

First of all, a good metric must be *comparative*. Comparing the current value of a metric to a benchmark or past value is much better than just mentioning it. That way the person reading that metric can understand whether there was progress or regression during a specific period of time. (CROLL & YOSKOVITZ, 2013, p. 9)

Second, a good metric should be *understandable*. Metrics should be easy to understand, remember and discuss, otherwise it would be very difficult or maybe too late for stakeholders to realize a critical situation. (CROLL & YOSKOVITZ, 2013, p. 9)

Third, a good metric is a *ratio*. According to CROLL & YOSKOVITZ (2013), a metric in a form of a ratio gives you information based on a relative reference point, which makes it easier to understand whether you need to change something. In addition, ratios facilitate the

comparison between previous values, thus fulfilling the first criterion of good metrics. Another reason that makes ratios the best metrics is that they can be used to compare opposing factors. With regards to that argument, CROLL & YOSKOVITZ (2013) present an example of a ratio comparing the distance travelled by a car, and the amount of traffic tickets that it gets. The faster it goes the more tickets it gets.

Furthermore, another characteristic of a good metric is that it *changes the behavior of the company*. CROLL & YOSKOVITZ (2013) contend that this is the most important criterion for a good metric, because it triggers the founders or the managers to do something differently. For instance, a good metric would show how close are the actual results to the predictions made, or it would show the results of an experiment. In both cases the metric would impel the responsible people to make significant changes in the behavior of the company.

Having said that, good metrics are not always the right ones to track. According to CROLL & YOSKOVITZ (2013), there are five things that managers need to keep in mind when choosing the right metrics:

*Qualitative versus quantitative metrics*

Quantitative data is easy to understand. It is the numbers that people track and measure; they are scientific, involve statistics, and provide hard numbers but less insight. On the other hand, qualitative data is hard to measure. They are subjective, imprecise, unstructured, anecdotal, revealing, and hard to aggregate. "If quantitative data answers "what" and "how much", qualitative data answers "why" (CROLL & YOSKOVITZ, 2013, p. 13).

*Vanity versus actionable metrics*

Metrics that don't inform, guide, or trigger people performing an action are called vanity metrics. These kinds of metrics present seemingly significant data that make managers think they are making progress, but they are actually of trivial significance. Some examples of vanity metrics are:

- Number of hits
- Number of page views
- Number of visits
- Number of unique visitors
- Number of followers/friends/likes
- Time on site/number of pages
- Emails collected
- Number of downloads

On the other hand, actionable metrics may not tell people what to do, but they show that an action has to be taken, and help managers decide on the course of action. (CROLL & YOSKOVITZ, 2013, p.13)

*Exploratory versus reporting metrics*

Exploratory metrics are theoretical, and are used to help people learn new things that they don't know. On the contrary, reporting metrics provide real-time data about the

everyday operations of the company. (CROLL & YOSKOVITZ, 2013, p.12)

*Leading versus lagging metrics*

Leading metrics are used to predict future performance, while lagging metrics are based on past performance. What makes leading metrics better is that they allow people to act before something actually happens. Nevertheless, in the case of early-stage startups, people do not have sufficient knowledge and experience to relate a current metric with a future one. In that case measuring lagging metrics is more efficient. (CROLL & YOSKOVITZ, 2013, p.19)

*Correlated versus causal metrics*

According to CROLL & YOSKOVITZ (2013), correlated metrics are the ones that change together. On the other hand, causal metrics are those that have a cause and effect relationship. That is to say a change in one would cause the other one to change. Finding causal metrics can help people control and guide their company where they want to. As CROLL & YOSKOVITZ (2013) state, "if you find a causal relationship between something you want (like revenue) and something you can control (like which ad you show), then you can change the future."

There are many frameworks in literature that suggest different set of metrics and areas on which a startup needs to focus. MCCLURE (2007) presents a set of metrics, which he named "Startup Metrics for Pirates: AARRR". The acronym gets its name from the five components, which according to MCCLURE (2007), constitute the phases of the customer lifecycle. These are: Acquisition, Activation, Retention, Revenue, and Referral. Figure 2-9 presents an overview of that model.

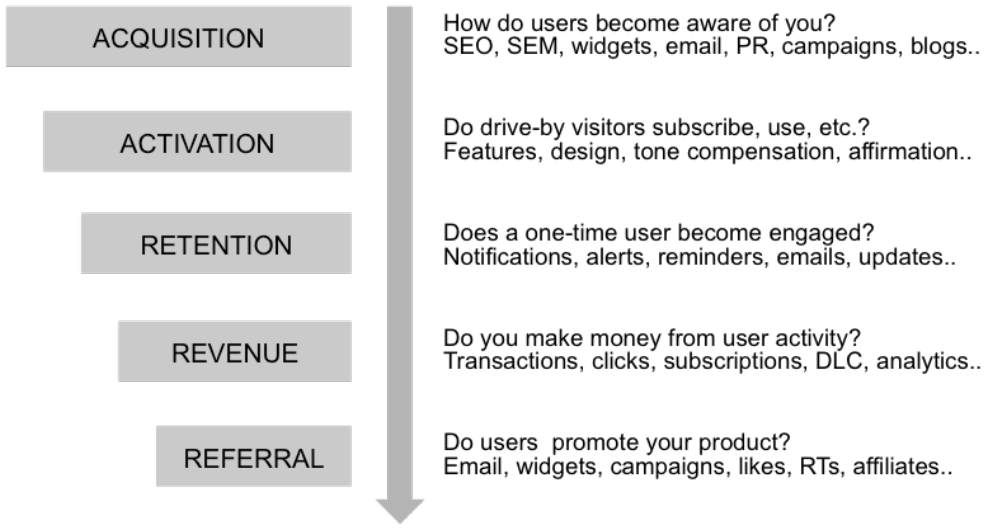



*Figure 2-9: Overview of the Pirate Metrics model, adapted from (CROLL & YOSKOVITZ, 2013, p. 46)*

These phases are not necessarily in that order; for instance, users might come back many times (retention) before actually buying the product (revenue), or they might promote the product (referral) before paying for it (revenue). Nevertheless, that flexibility in the model

makes it easy to implement in most businesses. Table 2-2 presents a list with a description of every phase, and some metrics that are relevant to each phase.

*Table 2-2: Pirate Metrics phases and relevant metrics, adapted from (CROLL & YOSKOVITZ, 2013, p. 46)*

| Element | Function | Relevant metrics |
|---|---|---|
| Acquisition | Generate attention through a variety of means, both organic and inorganic | Traffic, mentions, cost per click, search results, cost of acquisition, open rate |
| Activation | Turn the resulting drive-by visitors into users who are somehow enrolled | Enrollments, signups, completed onboarding process, used the service at least once, subscriptions |
| Retention | Convince users to come back repeatedly, exhibiting sticky behavior | Engagement, time since last visit, daily and monthly active use, churns |
| Revenue | Business outcomes (which vary by the business model: purchases, ad clicks, content creation, subscriptions, etc.) | Customer lifetime value, conversion rate, shopping cart size, click-through revenue |
| Referral | Viral and word-of-mouth invitations to other potential users | Invites sent, viral coefficient, viral cycle time |

Having mentioned some general metrics that apply for most startups, it is important to mention that the business model of a company is what clarifies which metrics matter most. In the course of this project, emphasis is given to the SaaS business model and the metrics that it involves, since Soley espouses that model. Such metrics and KPIs are analyzed below.

### 2.3.2 SaaS Metrics and KPIs

According to CROLL & YOSKOVITZ (2013), a SaaS company usually delivers software on a on-demand basis, and through its website. Revenue is normally made from a monthly or yearly subscription fee paid from the customers. Many SaaS companies categorize their products in tiers, depending on some dimension of the application. The subscription fee also changes in accordance with the tier level. For example, a company offering cloud storage could charge a small price for the first 20 gigabytes, a higher price for 50 gigabytes, and an even higher for 100 gigabytes. What most SaaS companies try to do is upsell a user to the highest, and most expensive tier.

Subscription businesses, like SaaS, are much different from traditional businesses. Thus, metrics used in traditional businesses cannot be used to track SaaS performance. According to SKOK (2013a), what makes SaaS so different is that the revenue is recurring, and it comes over an extended period of time, which is called *customer lifetime*. That causes a proportionate relationship between the revenue and the customer lifetime. The more

satisfied a customer is, the longer he keeps subscribing, and the more revenue the company makes. On the other hand, if a customer is not satisfied with the product or service, he will churn quickly. That will cause the company to lose money from the investment it made to acquire that customer. What that means is, that apart from the cost of acquiring a customer, the company must also invest on time and money to keep customers. (SKOK, 2013a)

When looking at metrics, the most important ones for a SaaS startup are those that help people understand whether their company is (financially) viable. According to SKOK (2013a), figuring that out could be translated as answering the following question:

*"Can the company make more profit from its customers, than it costs it to acquire them?"*

Answering that question necessitates the use of two metrics:

- CLV – Customer Lifetime Value
- CAC – Customer Acquisition Cost

#### 2.3.2.1 CLV – Customer Lifetime Value

In order to describe CLV, there is another thing that must be explained first. That is customer lifetime. Customer lifetime is the time between the moment that a user becomes a customer, until the moment that he churns. The former is usually the time of the first purchase.

Elaborating on that, an example, based on SKOK (2013b), of how to calculate customer lifetime is presented below. Assuming that a company has 100 customers, and a monthly churn rate of three percent is applied to that cohort, the following graph occurs:

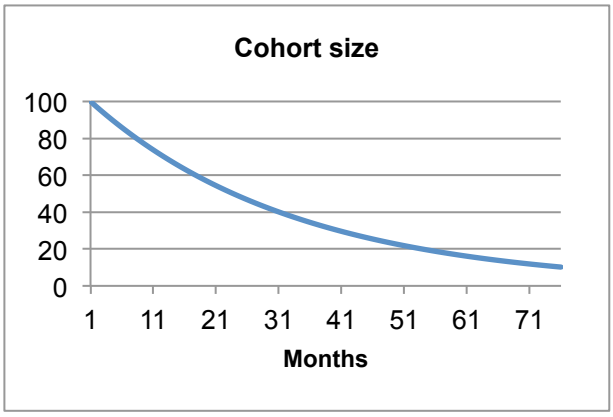



*Figure 2-10: Cohort size change with a monthly churn rate of three percent, adapted from* (SKOK, 2013b)

Mathematically, this can be expressed by the following equation:

$$Customer\ Lifetime = \frac{1}{Customer\ Churn\ Rate}$$

So, with that in mind, it is easier to understand how CLV is calculated. When searching in literature, the ways to calculate CLV vary widely. In the course of this project, a simple

formula, based on SKOK (2013b), is presented. According to that formula, CLV is calculated by multiplying the customer lifetime and the average *Monthly Recurring Revenue* (MRR) per account:

$$CLV = (Average\ MRR\ per\ Account) \times (Customer\ Lifetime)$$

From that formula one can easily understand that the longer the customer lifetime the higher the CLV.

#### 2.3.2.2 CAC – Customer Acquisition Cost

CAC is one of the most important metrics a SaaS early-stage startup should track. According to SKOK (2013c), one the biggest causes of startup failure is CAC turning out to be higher than initially expected, and exceeding the company's ability to monetize the customers.

Computing CAC is done by dividing "the entire cost of sales and marketing over a given period, including salaries and other headcount related expenses, by the number of customers that were acquired in that period." In pure web businesses, though, the headcount does not need to grow as customer acquisition scales, so it could be removed from the calculation. (SKOK, 2013c)

The formula to calculate CAC is defined as follows:

$$CAC = \frac{Sum\ of\ all\ Sales\ \&\ Marketing\ expenses}{No\ of\ new\ Customers\ added}$$

Using this formula in the early days of a startup could cause the CAC to be too high. That would be because of the small amount of customers, and the relatively high salaries of some employees. In order to avoid this, SKOK (2013b) suggests that only a small portion of these salaries should be taken into account during the early days.

A well-balanced business model should look like Figure 2-11:

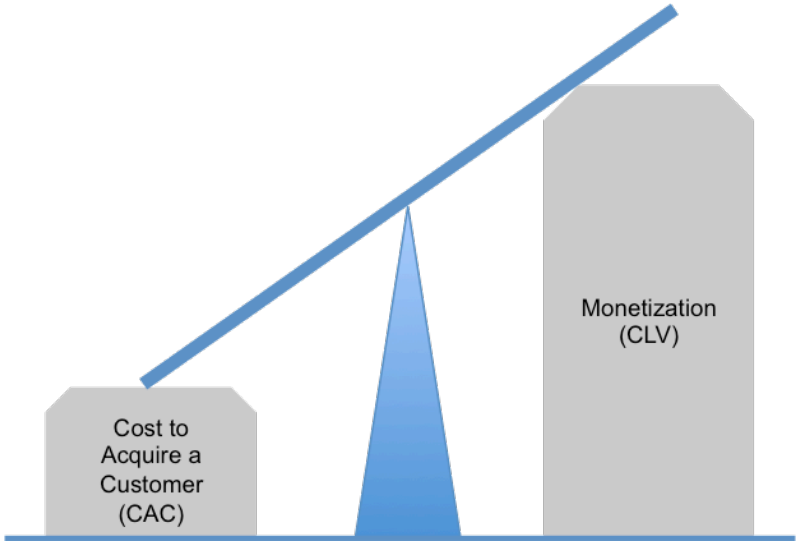



*Figure 2-11: CLV to CAC Ratio must be greater than or equal to three, adapted from (SKOK, 2013c)*

#### 2.3.2.3 Churn Metrics

The importance of churn is trivial when the company is in its early days. That is because losing, for instance, three percent of 100 customers each month is not a significant number, since the company can easily replace them. However, when a company loses three percent of a million customers, these customers are not easily replaced. According to SKOK (2013a), "the churn rate, combined with the rate of new MRR adds, not only defines how fast a business can grow, it also defines the maximum size a business can reach."

As SKOK (2013b) states, the following metrics are used to help people understand churn:

| | |
|---|---|
| Number of new Customers | The number of new customers added this month |
| Number of churned Customers | The number of customers lost due to churn this month |
| Customer Churn Rate | $\%\ Customer\ Churn = \frac{No\ of\ churned\ Customers}{Total\ number\ of\ Customers}$ |
| MRR Churn Rate | $\%\ MRR\ Churn = \frac{Churned\ MRR}{Previous\ \ Months\ MRR}$ |

When talking about churn, an important thing to mention is the difference between Revenue Churn and Customer Churn. To clarify this difference, an example based on SKOK (2013a) is presented below: A company has 50 "small" customers paying 100€ per month, and 50 "big" customers paying 1000€ per month. In total, the company has 100 customers, and an MRR of 55000€ at the start of a month. If the company loses ten of these customers, the Customer Churn Rate would be 10%. But if out of the ten churned customers the nine are "small", and one is "big", the MRR Churn would be only 1900€. That represents only a 3.4% MRR Churn Rate. Thus, it can be concluded that Revenue Churn and Customer Churn are quite different. But, according to SKOK (2013a), they are both important to have a complete picture of what is happening in the business.

#### 2.3.2.4 Funnel Metrics

These metrics are used to measure and track the performance of a company's sales funnels. Even though such metrics vary depending on the phases involved in a company's funnel, there is a common way to measure each phase. That involves measuring two things for each phase: the number of leads that went into that phase, and the conversion rate to the next phase of the funnel. Figure 2-12 presents a simple example of a three-phase sales funnel. (SKOK, 2013a)

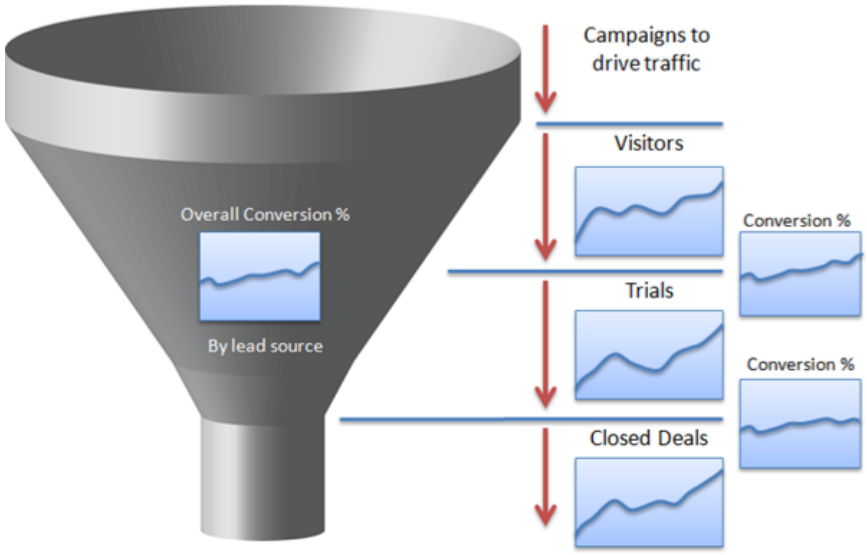



*Figure 2-12: Example of a simple three-phase sales process, adapted from (SKOK, 2013a)*

Elaborating on the above figure, visitors come to the company's web site, and a portion of them signs up for a trial. Next, some trial users convert to purchases. The goal of the company would be to track the number of visitors, trials and closed deals, but also the conversion rate of each phase. Knowing these conversion rates enables the managers to improve them, and make future forecasts. For example, if a company has a goal of five million euros in revenue for the next year, it can go backwards in the sales funnel to calculate in how many leads does that translate. From there, it can also calculate the number of sales people needed, and the cost of acquiring the customers. (SKOK, 2013a)

According to SKOK (2013a), the things that matter most in a SaaS business are:

1. Acquiring customers
2. Retaining customers
3. Monetizing customers

Retaining customers should be the first goal of a company, since there is no point in trying to acquire new customers, if one cannot keep them using the service. It would be like "filling a leaky bucket."

Figure 2-13 "represents a user's flow through a SaaS business, along with the key metrics at each stage.

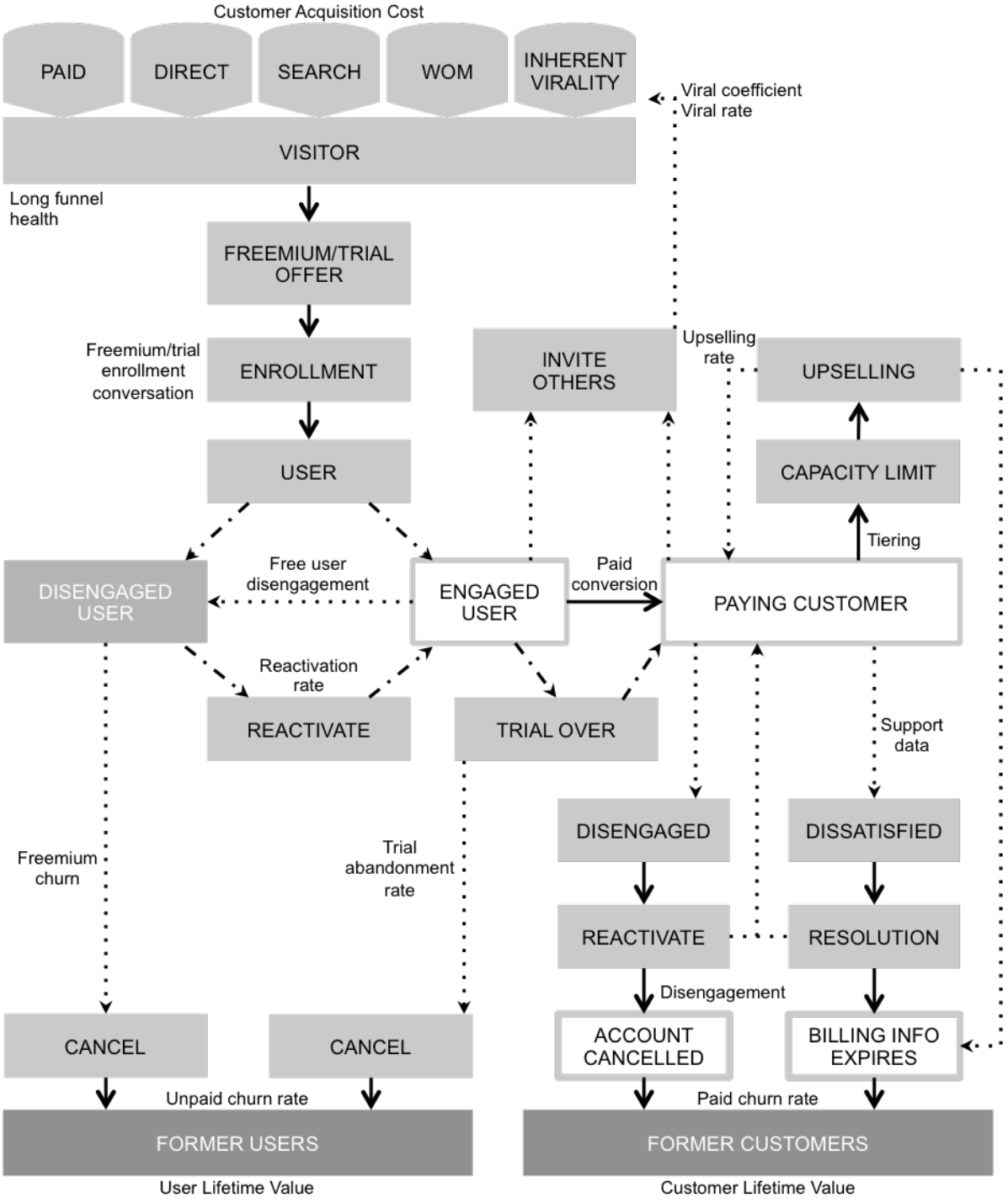



*Figure 2-13:Visitors, users, customers: the life of SaaS, adapted from (CROLL & YOSKOVITZ, 2013, p. 98)*

## 2.4 Implications of the State of the Art

Chapter 2 presented a review of the current state of the art regarding designing a business structure for a company and measuring its performance. The design and development of a business architecture for a startup requires an innovative and simple kind of thinking. Most

of the traditional modeling tools do not address problems stemming from the distinctive particularities of a startup. Moreover, many of these tools are too expensive for an early-age startup, with little to no capital, to purchase. While these tools allow for a detailed and more analyzed modeling of processes, they fail to fulfill the needs of a startup's environment. Such needs include:

- The creation of fast drafts
- The implementation of quick and iterative solutions
- The ability to easily modify the solution depending on the situation that might change from month to month
- An approach that is flexible and easily adaptable to new conditions

Apart from that, it should be also mentioned that the integration of such tools or approaches to an environment of a startup would require a lot time. That is exactly the opposite of what the startup needs.

Thus, it can be concluded that both the modeling languages of IDEF0 and BPMN, and the business architecture approach are:

- Too complicated for startups
- Time-consuming
- Not flexible
- Not easy to iterate on
- Suitable for large organizations

Having said that, the last part of the literature review regarding the startup metrics and KPIs is really useful for the implementation of this project and will be used in a great deal.

# 3 Methodology – Approach

The aim of this chapter is to introduce the method used in the course of achieving Goal 1 (increase transparency), Goal 2 (model and optimize critical business processes) and Goal 3 (achieve accountability). It can be considered as a four-stepped approach addressing Problem 1 (absence of strict business structure), Problem 2 (undefined business processes), Problem 3 (undefined key performance indicators) and Problem 4 (complicated business model). Figure 3-1 depicts a graphic overview and structure of the approach.

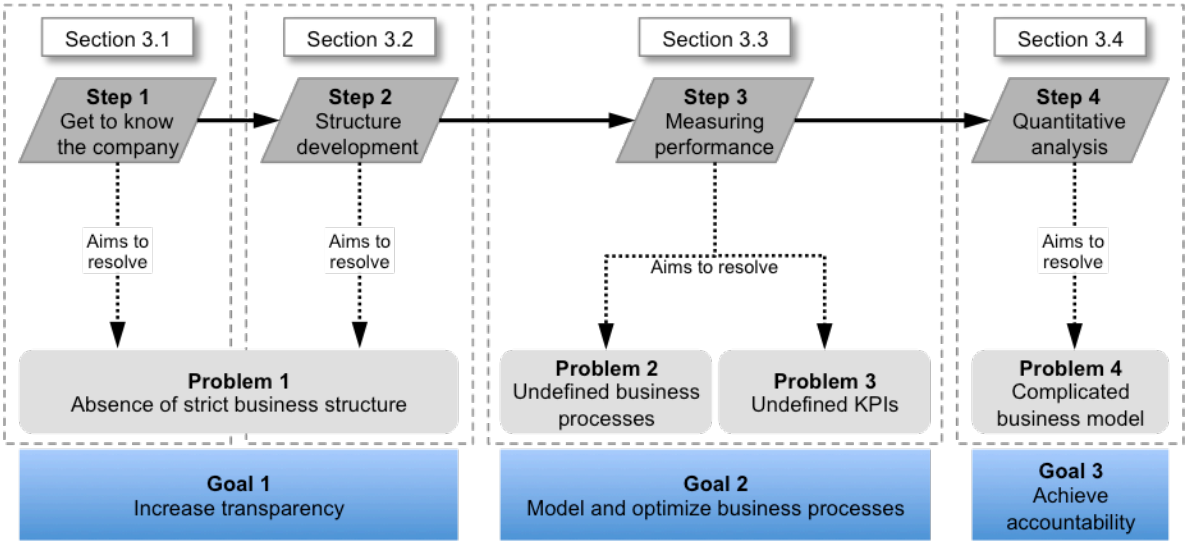



*Figure 3-1: Graphic representation of the four-stepped approach*

Section 3.1 presents the first step of the approach, which was getting familiar with the company. In the scope of achieving that, interviews with the founders were conducted. Then, an attempt to identify the revenue flows of the company was made, followed by a short literature review on the characteristics of the company's environment. Next, some *step-by-step stories* were created, and the *sales areas* were sketched out. Finally, the reservoir system method is introduced, according to which the sales and marketing funnels were modeled.

Section 3.2 describes the process of developing a general business structure and topology for the company. At first, the method of defining business units, and assigning responsible people to each unit is described. Next, the way of conducting interviews to determine inputs and outputs of departments is introduced and then discussed. The clarification of interactions between departments is, then, described, and the development of a division matrix is introduced. Furthermore, the development of a conflict template, and the process of specifying the purposes of departments are described. At the end of this section, the method of modeling the general business structure of the company is presented.

Section 3.3 introduces the method of measuring the performance of a startup. First, the *goals waterfall* method is introduced. Next, the clarification of business strategy and goals is described, followed by a discussion on establishing performance metrics. In addition to that, the method of defining business processes is introduced, and the most important measures (KPIs) are determined.

Section 3.4 presents the last step of the overall approach, presenting the quantitative analysis conducted in order to relate business processes to KPIs. The analysis of processes is described, and the conduction of interviews to determine process data is discussed. In addition, the implementation of the reservoir system method is explained. Finally, the process-KPI model development is described.

Chapter 3 ends with Section 3.5, which presents a discussion on the setbacks that occurred while implementing the aforementioned approach.

## 3.1 Familiarization with the company

The superordinate objective of this project is to develop a business handbook for a startup. In the course of realizing this objective, the first step implemented was to get familiar with the company and its environment. This section describes extensively the process followed in order to do that. Moreover, it contributes to achieving Goal 1 (increase transparency), which in turn addresses Problem 1 (absence of a strict business structure).

Getting familiar with a company can be interpreted as understanding its goal, vision and problems. In addition, it involves realizing what product or service it offers, what revenue streams it has, and which are its internal operations. Moreover, getting to know a company entails learning about the characteristics of the market, in which it operates, and the characteristics of the business model that it espouses. Finally, it includes becoming acquainted with more specialized details about the company, such as its sales and marketing funnels.

The approach implemented in this section can be characterized as a layered approach. The reasoning of the approach is as follows. The flow goes from outer to inner layers moving deeper into the operations of the company. Outer layers represent general information that is easier to acquire, while inner layers represent specific information about the operations of the company that require deeper insight. According to that, the process of getting familiar with the company starts with getting acquainted with more general information, such as vision and goals. Then, the process involves moving gradually to more specific details about the certain company, such as its sales and marketing funnels. Figure 3-2 depicts a graphic representation of the layered approach.

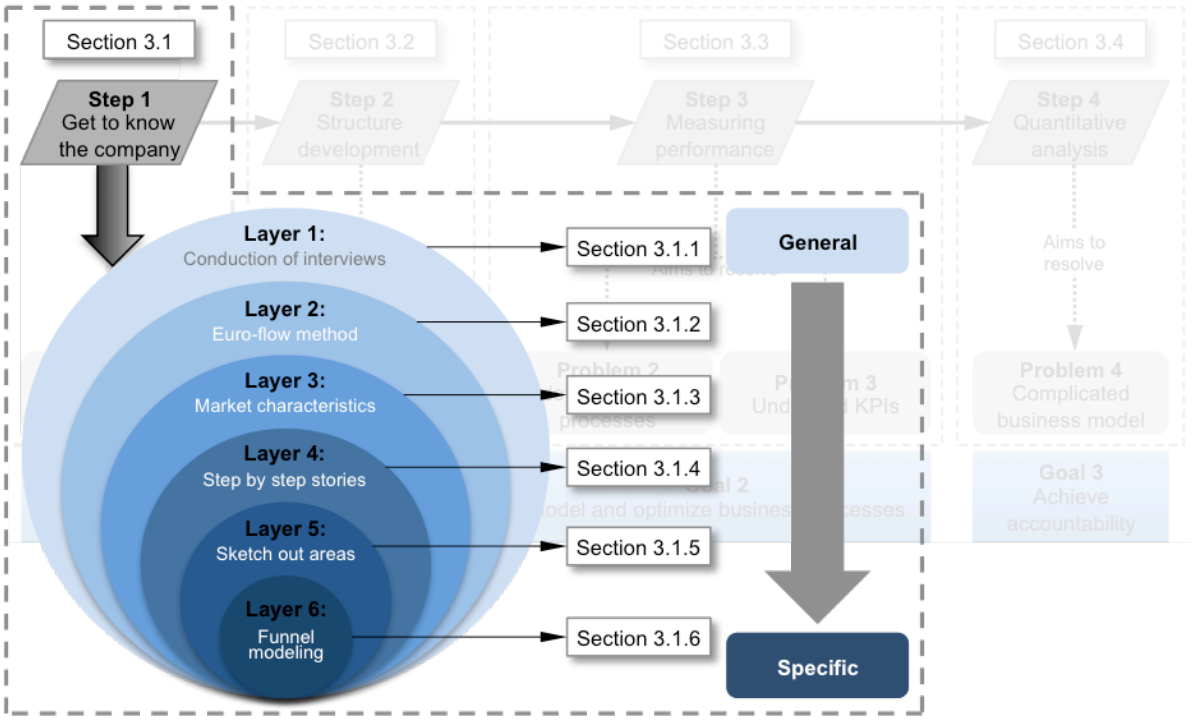



*Figure 3-2: Graphic representation of the layered approach implemented in Section 3.1*

The section is broken down into six sub-sections, each one of which describes a layer of the approach introduced. Section 3.1.1 describes the process of conducting interviews with the founders of the company. Section 3.1.2 explains the method implemented in order to familiarize with the company's operations. Section 3.1.3 discusses a short literature review made in the course of becoming acquainted with the characteristics of the market. Section 3.1.4 introduces the approach implemented while attempting to realize the company's operations. Section 3.1.5 presents the process of distinguishing different sales funnels. Lastly, Section 3.1.6 describes the method used to model those funnels.

### 3.1.1 Conduction of interviews to determine vision, goals and problems

Getting a grasp of a company's general details and information can be done by searching the internet or looking at the company's website. However, truly understanding the vision, the goals, and the problems of a company cannot be achieved remotely, because it takes a real person to communicate such a thing. One must speak with the people whose vision is the same as the company's – its founders. That is because the founders of a company are the people whose own vision is reflected on the company itself. Thus, they are the most appropriate people to talk to when attempting to figure out the true vision of the company.

In the course of this project, the meetings with the founders of the company were carried out in the form of interviews. The founders were interviewed separately, and in person. The process of conducting the interview is divided into three parts: before, during and after the interview. Figure 3-3 presents a graphic representation of that process.

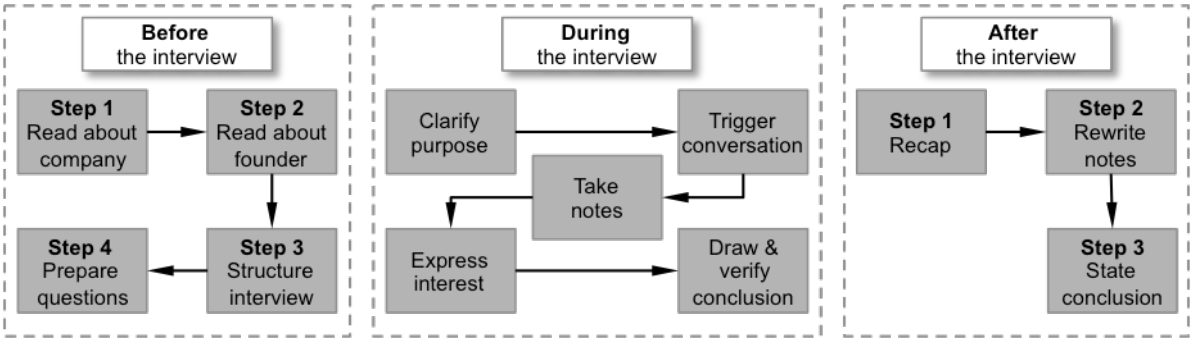



*Figure 3-3: Graphic representation of the interview process*

As depicted in Figure 3-3, the first phase of the interview process is before the interview. This phase describes what needs to be done prior to the actual interview, and can be considered as a preparation phase. First of all, the interviewer must read about the company (e.g. at LinkedIn), so that he or she has an overall idea of what the company deals with. That would aid in ensuring that the interview has a constant flow, and unnecessary questions are avoided. Second, the interviewer should conduct a small research in the web (e.g. publications, resume) or the company's website, to find out information about the person interviewed. Such information includes the education, work experience and role that the founder has in the company. Doing that would give a better understanding on who that person is, and what his or her background is. Furthermore, a significant step of this phase is that of structuring the interview. That entails realizing the goal of the interview, and what the outcome should be. In the scope of this project, for instance, the interview was structured in three parts, according to the topics addressed: the vision, the goals and the problems of the company. The last step of this phase is to prepare the questions that must be answered, depending on the subject of the interview. These questions should directly address the topic of interest.

The next phase of the interview process is that of the actual interview. This phase discusses some key points that need attention when conducting the interview. To begin with, clarifying the purpose of the interview should be the thing to do first. The person interviewed, in that case the founder, should know what the interviewer wants to know, and what the desired outcome is. During the interview, the interviewer must ensure that the interview flows smoothly by constantly triggering conversation. Furthermore, an important thing of this phase is taking notes. The main points of what the founder says should be noted down either in bullet points or in the form of small text. That would enable the interviewer to keep track of all the points made during the conversation. It should be mentioned that an alternative would be to record the conversation, but that has to be in agreement with the person interviewed. Moreover, during the course of that phase, the interviewer should express interest and curiosity about what the other person has to say. That way, the founder would be motivated to speak freely, and unfold his passion and vision. Lastly, before finishing the interview, the interviewer should make a conclusion, and verify it with the founder. Doing that would render the interview successful, and would have achieved the desired outcome.

The third and final phase of the interviewing process, as depicted in Figure 3-3, is after the

interview. This phase determines what is to be done after the interview is conducted. First, short after the conversation, the interviewer should try to recap the whole interview, and add any missing points. Doing that assists in having an overall view of what has been mentioned, and assures that the right conclusion has been drawn. Second, the notes taken during the interview should be rewritten clearly, and in a structured way. Every question asked should be matched with the answer given. Moreover, the pairs of questions and answers must be assigned to the different topics addressed in the interview. For instance, in this case, the pairs of questions and answers were sorted according to which topic they address (vision, goals or problems). The third and final step of this phase is to sum up the notes, and state the conclusion clearly. That means that a small summary should be written, which answers the main points of the interview. In the course of this project, for example, that step would be to clearly state what the vision, the goals and the problems of the company are.

Having described the interview process, it is important to mention some problems that occurred in the implementation of that method. Though it may seem as a not so complicated process, there are always challenges that need to be overcome. To begin with, the interview process itself is time-consuming. The *before the interview* phase, for instance, can take up to two hours to be completed, depending on how thorough the research about the company and the founder are, and how many questions need to be answered. Furthermore, another problem of this approach is that it requires time from the person interviewed. Specifically, when the person interviewed is a manager or a founder, free time becomes even less. Thus, meetings should be scheduled at a time that both people are available, if it is possible. Sometimes, the interview could not even take place, because of incompatible schedules.

At this point, it should be mentioned that there is a lot of information in literature concerning the way to conduct an interview, but the aforementioned method was a development of the author. That is because a straightforward approach was needed, and also because the process was implemented more like a conversation, rather than a professional interview.

### 3.1.2 *Euro-flow* method

Determining the vision, goals and problems of the company is the first step of getting to know it. Getting acquainted with this information gives a general view of the company. However, in order to really familiarize with a company, one must infiltrate deeper into its operations. Working towards that, the next step implemented was attempting to answer the question of "how a euro can end up in the company's account".

Answering this question to its entirety requires a clear understanding of the company's operations, sales and marketing funnels, products and services offered. That said, having this kind of understanding requires a lot of time working in the company, thus, is not easy to obtain at this early stage. Therefore, an alternative way of accomplishing that should be found. In the course of this project, a method named *euro-flow* was implemented.

The *euro-flow* method is a simplified way of getting a grasp of: the product or service that the company offers, the ways a customer can acquire that, the ways to market that, the

expenses that come with the above, and other ways of making revenue. Implementing this method was achieved by working backwards; meaning that the path followed started from the point that revenue is made. According to that method, there are four questions that need to be answered:

- What does the company offer?
- How does the product/service go from production to consumption?
- How does the company offer that?
- What expenses does the production or the service involve?
- What alternative ways of earning money does the company have?

The first question refers to the products or services that the company offers. Realizing that is the first step of the backward process since selling that would be the last phase in the path of the euro. Having a clear view of what the company offers would enable one to figure out the customer-related ways of making revenue, and the business model that it espouses. For instance, in the case of a SaaS company, the product offered is software.

The second question involves clarifying the distribution channels of the company. These are the ways that the product or service gets to the consumer. It could be a direct transaction between the company and the customer, or it may include several intermediate phases such as wholesalers, retailers, partners and others. Answering this question, or at least attempting to do so, provides one with a much better understanding of the operation of the company. It should be mentioned that the term consumption is used in the course of a generic approach, and can be altered depending on the type of the product (e.g. software, service and others).

The third question addresses the sales channels of the company. That is, the methods used to market its product or service to consumers. For example, sales channels may include the company's sales people, internet marketing, direct marketing and others. Clarifying the ways that a company markets its product supplements the previous question, and gives a more rounded view of the company.

The fourth question takes into account the expenses required to assure the flow of the euro. These can include sales and marketing costs, personnel costs related to the development or production of the software or product, and overhead costs. Of course, real numbers cannot be acquired at that moment due to the lack of information, but a rough estimation can be made. Answering this question provides one with an overview of the money being deducted from the company's account in order for revenue to be made.

The last question refers to the non-customer-related ways that a company can earn money. These could include investor funding, advertising rewards and others. Realizing that is the last step of answering the question of "how a euro can end up in the company's account".

Answering these questions in their entirety is complicated, and requires some relative knowledge (i.e. business operations, sales and marketing channels and others) and experience. The reason for that is that every business is different, so the answer cannot be found in literature. In the course of implementing this method, a complete and detailed answer is not required. That is because the goal so far is to get familiar with the company, and not to have a thorough description of it. Thus, an attempt to answer the aforementioned

questions provides one with a general overview of the company's functions and operations, and hence familiarizing him or her with the company.

### 3.1.3 Market and company characteristics

When aiming to familiarize with a company, an important step is to get to know the characteristics of its business model and of the market in which it operates. This step focuses on providing one with some general information that is independent of the specific company. It should be mentioned that this step could be implemented first, but it is considered better to first get an overview of the company, and then learn about its environment.

Due to the theoretic nature of this objective, the method used to address this issue was a short literature review. The goal of the literature review is to get acquainted with the environment in which the company operates. That involves the characteristics of the market and the company's business model. It is important to clarify that this section is part of the approach and not a literature review for this project. That is why it is not cited in the State of the Art.

This section describes the process of conducting the literature review. First, a research on the attributes of the market was conducted, which in this case was the Business-To-Business marketplace. After clarifying the market's particularities and realizing how the company fits in that, a literature review on the characteristics of the business model was conducted. Emphasis was given to the SaaS business model, although the business model was more complicated, as mentioned in Section 1.2. Then, a literature review on the particularities of startups was made.

Despite the seeming simplicity of this step, there are also problems occurring in the course of implementing the literature review. To begin with, the first problem was to realize on what should the research focus. For example, in order to conduct a literature review on the B2B marketplace, one must first realize that the company is involved in that market. Additionally, a significant problem accompanying this process is the time consumed to conduct the research. Multiple articles, publications and books must be reviewed before drawing a conclusion, which renders the process time-consuming.

### 3.1.4 *Step-by-step* stories

The previous sections constitute the outer layers of the approach. This section goes one level deeper into the operation of the company. It introduces the method of getting familiar with some important information concerning the function of the company. Such information includes: the path followed by a user during his *lifetime*, the process of acquiring a customer through different sales funnels, the upselling path from lower to higher tiers and others.

The method implemented in this section was named *step-by-step stories*. The name was given due to the nature of the method. According to that, a functions or operation is first described as a story in written form, and then the story is divided in smaller steps. Next, the logical flow from step to step is clarified, followed by the graphical representation of the

story, which is the last step of this method. Figure 3-4 depicts a graphic representation of that method.

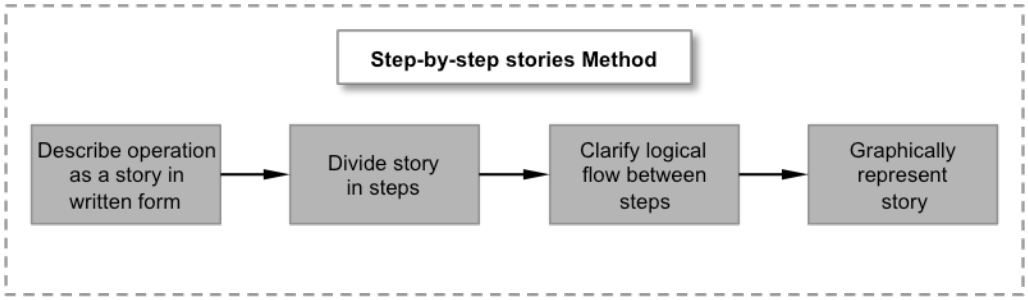



*Figure 3-4: Graphic representation of the step-by-step stories method*

As depicted in Figure 3-4, the first step of that process is to describe the operation of the company as a story in written form. That step involves providing an overview of the operation in written form. The operation is described as a whole, but not in detail. That said, there is a clear statement of the beginning and the end of the operation.

The following step of that process is to divide the story in smaller steps. The previously created text is analyzed more in depth, so as to clarify the distinct steps that constitute the operation. The steps are presented in bullet points, and details for each step are provided. It should be mentioned that the bullet points are not sorted in a way that clarifies the order in which each step is executed in the operation. That order is clarified in the next step of the process.

The third step of that process, as depicted in Figure 3-4, is the clarification of the logical flow between the steps presented in bullet points. As stated above, the second step of the process does not involve arranging the steps of the story in a logical turn. What that means is that, so far, the story is presented as text, and the distinct elements that constitute the story are stated clearly. Nevertheless, in order for the operation to be described properly, the order in which the different steps take place should be clarified.

After clarifying the steps of the operation, and the order in which they take place, the fourth step of the process is to create a graphical representation of the story-operation. That could be implemented using a flow chart or a process-modeling notation.

Implementing this method attempts to familiarize one with more complicated and in-depth information about the company. Getting acquainted with such convoluted information could cause one to encounter some problems, while trying to implement this method. For instance, one problem would be the lack of knowledge and information about a function or operation, because of the little time spent in the company. In addition, clarifying the logical flow between the steps of an operation could also be a tricky part. That is because some steps might not have a fixed order in which they occur, but rather switch turns depending on the situation.

### 3.1.5 Sketch out areas

After attempting to get familiar with some key operations of the company, the next layer of the approach presents a method to distinguish different areas of specific functions of the company. With the term *area*, the author means the different parts, elements, or channels of a function. For example, when talking about sales, different areas would be the channels through which a company sells its products. In the course of this project, areas were sketched out only for Sales and Marketing.

As far as Sales are concerned, distinguishing the different areas involved in sales includes clarifying the company's sales channels. In order to do that, one must realize in what ways can the product or service of the company reach the final customer. These could be through direct sales, partner sales, or web-based sales. Thus, these would be the areas sketched out.

The direct sales area or sales channel involves selling the product using direct approach. That is, the customer contacts the company via email or meets a representative at an exhibition. After that, the sales people of the company come in contact with the customer, and discussions concerning the ways that the product would come in handy for the customer take place. Most of the times, an offer-proposal would be placed from the side of the company, and the customer would have to decide whether he or she will buy the product or service offered.

The partner sales area or sales channel is different from the direct sales in the following way. The initial approach takes place through a partner of the company. That could be another company promoting the product or service. In that case, the partner suggests that a customer might find useful the product or service that *our* company has to offer. Apart from the initial connection between the company and the customer, the rest of the process remains the same as that of the direct sales area.

Finally, the web-based sales or sales channel is the area in which the product is sold through the web. In this area, the customer does not contact a sales person directly, but orders it online. That process is usually automated, aiming to optimize the user experience and the ration of users that purchase the product. Most of the times, that area involves a subscription-based model.

As far as the Marketing is concerned, distinguishing its different areas was done by separating the goal of each area. Elaborating on that, two different goals of marketing were clarified: lead generation and lead nurturing.

The lead generation *area* aims to create new leads for the Sales. Two ways of doing were recognized: online and offline marketing. Online marketing includes many different tools such as: Search Engine Marketing (SEM), Search Engine Optimization (SEO), content marketing, email marketing, paid social advertising and others. On the other hand, offline marketing involves ways of marketing that are not related to the internet. Such ways include: marketing the product through a fair trade or exhibition, existing customers recommending the product and others.

The lead nurturing *area* aims to sustain and nurture the already existing leads. That is, providing support material for Sales when they are trying to achieve a sale. Such material includes: newsletters, blog articles, social media posts and others.

### 3.1.6 Modeling of funnels: *Reservoir system* method

The last step of the layered approach with the goal to familiarize one with a company is modeling the aforementioned areas. In the course of this project, the Sales and Marketing areas sketched out above were characterized as funnels. That characterization occurred because of the similarity with a funnel. That similarity is that from one side a big amount of something enters the funnel, while from the other side only a small amount goes out.

The method implemented in this step is called *reservoir system* method. According to that, the funnels are broken down into reservoirs or containers. Stuff coming in the funnel is filtered from reservoir to reservoir, with each reservoir having a conversion rate that clarifies the percentage that goes out and continues to the next reservoir. The method is based on the related literature review about funnel metrics presented in Section 2.3.2.4. Figure 3-5 presents a graphic representation of that method.

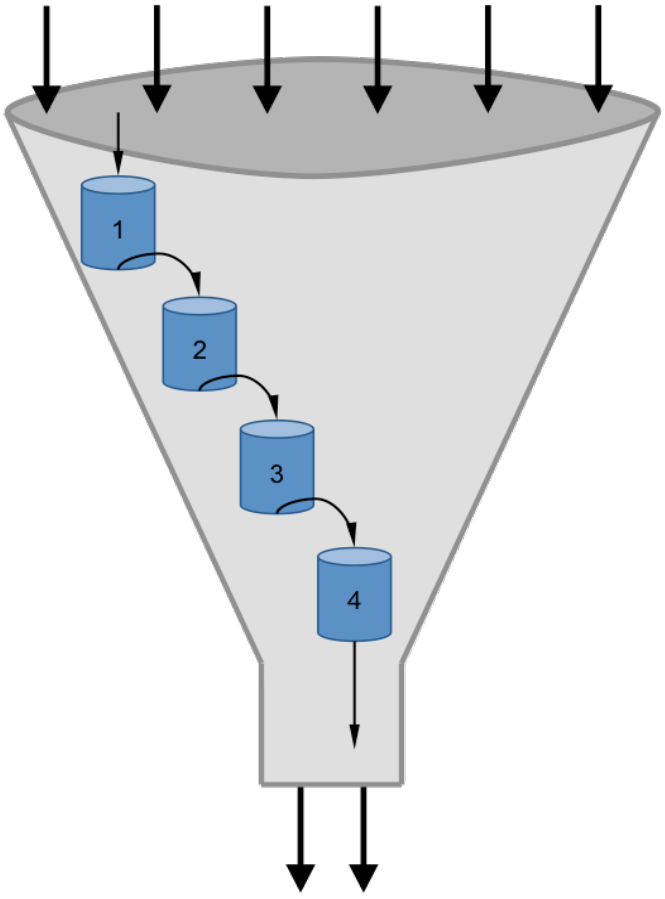



*Figure 3-5: Graphic representation of the Reservoir System method*

Elaborating on Figure 3-5, that method can be implemented when attempting to model any kind of funnel-based problem. For example, in the case of Sales, the sales funnel has some distinct phases. Specifically, in Soley these phases were the following: idea, qualified, opportunity, proposal, contracting and won. Leads coming in the funnel are gathered in the

reservoir of the ideas. Each reservoir is assigned some attributes that characterize it and provide important information about the function of the funnel. In this case, such attributes are: probability of winning, time spent in each reservoir, and cost of sales person working on that phase. Thus, leads are filtered and then move on to the next reservoir, which is the qualified leads. This process goes on until the last leads are extracted from the funnel as customers.

Some problems encountered while attempting to implement this method are the following. First of all, a lot of time is needed to bring a process or operation in the form of a funnel, thus making the method time-consuming. Second, acquiring the information for the different attributes of every reservoir requires the arrangement of appointments and meetings with the managers of the company. That renders the method dependent on others, and thus cannot be considered self-standing.

It should be mentioned that the implementation of that method is used not only for graphical modeling, but also for quantitative analysis as presented in Section 3.4.

## 3.2 Development of a general Business Structure and Topology

This section constitutes the second step of the four-stepped approach implemented with the objective of developing a business handbook for a startup. That is, attempting to develop a general business structure and topology for a startup. In this section the method used to achieve that is introduced and discussed extensively. Furthermore, it should be mentioned that, both Section 3.1 and Section 3.2 contribute to achieving Goal 1 (increase transparency), which in turn addresses Problem 1 (absence of a strict business structure).

The approach implemented in the course of developing a general business structure for a startup is partially based on the work of GHARAJEDAGHI (2011) when trying to design a business architecture for a company. With that in mind, the method implemented involves defining business units-departments and assigning responsible people to every department. In addition, it includes determining the inputs and outputs of every department, as well as clarifying the interactions between them. Moreover, developing a business structure entails resolving conflicts, creating a common understanding, and aligning the team under a common goal. Furthermore, it involves the specification of the purpose of every department. Finally, modeling the general business structure represents the topology of the company. Figure 3-6 depicts a graphic representation of the approach implemented in this section.

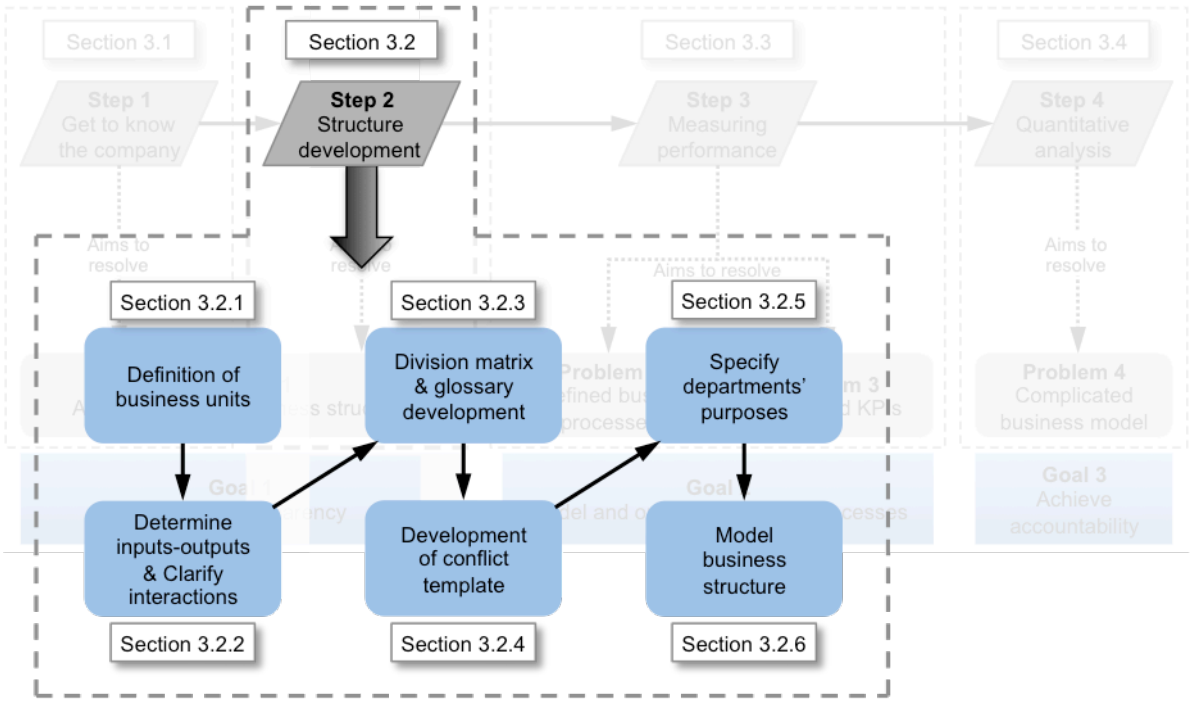



*Figure 3-6: Graphic representation of the approach implemented in Section 3.2*

As depicted in Figure 3-6, this section is divided in six sub-sections. Section 3.2.1 describes the process of defining business units-departments. Section 3.2.2 introduces the method implemented in the course of determining the inputs and outputs of departments, as well as clarifying their interactions. Section 3.2.3 presents the method of creating a division matrix and a glossary. Section 3.2.4 discusses the development of conflict template with the aim to resolve conflicts in understanding the goals of the company. Section 3.2.5 introduces and discusses the process of specifying the purpose of each department. Finally, Section 3.2.6 presents the process of modeling the general business structure and creating a topology.

### 3.2.1 Definition of business units-departments

Developing a general business structure for a startup can be a complicated problem, because of the quickly changing environment that necessitates a flexible and adaptive structure. Thus, the method to solve this kind of problem should enable changes and adaptations along its implementation. The first step of that method, as depicted in Figure 3-6, is to define business units-departments.

This section discusses the process of defining business units-departments in a startup. According to that, departments were defined using a function-oriented approach. That is, departments represent different operations-functions of the company, and differ from each other in a way that each one has a distinct purpose. When all of them operate together, they serve the common goal and vision of the company. In the course of implementing this step, every operation of the company must be assigned to a department. Nevertheless, it is important to avoid redundancy, meaning that an operation cannot be assigned to two or more departments.

Having in mind the aforementioned information, another important thing to keep in mind when defining departments of a startup is to produce a quick draft and then iterate on it. The reason for doing that is to tackle the problem of the quickly changing environment of startups. Doing things fast and iteratively has the advantage of not wasting time in something that might be changed anyway later on. For instance, one might spend a lot of time trying to make something perfect and complete, and then having to throw all that work away because a significant change. That would have caused him or her to waste all this time, when he or she could be moving forward to other issues. On the other hand, if these things were done really fast, a significant change forcing one to throw his work away would have wasted a trivial amount of time. Even if that change never happened and one ended up with a rough draft, he or she would have the chance to iterate on it, and improve it during every iteration.

After creating a first draft of the business units, the next step would be to assign people working in the company to those departments. People are assigned to departments according to their duties and responsibilities. As one may understand, some redundancy cannot be avoided at the early stages of a startup, when personnel are limited. A person might have tasks related to multiple departments since there are not enough people to cover all departments. It should be mentioned that the first people assigned to a department are its managers (e.g. head of marketing, head of sales and others), followed by people that are lower in the hierarchy.

As mentioned at the beginning of the section, developing a business structure for a startup is a complicated issue. Therefore, it is fair to assume that some problems will occur in the implementation of the aforementioned approach. In the course of this project, some of the problems encountered while defining business units-departments are the following. To begin with, the most significant problem faced was the fact that the environment was changing really fast. What that means is that new functions or operations came up, thus necessitating the addition or withdrawal of departments. As a result, a lot of work had to be repeated, and precious time was lost.

### 3.2.2 Clarification of interactions between departments

Developing a general business structure could be compared with the construction of a building. First, the building blocks should be created and placed in a proper way (in this case the business units). As one may understand though, separate building blocks cannot support the construction of the whole building. Thus, connecting materials should be installed keeping the building blocks together. Similar to the construction of a building, after defining the business units of the business structure, the next step would be to clarify the interactions between them.

This section presents the method used to clarify the interactions between the departments of the company. According to that, a drawing with the departments and their divisions is created and a quick draft with their inputs and outputs is made. Then, interviews are conducted with the founders in order to realize how each founder realizes the interactions between the departments. Figure 3-7 depicts the process of clarifying the interactions

between the departments.

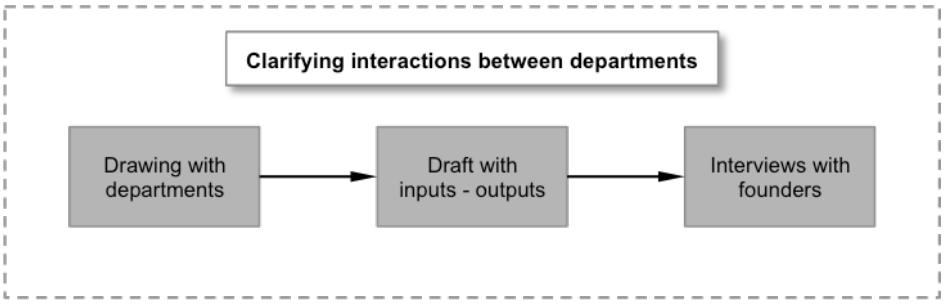



*Figure 3-7: Process of clarifying interactions between the departments of a startup*

As depicted in Figure 3-7, the first step of this method is to make a drawing with the already defined departments. Keeping in mind what is mentioned earlier in Section 3.2.1 about the importance of doing things fast and iteratively, the drawing should be made in paper without wasting time to make it look good. Nevertheless, the structure should be clear and easy to understand, distinguishing the different departments, and specifying which divisions belong to each department.

The second step of the aforementioned process is creating a draft with the inputs and outputs of every department and its divisions. Of course, knowing all the correct inputs and outputs is not possible, but after getting familiar with the company, one should have a rough overview of some. Even if the inputs and outputs written down are wrong, there is no problem. That is because the purpose of this step is to have some material ready in order to trigger the conversation with the founders when the interview is conducted.

The two previous steps can be considered as a preparation phase for the third and last step. That is because, so far, no actual interactions have been clarified, since the interviews with the founders will provide this information. During this step, the process of conducting interviews will not be described again, so one can refer to Section 3.1.1 in order to view a detailed description of the process. The goal of the interviews is to clarify all the inputs and outputs of the departments and their divisions. Moreover, an attempt to realize how each founder understands the interactions is made, with the scope of finding incompatibilities and conflicts in the overall understanding of the company.

As far as the problems encountered when implementing this method are concerned, it should be mentioned that the problems of the interview process also apply here. Apart from those, another problem was that the founders had a different understanding of how the departments interact with each other, thus creating contradictions. These contradictions resulted in incompatibilities in the structure, which in turn caused repetition and lost time in some interviews. In addition, a minor problem was the difficulty in modifying the drawings when mistakes were made, because of it being made in paper. Although making the drawing in paper helped speed up the process, it lacked the benefit of flexibility.

### 3.2.3 Division matrix and glossary development

Clarifying the interactions between the departments of the company is the second step of the approach, enabling one to get a rough overview of how departments and their divisions relate to each other. However, the previous step does not offer a clear structure since it involves paper drawings and drafts. So, the next step implemented aims to structure the inputs and outputs, and provide a much clearer view of the interactions between the departments.

This section describes the process implemented in order to structure the inputs and outputs acquired from the previous step. In addition, a secondary goal of this step is to develop a glossary with all the terms being used by the founders during the interviews. The purpose of that secondary objective is to make sure that everyone is using the same terms when working, thus eliminating inconsistencies. According to the process described in this section, a matrix table with the divisions was created in Excel, and another table with the glossary was made in a different sheet.

Elaborating on the aforementioned process, the method thought to be more suitable in order to structure the inputs and outputs was to create a matrix table in Excel. All divisions were distributed in both rows and columns, and departments were separated by different colors. Inputs were assigned to columns, while outputs were assigned to rows. Additionally, different colors were used to separate information provided by each founding member. That helps in realizing who has a better understanding of which department, and also in clarifying between whom the contradictions take place. Figure 3-8 presents an example of the matrix table created.

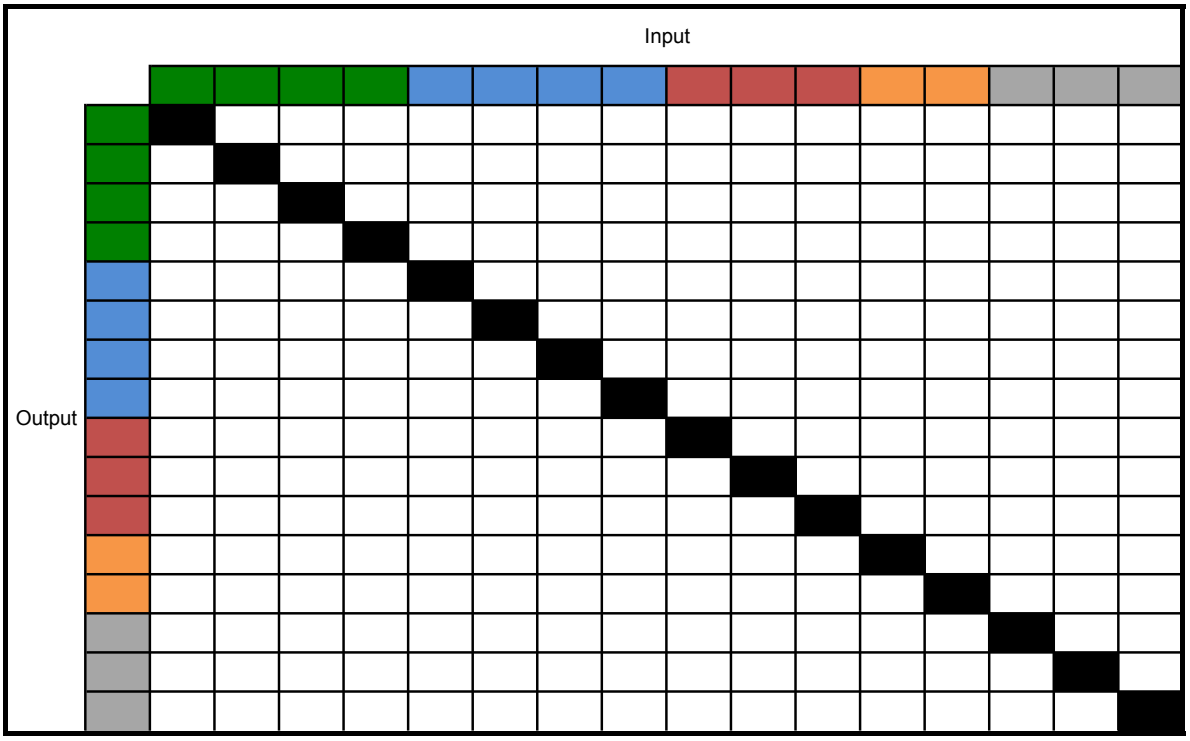



*Figure 3-8: Example of matrix table*

The second part of this section is to create a glossary for the terms being used by the founders, as far as inputs and outputs are concerned. In order to do that, first, all the terms were gathered and arranged in columns depending on the person that used each term. After gathering all the terms and deducting redundant ones, a four-column table was created in Excel. The first column contains the person that mentioned the term, the second mentions the term being used and the two last contain the divisions in which the term is used as an input or output, respectively.

Due to the simple nature of this step, there were not some significant problems worth mentioning. Neither was the process complicated nor time-consuming.

### 3.2.4 Development of conflict template

Developing a division matrix and a glossary was a small and simple step in the course of developing a general business structure. Nevertheless, it should not be assumed that implementing this step is of little significance for the overall approach. That is because without the division matrix and the glossary the next step could not be implemented. Having mentioned that, the next step of the approach of developing a business structure is to create a conflict template.

The goal of this step is attempting to resolve the conflicts that appeared during the previous step, thus creating a common understanding and aligning the whole team under a common terminology. The method implemented with the scope of achieving that goal is developing a conflict template. The conflict template addresses each conflict separately and clarifies the people between which the contradiction is created.

Elaborating on the development of the conflict template, there are several questions that it should address. These are the following:

- What is the conflict about?
- Between whom is the conflict?
- Which departments are involved in the conflict?
- What was the outcome of using the conflict template?
- Was the conflict resolved?

The first question aims to clarify the reason of the conflict. That could be either a term being used differently or a disagreement on the inputs and outputs of a department. The second question specifies the two or more people involved in the conflict. Furthermore, the third question identifies the departments that are involved in the conflict. When the conflict is about a disagreement on inputs or outputs, then the answer should state to which department does each person believe that the input or output belong. The fourth question aims to clarify the outcome of the meeting. Finally, the fifth question states whether or not the conflict was resolved.

The conflict template was developed with the scope of being used not only to resolve conflicts concerning the inputs and outputs of departments, but also to resolve any kind of future contradictions. Similar to the previous step, this step was simple and quick, so no

important problems were encountered while implementing it.

### 3.2.5 Specification of departments' purposes

After implementing the previous steps of the overall approach, business units are defined and the interactions between them are clearly specified. It might seem that the structure is ready to be modeled, but there is another thing left to be done before that. That is, identifying the purpose of every department.

This section introduces and describes the method used to clarify the purpose of every department and division. According to that, the inputs and outputs clarified previously are analyzed and thought through, and a first draft is produced. Then, through discussions with the founders of the company, the purpose of each department is finalized.

As mentioned above, in order to identify the purpose of every department, the first thing to do is produce a draft with possible purposes resulting from the previously clarified inputs and outputs. By thinking through the inputs and outputs of a department one can make possible assumptions about what the purpose of it could be. For example, when talking about the Marketing division the most common output would be leads. Thus, one can make the assumption that one purpose of Marketing would be to generate leads. Making such assumptions provides one with a quick draft of the purposes ready to be discussed with the founding members.

After creating the first draft with the possible purposes of every department, discussions with the founders should be made in order to verify or discard some of them. Apart from that, another goal of the discussions is to clarify the purpose of every department as thought by the founders. Discussions can be made either separately with every founder or (if possible) with the presence of all of them. During the implementation of the method, it was concluded that the second way is better, because it allows for more and faster results.

During the implementation of the aforementioned method there were some challenges that needed to be overcome. Some of these are the following. One challenge was dealing with the contradictions between the founders in understanding the purpose of every department. Similar to the problems faced when attempting to clarify the interactions between the departments, in some cases the founders had a different understanding of the purpose of each department. In the course of overcoming this problem, the conflict template developed and presented in the previous section helped speed up the process.

### 3.2.6 Modeling of general Business Structure

The previous sections presented the steps implemented in order to develop the general business structure of the company. However, there is one thing left so that the development is complete. As depicted in Figure 3-6, the last step of the approach implemented in the course of developing a general business structure and topology is to model the structure and create a graphic representation of it.

This section describes the process of modeling the general business structure of the

company and designing its topology. The modeling was implemented in PowerPoint, with the scope of achieving a fast and easy-to-iterate-on result. First, the structure is presented as a whole with departments being represented as boxes and consisting of their divisions. Next, going one level deeper into the approach, slides for every department were created depicting the interactions between the divisions. Then, a slide was made for each and every division separately, presenting inputs, outputs, and purposes of each department. Figure 3-9 presents a graphic representation of the process of modeling the general business structure.

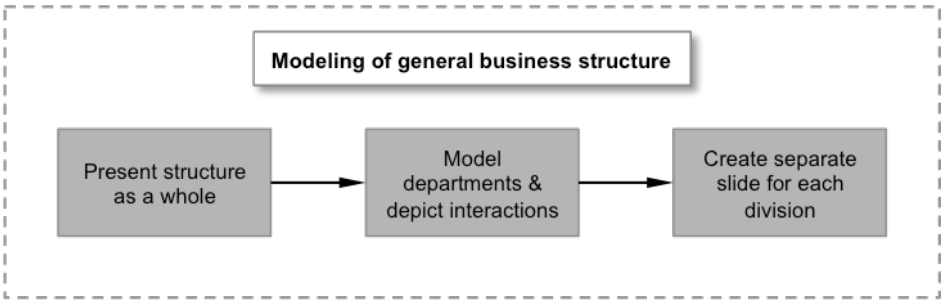



*Figure 3-9: Process of modeling the general business structure*

Elaborating on the aforementioned approach, the first step of modeling the general business structure is to present the business structure as a whole. Implementing this step involves graphically representing the highest level of the structure, which consists of all the defined business units-departments. Departments are represented separately as boxes, and in each box the divisions of the department are listed. However, at this point the interactions between the departments or division are not yet visible.

As depicted in Figure 3-9, the second step of the process is to model each department more extensively, depicting the interactions between its divisions. This step goes one level deeper into the business structure of the company. In the course of implementing this step, each department is analyzed in a different slide. The divisions of each department are represented in each slide, and the interactions between them are presented clearly with arrows. The start of an arrow clarifies the source or the output of a division, while the end of an arrow displays the receiver or the input of a division.

The third and final step of this process, as depicted in Figure 3-9, is the creation of a separate slide for every division. This step reaches the deepest level of the business structure of the company, which is inside the divisions. In this step, all the inputs and outputs of a division are listed clearly. Additionally, the previously clarified purposes of the divisions are depicted in the form of a list.

During the implementation of the aforementioned process, no problems were encountered. The reason for that is that the previous steps had fully addressed the development of the business structure. Thus, modeling the general business structure was an easy task since all relevant information was provided in drafts.

## 3.3 How to measure performance: *Goals waterfall* method

With the completion of the first two steps of the overall approach, Problem 1 (absence of a strict business structure) is addressed in its entirety, and Goal 1 (increase transparency) is getting closer to achieve. This section constitutes the third step of the four-stepped approach implemented with the objective of developing a business handbook for a startup. As depicted in Figure 3-1, that is measuring the performance of the company. In addition, the section contributes to achieving Goal 2 (model and optimize critical business processes), which in turn addresses Problem 2 (undefined business processes) and Problem 3 (undefined key performance indicators).

The approach introduced in this section aims to find a way to measure the performance of a startup. The reasoning is based on the waterfall model developed by Winston W. Royce in 1970. The waterfall model is a sequential design process, used in software development processes, in which progress is seen as flowing steadily downwards, like a cascading waterfall (RERYCH, 2002; ROYCE, 1970). In the course of this project, the waterfall model was adjusted to fit the needs of this thesis. Hence, the approach was named *goals waterfall*.

According to the *goals waterfall* approach, measuring the performance of a company is attempted by implementing the following steps. First, the company's business strategy and goals are clarified. Then, the business goals are decomposed, and performance metrics used to track the progress towards these goals are established. Next, from those metrics some key business processes are derived. Finally, keeping in mind that the environment is that of a startup, the last step is to identify which metrics are KPIs and can be measured at this moment. Figure 3-10 depicts a graphic representation of the *goals waterfall* approach.

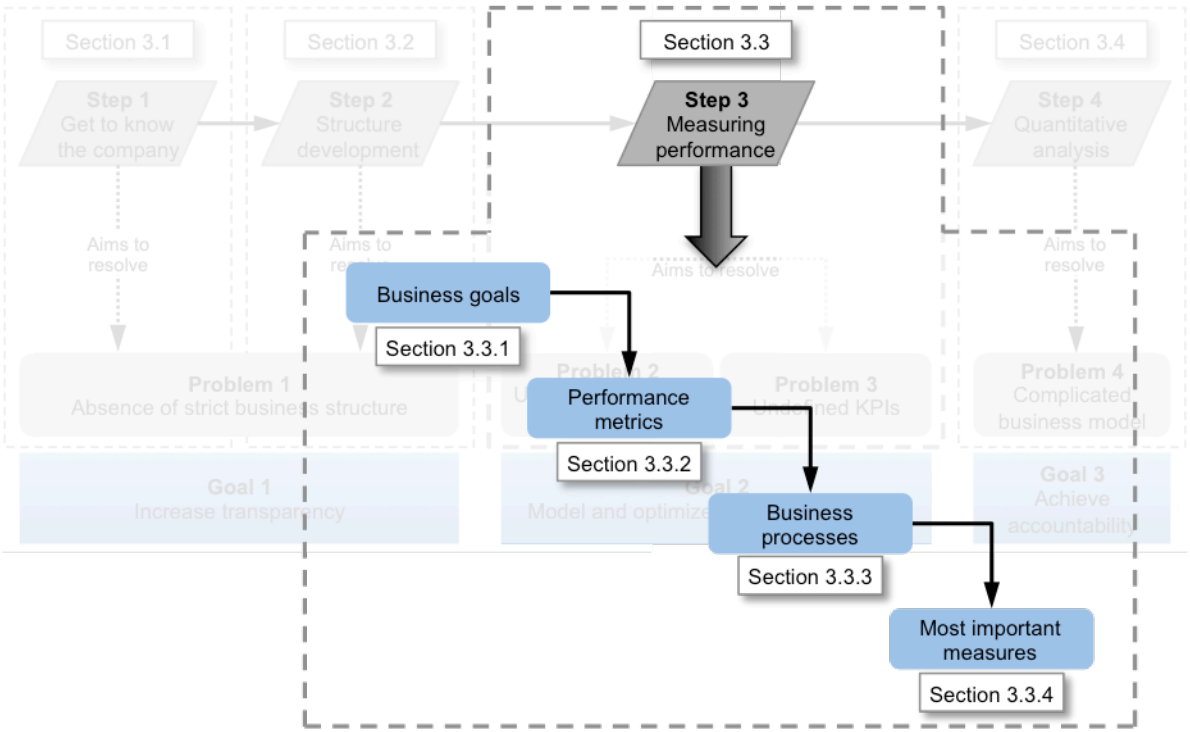



*Figure 3-10: Graphic representation of the goals waterfall approach implemented in Section 3.3*

Elaborating on the above figure, it should be mentioned that measuring performance varies from company to company, because of the different definitions that companies give to performance. In the course of this project, the approach implemented uses the following reasoning. In order to measure the performance of a bigger system, the first step is to break it down to smaller parts. Starting from the overall business goals of the company, one goes down the way to find out which processes are involved in reaching those goals. The following example aims to make the reasoning of the approach clearer for the reader: Let us assume that a business goal of a company for the next year is to make one million of revenue. In order to see if the goal is achieved, some relevant metrics would be volume of sales, profit, revenue and others. Then, by thinking of which processes affect those metrics, key business processes are clarified, such as the process of acquiring a customer. So, the last step would be to go back again to the metrics and: 1) clarify which ones are the most important (KPIs) for what is attempted to be measured, and 2) identify which of the KPIs can actually be measured at the current state. In this case one KPI would be the metric of revenue.

As depicted in Figure 3-10, this section consists of four sub-sections. Section 3.3.1 discusses the process of clarifying the business strategy and goals of the company. Section 3.3.2 presents the method followed in order to establish performance metrics. Section 3.3.3 introduces the approach implemented in the course of defining key business processes. Section 3.3.4 describes the process of identifying which metrics are KPIs and can be measured at the moment of the implementation of the approach.

### 3.3.1 Clarification of Business Strategy and Goals

Measuring the performance of a startup is a challenging objective, because of the dynamic environment of startups. In addition, the distinctive characteristics of each startup complicate the problem, because there is no standard way in literature to approaching such a problem. These conditions necessitate the implementation of a new approach. That is, the *goals waterfall* approach. According to that, the first step implemented when attempting to measure the performance of a startup is to clarify its business strategy and goals.

As depicted in Figure 3-10, this section discusses the method used to clarify the business strategy and the goals of the startup. According to that method, clarifying the strategy and goals can be done by participating in strategic meetings of the company. In addition, conducting interviews with the founding members of the company also contributes to that objective. The reason for using this kind of method is that such information is private and confidential. Companies do not announce this kind of information; sometimes not even all employees of the company are aware of its strategy and its goals. So, recapping the aforementioned, the clarification of the business strategy and of the goals of the company is achieved by:

- Participating in strategic meetings
- Conducting interviews with the founding members

Elaborating on the first point, strategic meetings refer to meetings of company members that

are in the position to take strategic decisions. Such people are the managers of the company and the people in charge of departments. Strategic meetings vary from simple weekly and monthly meetings organized to discuss short-term objectives, to yearly meetings (happening once a year) to discuss long-term objectives for a whole year. In the course of this project, although the author was neither a manager nor a head of department, he attended such meetings with the aim of implementing this approach. During those meetings, notes regarding the strategy were taken and the business goals were clarified.

In this section, the process of conducting interviews is not analyzed again. In order to review the extensive description of the interview process, one can refer to Section 3.1.1. The interviews were supplementary to participating in strategic meetings, because the limited amount of time for the project impeded the attendance to all meetings. Their objective was to gather additional information about the strategy of the company. In addition, their conduction aimed at decomposing the overall goals into smaller ones, so that metrics established later could be used to track the progress towards these goals.

Regarding the problems faced while implementing this step, while not many, there were some. One problem was the fact that meetings took place only once a week, a month, or even a year. The reason for that being a problem is that the project had a specific deadline of six months, thus there was not enough time to attend every meeting because a result was needed faster. That necessitated the conduction of interviews, which in turn has the problems mentioned in Section 3.1.1.

### 3.3.2 Establishment of performance metrics

After clarifying the strategy and the business goals of the company, the next step of the *goals waterfall* approach is to realize how the progress towards these goals will be tracked. That is, identifying which metrics are linked to those goals and measuring them will enable one to see how close the company is to achieving those goals.

This section discusses the way of establishing these metrics. It is based on the literature review on metrics and Key Performance Indicators of Section 2.3. First, an extended list of metrics is made. Following is filtering this list of metrics and keeping the ones that are related to the business goals of the company. Next, metrics are assigned to the five phases of the customer lifecycle introduced by McClure (2007). These are: acquisition, activation, retention, revenue, and referral. Lastly, real metrics are differentiated from vanity metrics, according to Croll & Yoskovitz (2013), and the final list of metrics divided into the five phases is made.

Elaborating on the above, the first step implemented is a conduction of literature review on metrics and KPIs for startups and SaaS companies. This literature review is presented in Section 2.3.1 and Section 2.3.2, respectively. At this point, the list created consists of all kinds of metrics related to startups and SaaS companies, which makes it long and extensive.

The next step is to filter the extensive list created earlier and identify which of these metrics are closely related to the business goals of the company. In order to do that, one must try to think how the goal can be achieved, and in turn how to measure the progress towards that goal.

After clarifying which metrics are related to the business goals of the company, and thus shortening the list, the next step is to arrange the metrics in the five phases of the customer lifecycle. Doing that requires understanding the purpose and the goal of each phase. According to McClure (2007), in order to understand which metrics are assigned to each phase, one must think of how to answer the following questions for each phase:

- Acquisition: How do users become aware of you?
- Activation: Do drive-by visitors subscribe, use, etc.?
- Retention: Does a one-time user become engaged?
- Revenue: Do you make money from user activity?
- Referral: Do users promote your product?

Finally, the last step of establishing performance metrics is to clarify which of the metrics occurred so far are real metrics and which ones are vanity metrics. Doing that is based on the literature review presented in Section 2.3.1. According to that, Croll & Yoskovitz (2013) state that vanity metrics are metrics that don't inform, guide, or trigger people performing an action. These kinds of metrics present seemingly significant data that make managers think they are making progress, but they are actually of trivial significance. Having that in mind, the list of metrics is filtered once again, eliminating the vanity metrics and keeping the real-actionable metrics.

In the course of establishing performance metrics some problems were encountered. These problems include the time-consuming process of conducting the literature review on metrics, and also the difficulty in clarifying which metrics are related to the business goals of the company.

### 3.3.3 Definition of business processes

According to the *goals waterfall* method, the next step after clarifying the business goals of the company and the metrics related to them is to define business processes. This section describes the method used to identify key business processes of the company. According to that method, doing that can be achieved by answering the question of how to achieve the purpose of each department of the company. The purposes of the departments were clarified previously in Section 3.2.5. Then, the following step is to clarify which of these processes are related to the metrics that were established earlier.

As mentioned above, the method used to identify the business processes of the company is by attempting to answer the following question:

- How to achieve the purpose of each department?

In the course of answering this question one identifies the actions required to fulfill the purpose of each department. Some of these actions constitute steps of the processes and some constitute whole processes that are involved in the department. For example, when talking about sales, the purpose clarified was to turn leads into customers. So, answering the question of how to turn leads into customers results in the key business process of getting

customers through the sales funnel. Moreover, another answer to this question would be to understand the problem of the customer and make a good offer. In this case, these two answers are not complete processes, but rather steps of the sales funnel process.

Having identified some key business processes of the company, the next step is to clarify which of these processes are directly related to the metrics established earlier. Doing that involves realizing which actions affect the metrics. That is, understanding which actions if taken will alter the value of one or more metrics either in the short term or the long term. In order to make this clearer for the reader, the following example is presented: Assuming that one is trying to identify the processes related to the Customer Acquisition Cost. Such processes would be those related with the acquisition of customers. So, they would be processes of the Marketing, Sales, and Customer Services departments, like: writing a blog article, sales funnel process and others. If, for instance, the number of personnel, the cost of the personnel, or the time of the process changes, then the CAC is directly influenced by that change. Thus, these processes would be the ones that we are looking for.

### 3.3.4 Measure what is most important

As depicted in Figure 3-10, the fourth and final step of the *goals waterfall* approach is identifying the most important measures. That is, going back to step two when performance metrics were established and from those metrics clarify which ones are the most important ones to be measured. The reason for doing that in a separate step and not during step two is that a more extensive list of metrics could be useful in the future, considering that the situation changes really fast.

This section explains the process of realizing the most important metrics. According to that, there are two criteria that help one identify these metrics. The first criterion is understanding which of the metrics are Key Performance Indicators (KPIs) and the second is realizing which of metrics can be measured at the moment of the implementation of the approach. These two criteria supplement each other, so they are not taken into account in turn, but together.

Elaborating on the first criterion, one must first understand what a KPI is. In order to do that, the definition of PARMENTER (2010), found in Section 2.3, is stated below: Key Performance Indicators represent "a set of measures focusing on those aspects of organizational performance that are the most critical for the current and future success of the organization". With that in mind the metrics are filtered, and the ones that are the most critical for the current success of the company are gathered. What exactly is critical varies from company to company and is relevant to the current business goals of the company.

The second criterion used to determine the most important measures is, as mentioned above, realizing which of the established performance metrics can be measured at this moment. Establishing an extensive list of metrics is useful, but it does not mean that all metrics can be used at that moment. That is because in order to use a metric, a company has to clearly understand why it changed and what actions it can take with the scope of improving it. According to CROLL & YOSKOVITZ (2013), good metrics are actionable, meaning that when a manager is reading the value of a metric, it should trigger him or her to take an action. In

addition, another reason for a company to not be able to use a metric is because it lacks the required data that come from, for example, usage statistics and analysis.

With the completion of this step, the final performance metrics have been established and are ready to be measured.

## 3.4 Quantitative Analysis: Relation between processes and KPIs

Having established the performance metrics related to the business goals of the company and the business processes that derive from those metrics, the next step of the overall approach is to conduct a quantitative analysis. This section describes the approach implemented in the course of conducting this quantitative analysis. The goal of this step is to clarify how the business processes of the company relate to the KPIs. The goal is, first, to be able to analytically read data of past performance and realize why things happened as they did. And second, to be able to accurately measure and predict the impact that a future change in a process will have on a KPI. Furthermore, this step contributes to achieving Goal 3 (achieve accountability), which in turn addresses Problem 4 (complicated business model).

The approach described in this section aims to develop some quantitative models that clearly show the interactions between the business processes and the KPIs. In the course of implementing this approach, the following steps take place: First, the processes are broken down into smaller steps. Second, the time and cost of each step is determined. Third, the quantitative model connecting the process to the KPI is developed. Figure 3-11 depicts a graphic representation of the aforementioned approach.

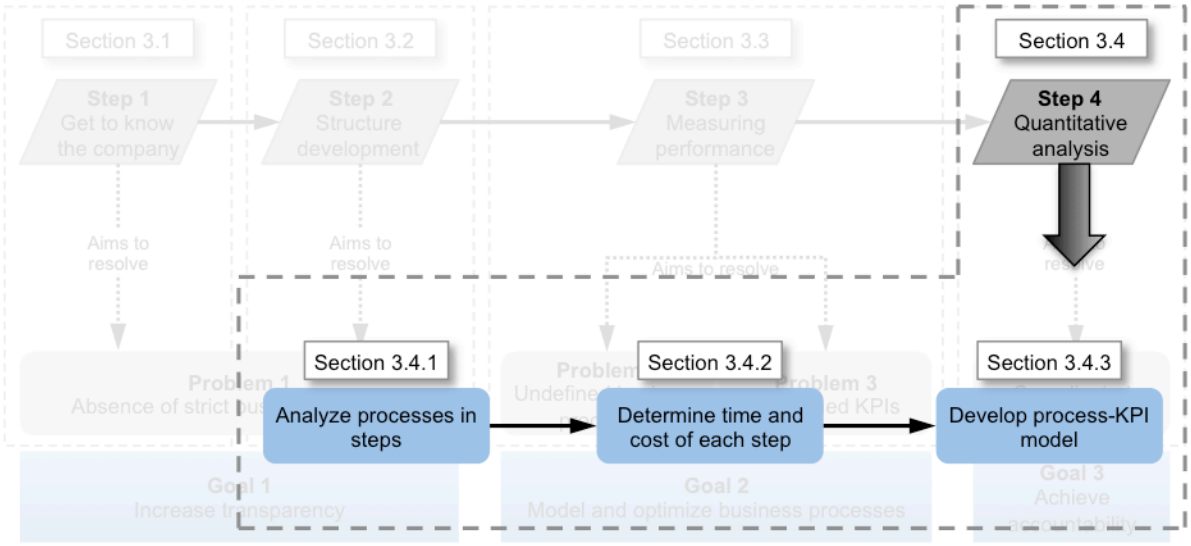



*Figure 3-11: Graphic representation of the approach implemented in Section 3.4*

As depicted in Figure 3-11, this section is divided into three sub-sections. Section 3.4.1 describes the process of analyzing business processes in smaller steps. Section 3.4.2

presents the method used to determine the time and cost of each step of the process. Finally, Section 3.4.3 discusses the process of developing the quantitative model that connects the process to the KPI.

### 3.4.1 Analysis of processes

As depicted in Figure 3-11, conducting a quantitative analysis consists of three steps. The first step of implementing the quantitative analysis is to break down the processes into smaller steps or activities. Doing that is a prerequisite for the next step which is determining the time and cost of a process. Having analyzed a process into its activities makes it easier for one to determine the time, cost and people needed for a process to take place. That is because, data is easier to acquire for a single activity of a process, rather the whole process itself, meaning that the relation between an activity and its cost or time is much more direct.

This section describes the process of analyzing the processes. According to that, a draft is made depicting the activities involved in a process. Then, discussions with the people responsible for a process (process owners) are made with the scope of proofreading the draft, adding missing activities, and making improvements. This way of implementing this step aims to minimize time and optimize the result of the step through quick iteration.

The first step of the approach is to make a quick draft of the process and its activities. Doing that requires thinking through the process from the beginning to the end. In addition, one can observe the people responsible for that process and see what they do and how they do it while they execute a process. Furthermore, another way to determine the activities involved in a process is by attending relevant meetings, where people discuss about the process and its execution. Doing the aforementioned will grant one with the required material to produce a first quick draft of a process.

After the first draft is made, the next step is to discuss it with a person responsible (process owner). In order to do that, first, a meeting must be scheduled at a time that the process owner is free. During the meeting, the process owner proofreads the already made draft and gives feedback on it. That feedback might add more activities to the process, modify already sketched activities, or alter the sequence according to which the activities take place.

It should be mentioned that processes might not be sketched out completely yet, thus the process owner would have to think of how he executes the process. That necessitates an iteration of this step of the approach that would result in the best outcome, which is that of a best sketched out process.

In the course of implementing this step some problems were encountered. Some of these problems include the lack of knowledge on the implementation of a business process, which results in difficulty in breaking down a process. In addition, a common problem was found again, which was requiring a manager or other person in order to complete the step. The reason for that being a problem is that, as mentioned earlier, people in the company have a lot of other tasks, and thus finding time to arrange a meeting could take some time.

### 3.4.2 Determine time and cost of each step

As mentioned earlier, breaking down the processes into smaller activities is a prerequisite for determining the time and cost of a process. That is because in order to determine the overall time and cost of a process, one must know of what that process consists. In order to make that clearer, the example of putting a price on a new patent is brought up. According to that, in order for someone to put a price on a new patent, the cost of its distinct parts or elements must be acquainted. When one knows the costs of all parts, then the overall cost of the patent can be clarified. The same reasoning applies to the determination of the processes' time and cost.

This section presents the method implemented in the course of determining the time and cost of each step-activity of a process. According to that method, interviews are conducted with the owners of each process. The process of conducting the interviews is not presented again in this section. The reader can refer to Section 3.1.1 for an extensive description of that process. An important thing to mention is that the interviews are conducted at the same time with the discussions implemented in the previous step. Nevertheless, they are presented in a separate section for structural reasons. That is, so that the reader has a clear view of the steps of the approach.

The goal of each interview is to clarify two things: 1) the approximate time required for the execution of an activity of a process, and 2) the approximate cost that accompanies that activity. As far as both things are concerned, specific values cannot be obtained due to lack of measured data. Time of each activity is determined by the process owner in an empirical way. Moreover, the cost approximation is based on the salary of the person that executes each activity. Accuracy is not of great significance at this moment, while fast implementation and quick iteration is much more important. Thus, acquiring some approximate data to work with and proceed on the implementation of the approach is what matters most. If more accurate data are measured later on, then the developed model in the end of the approach can be adjusted to the new data.

Since this step was implemented at the same time with the previous one, the problems of the previous step also apply to this one. However, apart from the aforementioned problems, the problems encountered when conducting an interview shall apply to this step as well. For a description of these problems, one can refer to Section 3.1.1.

It should be mentioned that this step could be used to determine different kinds of attributes of an activity of a process. The reason for mentioning only the time and cost is that, in the course of this project, these were the ones mostly related to the most important KPI which was CAC.

### 3.4.3 Process-KPI model development

After determining the time and cost of each activity of a process, the last step of the approach implemented in the course of conducting a quantitative analysis is to develop a quantitative model that correlates business processes to KPIs. Through that model, a manager of the company could analytically read data of past performance and realize why things happened as they did. In addition, he or she would be able to accurately measure and

predict the impact that a future change in a process will have on a KPI.

This section describes the method used to implement the last step of the approach, which is developing models that quantitatively show the correlation between processes and KPIs. According to that, the attributes determined in the previous step are taken into account and used in the model in order to calculate the values of the KPIs. Moreover, the development of some models requires the implementation of the *reservoir system* method introduced in Section 3.1.6.

Developing a quantitative model involves creating a model that quantifies the correlation between a process and a specific KPI. Of course, not all KPIs are quantitative; there are also qualitative KPIs whose value is not a number or a ratio. Thus, the models created address quantitative metrics. In order to develop such a model, the first thing is to clarify the relation between the KPI and the related process. That is, realizing whether the KPI and the performance of the process are, for instance, directly proportional or inversely proportional. Having figured that out enables one to understand how to structure the model.

After identifying what kind of relation exists between the process and the KPI, the next step is to note down the activities or phases of the process in the program in which the model will be created. In the course of this project, Microsoft Excel was used to develop the quantitative models. At this point, the *reservoir system* method can be used. Elaborating on that, the activities or phases of a process are depicted as reservoirs, and the flow of money or leads, for instance, is presented from reservoir to reservoir.

## 3.5 Discussion

Bringing clarity and transparency to a startup is a tricky task. That is because startups are not like large established companies that have a defined business structure, processes and metrics. The lack of defined structure and processes results, in turn, in difficulty measuring progress and growth. That means that startups often have problems proving themselves accountable towards their investors, but also towards their employees.

The aforementioned situation in the environment of a startup necessitates the implementation of an approach, which has the following characteristics:

- **Quick and iterative**: Each of the distinct steps of the approach, both bigger and smaller, need to be executed quickly. That is because time should not be spent on doing stuff perfect and in detail, but rather produce quick drafts and then iterate on them. The benefit of quick iteration is that when conditions change and the previous step is not suitable any longer, then adaptation can be achieved faster and without lots of time lost. Furthermore, if conditions remain unaltered, then by iterating can one improve the previous steps.
- **Flexible**: The approach needs to have flexibility in terms of being able to address different situations. That means that the approach should be of a higher level or a little bit generic and not getting into detail of every step.
- **Easy to modify**: Due to the fast and many changes happening in the environment

of a startup, modifications or pivots are required frequently. Thus, implementing an approach that is easy to modify depending on the situation is a necessary characteristic.

The need for the aforementioned characteristics resulted in the approach presented in Chapter 3. As one can observe, the approach is not complicated and does not go deep in the operations of the company. Instead, a lightweight definition of the company is presented. On the other hand, many of the tools and approaches presented in the literature review do not meet the aforementioned criteria. Most of the times, the approaches in literature are:

- Complicated
- Time-consuming
- Suitable for well-established organizations
- Not flexible
- Difficult to iterate on

These characteristics render the approaches presented in literature unsuitable for the objectives of this thesis. Thus, only distinct elements of these approaches were used in implementing this approach.

Nevertheless, during the implementation of the approach with the scope of achieving transparency and accountability in the business, some problems were encountered. However, none of these problems was of such significance that obstructed the implementation of the approach. The nature of most problems was related to time. That was expected due to the desired iteration in the approach. Had there been more time for the project, iteration would have been achieved in its entirety. Below, some of the disadvantages of the approach implemented are presented:

**Familiarization with the company**

| | |
|---|---|
| Conduction of interviews: | Time-consuming, not self-dependent |
| Euro-flow method: | Requires relative knowledge on sales and marketing channels, among others |
| Market characteristics: | Time-consuming |
| Step by step stories: | Lack of knowledge and information about a function or operation |
| Sketch out areas: | No significant problems encountered |
| Funnel modeling: | Time-consuming, not self-dependent |

Summing-up the disadvantages of this method, one can conclude that the disadvantages of this step overall are that it is partially time-consuming and not self-dependent.

**Development of a general business structure and topology**

| | |
|---|---|
| Definition of business units: | Fast-changing environment causes repetition of process |
| Clarification of interactions between departments: | Contradictions in understanding |
| Division matrix & glossary development: | No significant problems encountered |
| Conflict template development: | No significant problems encountered |

| | |
|---|---|
| Specification of departments' purposes: | Contradictions in understanding |
| General business structure modeling: | No significant problems encountered |

Having mentioned the distinct disadvantages of each step, it can be concluded that the implementation of this method does not present significant problems.

**How to measure performance**

| | |
|---|---|
| Clarification of business goals: | Not self-dependent |
| Establishment of performance metrics: | Relate metrics to business goals |
| Definition of business processes: | Lack of knowledge and experience on processes |
| Measure what is most important: | No significant problems encountered |

Measuring the performance of a company presents different disadvantages, and thus might be the trickiest step so far.

**Quantitative analysis**

| | |
|---|---|
| Analysis of processes: | Not self-dependent |
| Time and cost of each step: | Time-consuming, not self-dependent |
| Process-KPI model development: | No significant problems encountered |

One disadvantage that can be inferred about the last step of the overall approach is that it lacks self-dependency.

# 4 Results & Analysis

The aforementioned approach aiming to increase transparency, optimize business processes and achieve accountability in Soley has been implemented and brought some results. This chapter presents and describes the results that came out in the course of implementing the approach introduced in Chapter 3.

Section 4.1 presents the business structure defined. Departments and divisions are described and the interactions between them are clarified. In addition, some results that came out in the course of defining the business structure are presented and described in this section, such as the division matrix and the glossary.

Section 4.2 presents the Key Performance Indicators defined and explains what can the company measure with them. In addition, it mentions what the company can do using those KPIs. What is more, the defined business processes are also clarified at this section.

Section 4.3 presents the quantitative process-KPI models developed. Moreover, it explains extensively what these models allow Soley to do.

Section 4.4 describes the business handbook developed. That is, putting together the previously mentioned results.

Chapter 4 closes with a conclusion and evaluation of the aforementioned results.

## 4.1 Development of business structure

One of the three goals of this project was to increase transparency in the company. As depicted in Figure 3-1, Goal 1 (increase transparency) addresses Problem 1 (absence of strict business structure). Thus, in the course of increasing transparency in the company and addressing the problem of business structure absence, a business structure was defined.

This section presents and describes the business structure that was developed for Soley. It is a result that occurred from the implementation of Step 2 (structure development) of the overall approach presented in Chapter 3. In addition, it presents the results that came out from the smaller phases of Step 2, as presented in Figure 3-6.

### 4.1.1 Departments and divisions

The first step of developing the business structure was to define the business units of the company, i.e. departments that consist of divisions. As mentioned in Section 3.2.1, that was done using a function-oriented approach. Five departments were defined, each one of which consists of smaller divisions. The five departments are:

- Administration (AD): Its purpose is not related to the development of the product or to the communication with the customers. But, its purpose is to carry out tasks that are essential for the operation of the company and are more high level.
- Customer Acquisition (CA): This department deals with all processes involved in

acquiring new customers or partners.

- Research & Development (RD): Everything that has to do with the product of the company, which is its software, is considered a part of the Research & Development department.
- Services (SV): The purpose of the Services department is to support the customers in any kind of way. That could be by answering questions and providing feedback or carrying out customer projects.
- Strategy (ST): This department is supplementary and is not yet exploited. Its purpose is to support all other departments and aligning the whole company under a common vision and goal.

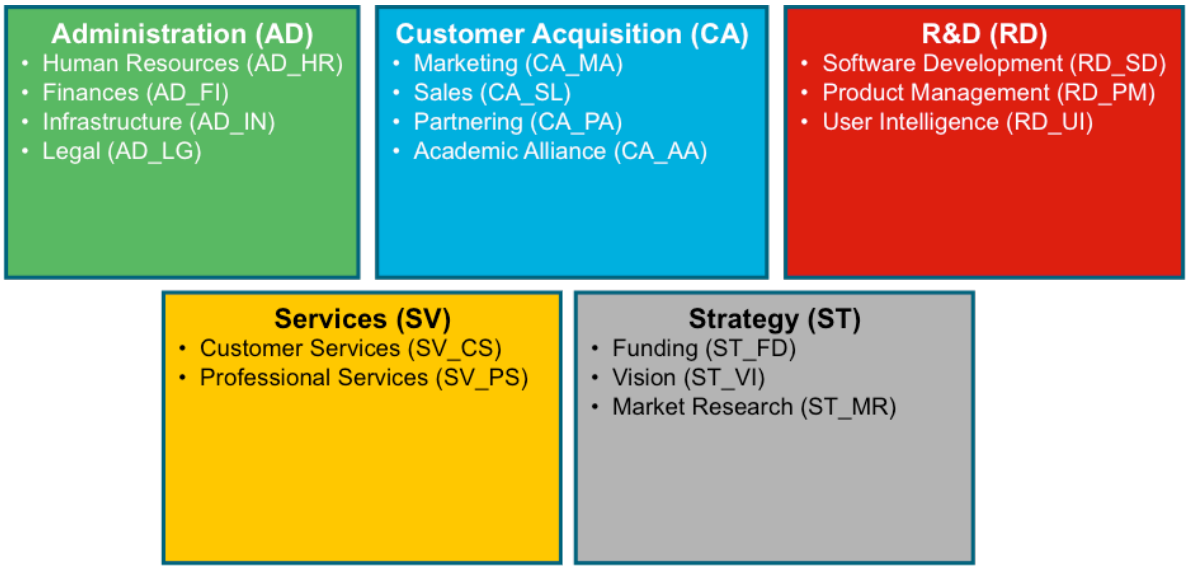



*Figure 4-1: The five departments of Soley with their divisions*

Elaborating on Figure 4-1, different colors were given to each department, along with initials. That facilitates processes like task and time management, when one person might be involved in tasks of several departments. That way, when one is doing, for example, time tracking the tasks of different departments that he or she worked on can be observed clearly. Thus, transparency is strengthened.

As depicted in Figure 4-1, the Administration department consists of four divisions:

- Human Resources (AD_HR): This division, as is commonly known, deals with personnel. That involves recruiting, hiring, providing non-technical trainings to employees, either new or old. Furthermore, other objectives of the Human Resources division is developing, compensating, dismissing or laying-off personnel.
- Finances (AD_FI): As one would expect, this division is responsible for managing the finances of the company. Its purpose is to provide all divisions with sufficient financial support. In addition, it has to make sure that all employees are paid in time and that the company does not run out of money.

- Infrastructure (AD_IN): People working in this division are responsible for acquiring the necessary equipment for all employees. Moreover, they are in charge of managing the facilities needed to meet the company's needs.
- Legal (AD_LG): This division deals with all legal issues of the company. That is, creating and signing contracts, developing legal templates, and making sure that all operations of the company are legal.

The Customer Acquisition department, depicted with blue in Figure 4-1, consists of four divisions as well. These are the following:

- Marketing (CA_MA): People working in the Marketing division deal with marketing and advertising the products or services of the company to the public. The main purpose of doing that is to create new leads for the Sales division. In addition, another objective is to nurture existing leads that are already in the sales funnel of the company.
- Sales (CA_SL): The Sales division is the one closest to the leads or prospecting customers. Sales people are the ones who talk and try to convince the leads to buy the company's products or services. Their main goal is to turn leads into customers.
- Partnering (CA_PA): This division deals with the partners of the company. That is, other companies that assist Soley acquire customers. So, the goal of this division is to create new partners and also to activate existing ones.
- Academic Alliance (CA_AA): The Academic Alliance division aims to acquire new customers through student projects. The way this could be achieved is by targeting students that work or cooperate with companies that are prospecting customers of Soley. Students are getting a license for free, with the scope of using the software to solve a problem of the customer. That acts as an inside advertising, making the customers interested in Soley's services.

Next, the Research & Development department drawn with red color consists of three divisions:

- Software Development (RD_SD): The responsibilities of people working in the Software Development division involve working on the software. Thus, the purpose of this division is to develop, improve and deliver the software to the end customers.
- Product Management (RD_PM): The Product Management division can be thought as the coordinator of the Research & Development department. Product managers prioritize the development of features and organize sprints. Hence, this division manages and coordinates the product development team.
- User Intelligence (RD_UI): This division aims to optimize the user experience. People working in the User Intelligence division gather usage statistics data coming from users and learn from their feedback.

The fourth department of Soley is Services and it consists of the two following divisions:

- Customer Services (SV_CS): The Customer Services division constitutes the communication bridge that connects the customers and the company. When customers have questions, want to report bugs, or want to request new features and improvements, they contact this division. So, the purpose of this division is to support customers by providing quick and beneficial feedback.
- Professional Services (SV_PS): People working in this division must be advanced users of the software. That is because their responsibilities include doing customer projects (either demos or real projects) and offering technical trainings to customers and new employees. The existence of this division results from the complicated business model, mentioned at the Introduction, that resembles the consulting business model.

The fifth and final department of Soley, drawn with grey in Figure 4-1, is Strategy. It consists of three divisions, which are:

- Funding (ST_FD): The goal of this division is to acquire public and private funding. Responsibilities of people working in this division include networking and approaching new investors and writing proposals for funding.
- Vision (ST_VI): This division aims to define and communicate the overall vision-goal-scope of Soley to all employees.
- Market Research (ST_MR): Its purpose is to conduct market and competition analysis.

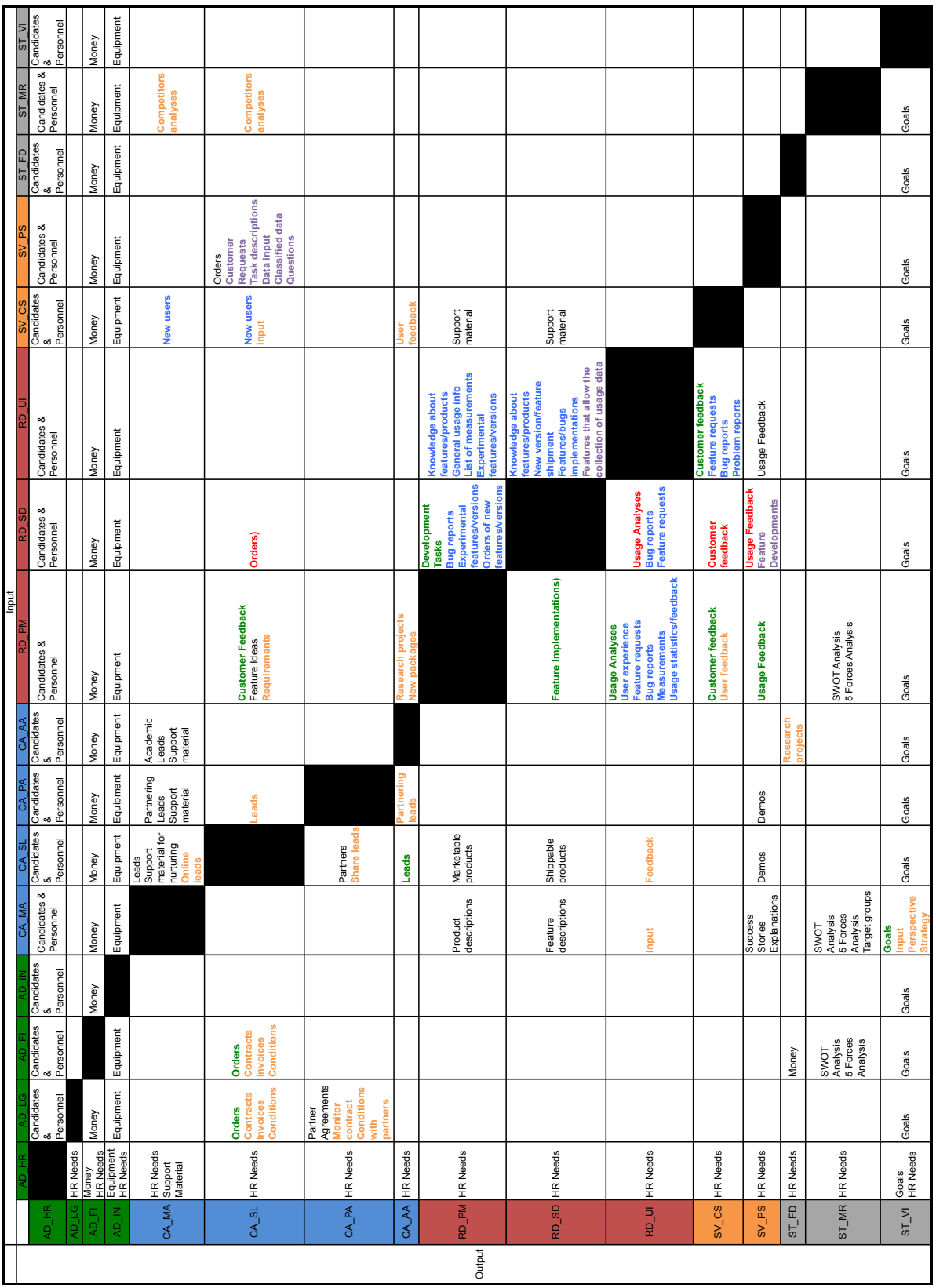
### 4.1.2 Division matrix and glossary

As depicted in Figure 3-6, after defining departments and divisions of the company, the next step is to clarify the interactions between them. In order to do that, interviews were conducted with the scope of determining the inputs and outputs of every division. In order to structure and arrange the data collected from the interviews, the next step was to create a division matrix and a glossary.

Table 4-1 presents the division matrix developed. Elaborating on that, first it should be mentioned that columns represent inputs and rows represent outputs. So, as an example, take the cell of the first row (AD_HR) and the fifth column (CA_MA). That writes Candidates & Personnel. What that means is that Candidates & Personnel are an input of the Marketing division and an output of the Human Resources division. Thus, one interaction between these two is that AD_HR offers Candidates & Personnel to CA_MA.

Furthermore, the colors drawn over the divisions are the ones used earlier to distinguish the divisions. But, the colors used on some inputs-outputs have a different meaning. One color was assigned to each one of the four founders interviewed. The reason for that was to be able to see who said what, identify the understanding that every one has about the operation

*Table 4-1: Division matrix with inputs and outputs*




of the company, and also depict the conflicts in that understanding. This is why the colors are six, while the founders are four. The green and red colors were used to show that two or

more agree or disagree, respectively. Doing that contributes to the effort to align the whole team under a common understanding about the function of the company. Since the structure was recently developed, in order for it to be implemented, everyone must be on the same page.

In the course of the effort to align everyone under a common understanding, a glossary was also created. That aimed at identifying the terms that each founder is using about the different departments and divisions and establishing a common terminology in the company. Table 4-2 presents the glossary.

*Table 4-2: Glossary with terms*

| Terms | | | |
|---|---|---|---|
| Person | Term | Division | |
| | | Input | Output |
| 1 | Bug Reports | RD_SD | RD_PM |
| 1 | Experimental Features/Versions | RD_UI | RD_PM |
| 1 | Feature Requests | RD_UI | SV_CS |
| 1 | Features/Bugs Implementations | RD_UI | RD_SD |
| 1 | General Usage Info | RD_UI | RD_PM |
| 1 | Knowledge about features/products | RD_UI | RD_SD |
| 1 | List of Measurements | RD_UI | RD_PM |
| 1 | New Users | SV_CS | CA_MA |
| 1 | New version/feature Shipment | RD_UI | RD_SD |
| 1 | Orders of New Features/Versions | RD_SD | RD_PM |
| 1 | Problem Reports | RD_UI | SV_CS |
| 1 | Usage Statistics/Feedback | RD_PM | RD_UI |
| 1 | User Experience | RD_PM | RD_UI |
| 2 | 5 Forces Analysis | RD_PM | ST_MR |
| 2 | Academic Leads | CA_AA | CA_MA |
| 2 | Candidates & Personnel | CA_SL | AD_HR |
| 2 | Demos | CA_SL | SV_PS |
| 2 | Equipment | RD_SD | AD_IN |
| 2 | Explanations | CA_MA | SV_PS |
| 2 | Feature Descriptions | CA_MA | RD_SD |
| 2 | Feature Ideas | RD_PM | CA_SL |
| 2 | Goals | RD_PM | ST_VI |
| 2 | HR Needs | AD_HR | AD_FI |
| 2 | Leads | CA_SL | CA_MA |
| 2 | Marketable Products | CA_SL | RD_PM |
| 2 | Money | CA_MA | AD_FI |
| 2 | Orders | RD_SD | CA_SL |
| 2 | Partner Agreements | AD_LG | CA_PA |
| 2 | Partnering Leads | CA_PA | CA_MA |
| 2 | Partners | CA_SL | CA_PA |
| 2 | Product Descriptions | CA_MA | RD_PM |
| 2 | Shippable Products | CA_SL | RD_SD |
| 2 | Success Stories | CA_MA | SV_PS |
| 2 | Support Material | CA_SL | CA_MA |
| 2 | Support Material for Nurturing | CA_SL | CA_MA |
| 2 | SWOT Analysis | CA_MA | ST_MR |
| 2 | Target Groups | CA_MA | ST_MR |
| 2 | Usage Feedback | RD_PM | SV_PS |
| 3 | Competitors Analyses | ST_MR | CA_SL |
| 3 | Conditions | AD_LG | CA_SL |
| 3 | Conditions with Partners | AD_LG | CA_PA |
| 3 | Contracts | AD_LG | CA_SL |
| 3 | Invoices | AD_FI | CA_SL |
| 3 | Leads | CA_SL | CA_AA |
| 3 | Monitor Contract | AD_LG | CA_PA |
| 3 | New Packages | RD_PM | CA_AA |
| 3 | Online Leads | CA_SL | CA_MA |
| 3 | Partnering Leads | CA_PA | CA_AA |
| 3 | Perspective | CA_MA | ST_VI |
| 3 | Requirements | RD_PM | CA_SL |
| 3 | Research Projects | CA_AA | ST_FD |
| 3 | Share Leads | CA_SL | CA_PA |
| 3 | Strategy | CA_MA | ST_VI |
| 3 | User Feedback | RD_PM | SV_CS |
| 4 | Classified Data | SV_PS | CA_SL |
| 4 | Customer Requests | SV_PS | CA_SL |
| 4 | Data Input | SV_PS | CA_SL |
| 4 | Feature Developments | RD_SD | SV_PS |
| 4 | Features that allow the collection of usage data | RD_UI | RD_SD |
| 4 | Questions | SV_PS | CA_SL |
| 4 | Task Descriptions | SV_PS | CA_SL |

In order to do that, first all the terms used during the interviews about the inputs and outputs were gathered and arranged by person. In addition, more terms observed during meetings

and discussions were gathered. Then, all the terms were brought together in a table that consists of four columns: person, term, input division, and output division.

### 4.1.3 Business structure and topology

After having defined departments and divisions and clarified the interactions between them, the only thing left is to put it all together. First, drawings were made. One drawing was done for every department depicting its divisions. In addition, the interactions between the divisions were drawn with arrows and a description that specifies either the input or the output. The reason for making it first a drawing was to be quick and easy to modify. In the end, the final structure with all departments, divisions and their interactions was modeled in PowerPoint. Again, the reason for that is quick iteration and higher-level approach.

The graphic representation of the business structure developed is presented in Appendix 9.1. One can observe that figures are not of the best quality, but that is neither carelessness nor negligence of the author. It is because of the effort to achieve fast drafts and quick iteration. Since, the business structure is still under iteration, there is no finalized version. So, the last draft produced is presented.

## 4.2 Measuring performance

The second goal of this project is to model and optimize critical business processes of the company with the scope of measuring and improving its performance. As depicted in Figure 3-1, Goal 2 (model and optimize business processes) addresses Problem 2 (undefined business processes) and Problem 3 (undefined KPIs). Thus, in the course of measuring and improving the performance of the company, KPIs were established and business processes were defined.

This section presents and describes the KPIs and the processes defined for Soley. It is a result that occurred from the implementation of Step 3 (measuring performance) of the overall approach presented in Chapter 3.

### 4.2.1 Key Performance Indicators

As presented in Section 3.3, during the description of the *goals waterfall* method, in order to reach down to defining processes of a company one must start by decomposing its goals. However, the business goals of the company are not considered to by a result of this project, and thus, are not presented here.

On the other hand, the next step of the *goals waterfall* method is a result of this thesis. That is, establishing performance metrics, which in the end are brought down to the most important KPIs. Both phases will be presented in this section: the first general metrics and the final KPIs.

Tables 4-3, 4-4, 4-5, and 4-6 present the intermediate and the final results of the process of establishing performance metrics for the company.

*Table 4-3: General metrics*

| General metrics | |
|---|---|
| Business and financial metrics | Bookings<br>Revenue<br>Gross Merchandise Value (GMV)<br>Annual Recurring Revenue (ARR)<br>Annual Recurring Revenue per Customer<br>Monthly Recurring Revenue<br>Total revenue<br>Average revenue per user<br>Total Contract Value (TCV)<br>Annual Contract Value (ACV)<br>Gross profit<br>Gross margins<br>Customer Lifetime Value (CLV)<br>Contribution margin CLV to CAC ratio<br>Unearned or deferred revenue<br>Billings<br>Customer Acquisition Cost (CAC)<br>Blended - Paid<br>Organic – Inorganic<br>Upselling rate |
| Product and engagement metrics | Active users<br>Registered users<br>Net Promoter Score (NPS)<br>Cohort Analysis<br>Pages per visit<br>Time on site<br>Month on month growth<br>Churn<br>Gross churn<br>Net churn<br>Burn rate<br>Gross burn<br>Net burn<br>Number of visits<br>Visitor's loyalty<br>Session length<br>Downloads<br>Engagement expressed as cohort retention<br>Time since last use<br>Daily Active Users (DAU)<br>Monthly Active Users (MAU)<br>Number of clicks<br>Conversions (%)<br>Conversion rate<br>Number of conversions |
| Economic and other defining qualities | Virality<br>Viral coefficient<br>Economies of scale |

*Table 4-4: AARRR metrics*

| Metrics distributed in the 5 phases of Customer Lifecycle | |
|---|---|
| Acquisition | Customer Acquisition Cost (CAC) |
| Activation | Pages per visit<br>Time on site<br>Number of visits<br>Session length<br>Downloads<br>Number of clicks<br>Conversions<br>Conversion rate<br>Number of conversions |
| Retention | Registered users<br>Cohort Analysis<br>Pages per visit<br>Time on site<br>Month on month growth<br>Churn<br>Number of visits<br>Session length<br>Engagement expressed as cohort retention<br>Time since last use<br>Daily Active Users (DAU)<br>Monthly Active Users (MAU)<br>Number of clicks<br>Conversions (%)<br>Conversion rate<br>Number of conversions |
| Revenue | Bookings<br>Revenue<br>Annual Recurring Revenue (ARR)<br>Annual Recurring Revenue per Customer<br>Monthly Recurring Revenue<br>Total revenue<br>Average revenue per user<br>Gross profit<br>Gross margins<br>Customer Lifetime Value (CLV)<br>Contribution margin CLV to CAC ratio<br>Upselling rate |
| Referral | Virality<br>Viral coefficient |

*Table 4-5: Final metrics*

| Final metrics | |
|---|---|
| Acquisition | Conversions from Visitor to Freemium/Trial (goal: accept Freemium/trial offer)<br>Conv. Rate (%)<br>Nr. of people visited site (time on site)<br>Nr. of people viewed blog article (time on blog) |
| Activation | Conversions from Freemium/trial or visitor to User (goal: signup)<br>Conv. Rate (%)<br>Signups in a period of time |
| Retention | Nr. of users (session length)<br>Time since last use<br>Daily Active Users (DAU)<br>Weekly Active Users (WAU)<br>Monthly Active Users (MAU) |
| Revenue | Subscriptions/week<br>Upgrades/Renewals / week<br>Upselling Rate (=upgrades/customers)<br>Monthly Recurring Revenue (MRR) |

*Table 4-6: Most important metrics (KPIs)*

| Most important metrics (KPIs) | |
|---|---|
| Acquisition | Nr. of people visited site (average time on site)<br>Nr. of people viewed blog article (average time on blog)<br>Customer Acquisition Cost (CAC) |
| Activation | Conversions from Visitor to Freemium/Trial User in a period of time<br>(goal: accept Freemium/trial offer/ signup)<br>Conv. Rate (%) |
| Retention | Nr. of users (session length)<br>Time since last use<br>Daily Active Users (DAU)<br>Weekly Active Users (WAU)<br>Monthly Active Users (MAU) |
| Revenue | Subscriptions per week<br>Upgrades/Renewals per week<br>Upselling Rate<br>Monthly Recurring Revenue (MRR) |

The above tables show how the metrics were filtered and changed from phase to phase until the KPIs came out. Table 4-3 presents the general metrics that resulted from the literature review on startup and SaaS metrics, as mentioned in Section 2.3. One can observe that the list is quite extensive and consists of some complicated metrics. At that point, the metrics were sorted in:

- Business and financial metrics
- Product and engagement metrics
- Economic and other defining qualities

Next, the extensive list of metrics was filtered a little bit, so that metrics that are very complicated and detailed, such as Gross Merchandise Value (GMV) are taken out. The filtering was not done in a big extent, rather the metrics that could not be used now, for sure, were filtered out. Moreover, at this point the metrics left were arranged in four of the five phases of the Customer Lifecycle described in Section 2.3.1, which are:

- Acquisition
- Activation
- Retention
- Revenue

Table 4-4 depicts these metrics.

After that point, the final performance metrics were established, according to step two of the *goals waterfall* method and are presented in Table 4-5. The criterion used to filter the metrics this time was whether they are real or vanity metrics. As a reminder, vanity metrics

are metrics that don't inform, guide, or trigger people performing an action. These kinds of metrics present seemingly significant data that make managers think they are making progress, but they are actually of trivial significance. This kind of filtering eliminated a lot of metrics that were included so far.

Table 4-6 presents the most important metrics or KPIs that came out after the implementation of step four of the *goals waterfall* method. As mentioned earlier in Section 3.3.4, doing that required the understanding of which metrics are the most important for the company at this moment. That is, realizing which metrics are critical to the performance and growth of the company at this time. Furthermore, another criterion used to determine which metrics are the most important at that moment was the company's ability to keep track of something. What that means is that if the company does not have the data, the time, or the resources to keep track of a specific metric, then there is no point in trying to measure it, even if it is critical.

It should be mentioned here that from the final KPIs, emphasis was given to Customer Acquisition Cost (CAC). That decision was made after discussions with the managers of the company, from which it was decided that attempting to track all metrics represented a scope too extensive for this thesis.

### 4.2.2 Business processes

According to the *goals waterfall* method, the next step after establishing performance metrics is to define critical business processes of the company. This section presents these processes, but emphasizes on the processes that were mostly related to CAC.

In the course of defining business processes of the company, the question of "how to achieve the purpose of each department?", was attempted to be answered, as mentioned in Section 3.3.3. Thus, a list of processes sorted by departments was created. Table 4-7 presents the processes that came out, while realizing how to achieve the purpose of every department.

*Table 4-7: Business process of Soley (how to achieve the purpose)*

| Department | Division | Purpose | How to achieve the purpose |
|---|---|---|---|
| Administration | HR | Recruiting, hiring, training (non technical), developing, compensating, dismissing or laying off personnel | Scouting for job seekers.<br>Writing job applications. |
| | LG | Contracts<br>Legal templates | Cooperate with Sales department to learn details and terms of agreement.<br>Check whether vision is in line with legal setup. |
| | FI | Provide all departments with financial support<br>Measure growth-critical KPIs | Understand the financial needs of each department and distribute the money based on those needs.<br>Support funding activities. |
| | IN | Provide/acquire necessary equipment/facilities | Understand infrastructure needs.<br>Buy equipment. |
| Customer Acquisition | MA | Create leads for SL<br>Lead nurturing | Online: SEM, SEO, SMM, Content marketing, Email marketing, Retargeting & Remarketing, Paid Social Advertising, Writing a blog article<br>Offline: Visitor at fair-trade, Personal network, customers |
| | SL | Turn leads into customers<br>Collect market feedback | Actively engage with customers as often as possible.<br>Understand the problem of the customer.<br>Communicate what Soley does in the best way possible.<br>Clearly show how Soley software can help the customer solve his problem.<br>Make good offer.<br>Sales funnel process. |
| | PA | Create and activate partners | Networking with potential partners.<br>Project support.<br>Supporting partner-sales activities. |
| | AA | Long term user generation<br>Acquire customers through student projects | Train students on Soley software.<br>Students work with Soley software inside companies/university.<br>Students show the results to managers and suggest it to them. |
| Research & Development | PM | Manage and coordinate product development team | Organize sprints.<br>BML meetings.<br>Check commits.<br>Prioritize features based on customer needs.<br>Relate operational planning to product vision. |
| | SD | Develop, improve, deliver the software. | Write source code.<br>Be in track with sprints.<br>Fix bugs.<br>Implement new features.<br>Release new versions.<br>Quality assurance. |
| | UI | Gather and learn from user feedback<br>Optimize user experience | Keep track of "qualitative & quantitative" usage data. |
| Services | CS | Supporting customers-users in doing beneficial analysis quickly | Be in touch with customers.<br>Answer questions. |
| | PS | Customer projects (Demos, get-to-know projects, real projects)<br>Training<br>Providing content for MA & CS | Perform customer & sales projects.<br>Train new employees, and customers that buy the on Soley Studio.<br>Inform MA department about new features and write articles about Soley Studio usage. |
| Strategy | FD | Acquire public and private funding | Networking and approaching new investors.<br>Writing proposals for funding. |
| | MR | Market & Competition analysis | SWOT Analysis.<br>5 Forces Analysis.<br>Specify target groups. |
| | VI | Define an overall vision-goal-scope of the company | Communicate the vision-goal-scope of the company to all employees. |

The next step of defining critical business processes is to see which of the aforementioned processes affect the metrics that were established. As mentioned earlier, one of the most important metrics was considered to be CAC, so two processes related to that were determined and analyzed into their activities. These are:

- Writing a blog article process
- Sales funnel process

The first is executed by the Marketing division, while the second is executed by the Sales division. The relation between those processes and CAC will be discussed in the next section.

The “writing a blog article process” consists of five activities, which are:

- Trigger
- Write
- Translate
- Publish
- Tracking

Figure 4-2 depicts this process broken down to its activities.

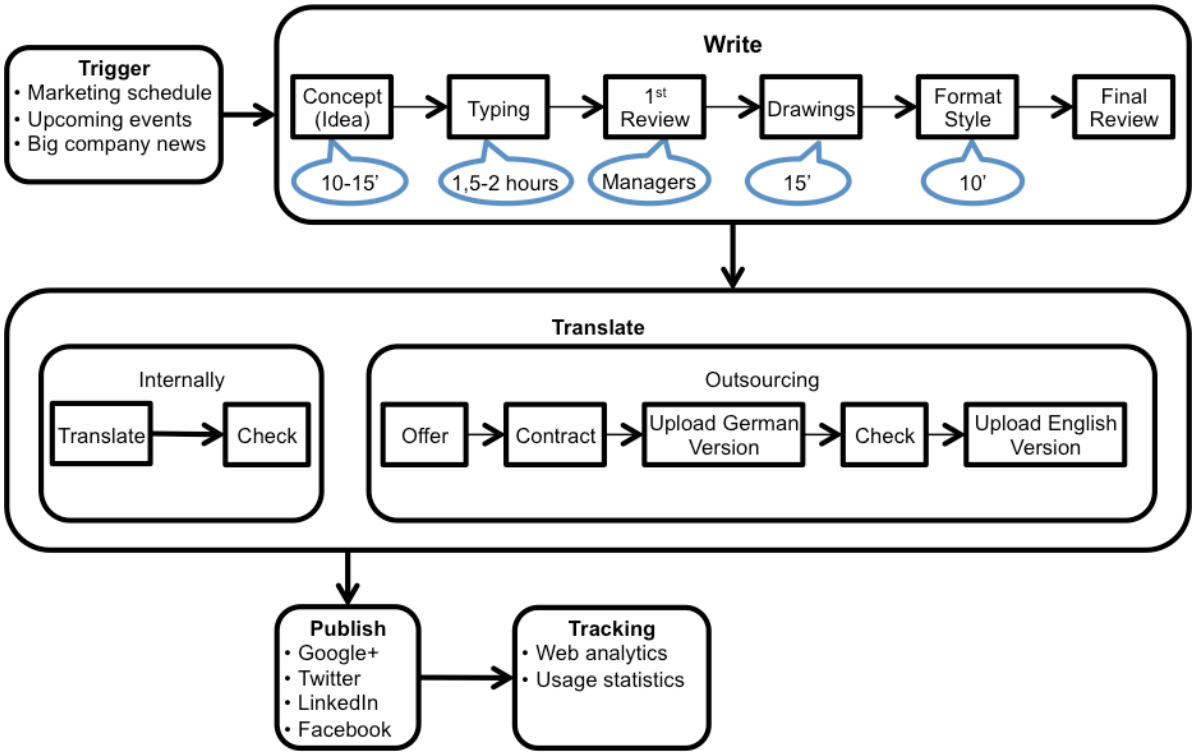



*Figure 4-2: Graphic representation of the "writing a blog article process"*

Elaborating on the above figure, each of the five activities of this process are broken down to one level deeper, showing the steps of each activity. In addition, it can be seen that for the activity of writing, for example, the data acquired from the interviews are noted down. The translating activity can be done either internally, meaning that an employee of the company will translate the blog article, or through outsourcing. That is, hiring a translating company to do it. Analyzing each activity facilitates the development of the quantitative models.

As far as the “sales funnel process” is concerned, it consists of five phases. These are:

- Idea
- Qualified
- Opportunity
- Proposal
- Contracting

These phases refer to phases that leads must go through in the sales funnel in order to become customers.

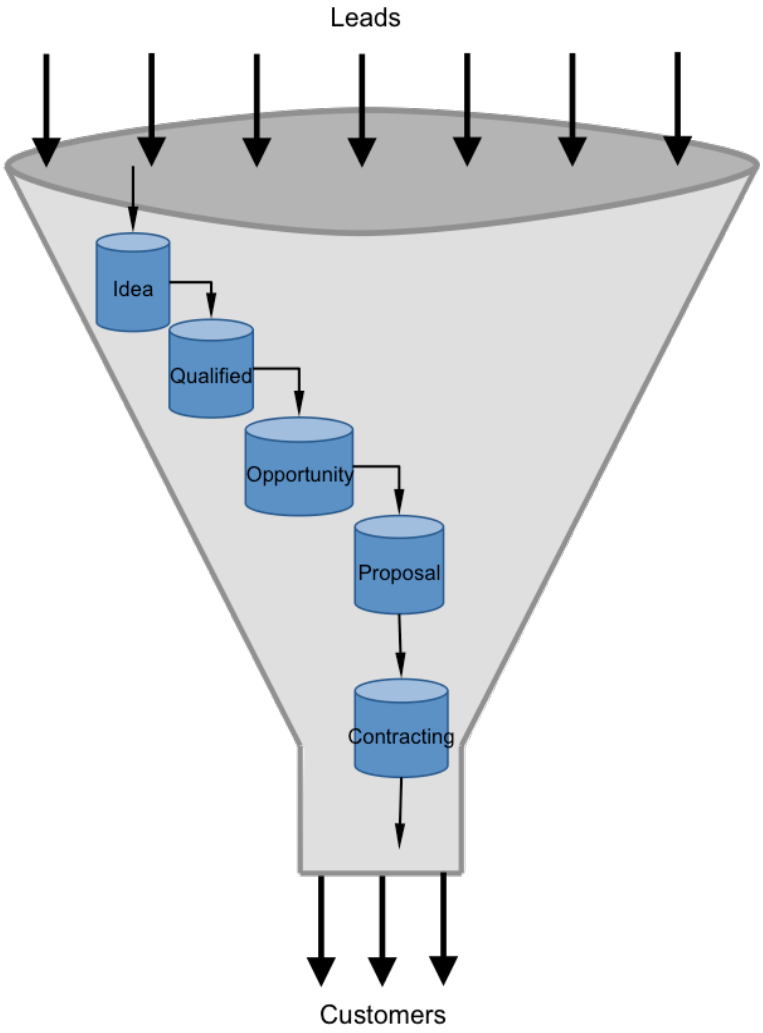



*Figure 4-3: Graphic representation of the "sales funnel process"*

The modeling of the “sales funnel process” is a result of the implementation of the *reservoir system* method, according to which phases are considered to be reservoirs. Each phase has some attributes. Here the most important one is the probability of a lead becoming a customer. As one may understand, that number increases as the funnel gets narrower. In addition, each phase has a different amount of time needed to be dedicated by the sales person. That is because leads that are in the contracting phase are much more important than those that are in the idea phase, because they have higher chances of becoming customers. These attributes come in handy when developing the quantitative models that will be described later on.

## 4.3 Process-KPI models

The third and last goal of this project is that Soley achieves accountability towards its investors, but also towards its employees. That means being able to quantitatively prove progress and growth. In the course of achieving that goal, quantitative models connecting the two aforementioned processes with CAC were developed.

This section presents the two quantitative models developed and discusses what information can be extracted by them. In addition, it discusses in what way can these models help Soley do in the future.

### 4.3.1 Writing a blog article process – CAC

The first model created was that of connecting the "writing a blog article process" to CAC. That model aims at showing how different modifications, in the time and cost required to execute that process, affect the cost to acquire a customer. The reason for that is the fact that money spent on the execution of that process, no matter where they come from or what they are for, add up to the total CAC. These kinds of expenses mostly include salaries, but sometimes other expenses like the translation of the blog article externally might also go into these costs.

Having already clarified and modeled the activities of the process, the first thing to do in the course of developing this model is to calculate the cost per minute of the person working on that. This can be also be cost per hour, per day, per week or per month, depending on the unit size of the time needed for the process to be executed. That is being done by dividing the monthly cost of the person by four, which is the number of weeks that a month has, and then by dividing the cost per week by five, which is number of working days per week. So far, we have the daily cost of an employee, so once again we divide that number by the number of working hours per day, and then we divide that number by 60, which is the number of minutes that an hour has. Table 4-8 presents an example of a monthly cost being converted to cost per minute.

*Table 4-8: Converting cost per month to cost per minute*

| Person | Cost per Month | Cost per Week | Cost per Day | Cost per Hour | Cost per Minute |
|---|---|---|---|---|---|
| Manager | € 5,000.00 | € 1,250.00 | € 250.00 | € 31.25 | € 0.52 |
| Working Student | | | | € 10.00 | € 0.17 |

The numbers are sample and do not represent real data of the company. That said, one can easily observe that the cost of a working student, for example, is much less than the cost of a manager or any other full-time employee.

The next step is to document the already clarified times per phase in the excel model. That is, writing for every activity of the process, how much time it needs to be executed. Table 4-9 presents an example of that.

*Table 4-9: Assigning times to each activity of the process*

| | Time of each phase depending on person executing it (minutes) | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Trigger** | **Write** | | | | | | **Translate** | | | | | | | **Publish** | **Tracking** |
| | | | | | | | | **Externally** | | | | | **Internally** | | | |
| **Person** | -Marketing schedule -Upcoming events -Big company news | Concept (Idea) | Typing | 1st Review | Drawings | Format Style | Final Review | Offer | Contract | Upload german version | Check | Upload english version | Translate | Check | -Google + -Twitter -LinkedIn -Facebook | -Web analytics -Usage statistics |
| Manager | - | 10 | 120 | 5 | 30 | 15 | 10 | - | - | - | - | - | 180 | 30 | 10 | 1 |
| Working student | - | 45 | 210 | 8 | 40 | 20 | 20 | - | - | - | - | - | 300 | 90 | 30 | 0 |

Knowing both the time and the cost per time enables to calculate the cost per activity of the process, and thus the overall cost. That is done by multiplying the cost per minute with the minutes required for each activity. Table 4-10 depicts how the previous example evolves.

*Table 4-10: Cost per phase and total cost of process*

| | **Trigger** | **Write** | | | | | | **Translate** | | | | | | | **Publish** | **Tracking** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | **Externally** | | | | | **Internally** | | | | |
| Phase | -Marketing schedule -Upcoming events -Big company news | Concept (Idea) | Typing | 1st Review | Drawings | Format Style | Final Review | Offer | Contract | Upload german version | Check | Upload english version | Translate | Check | -Google + -Twitter -LinkedIn -Facebook | -Web analytics -Usage statistics | |
| Person | | Manager | Manager | Manager | Manager | Manager | Manager | EXTERNALLY | | | | | Manager | Manager | Manager | Manager | TOTAL |
| Time (minutes) | | 10 | 120 | 5 | 30 | 15 | 10 | 0 | 0 | 0 | 0 | 0 | 180 | 30 | 10 | 1 | 411 |
| Cost (€) | | € 5.21 | € 62.50 | € 2.60 | € 15.63 | € 7.81 | € 5.21 | € - | € - | € - | € - | € - | € 93.75 | € 15.63 | € 5.21 | € 0.52 | € 214.06 |

After calculating these data, the next step is to create a table with the accumulative costs, showing the relation between time and cost. So, Table 4-11 and Figure 4-4 present this result.

*Table 4-11: Accumulative cost of the process*

| **Accumulative cost** | |
|---|---|
| Time (minutes) | Cost (€) |
| 0 | 0 |
| 10 | € 5.21 |
| 130 | € 67.71 |
| 135 | € 70.31 |
| 165 | € 85.94 |
| 180 | € 93.75 |
| 190 | € 98.96 |
| 190 | € 98.96 |
| 190 | € 98.96 |
| 190 | € 98.96 |
| 190 | € 98.96 |
| 190 | € 98.96 |
| 370 | € 192.71 |
| 400 | € 208.33 |
| 410 | € 213.54 |
| 411 | € 214.06 |

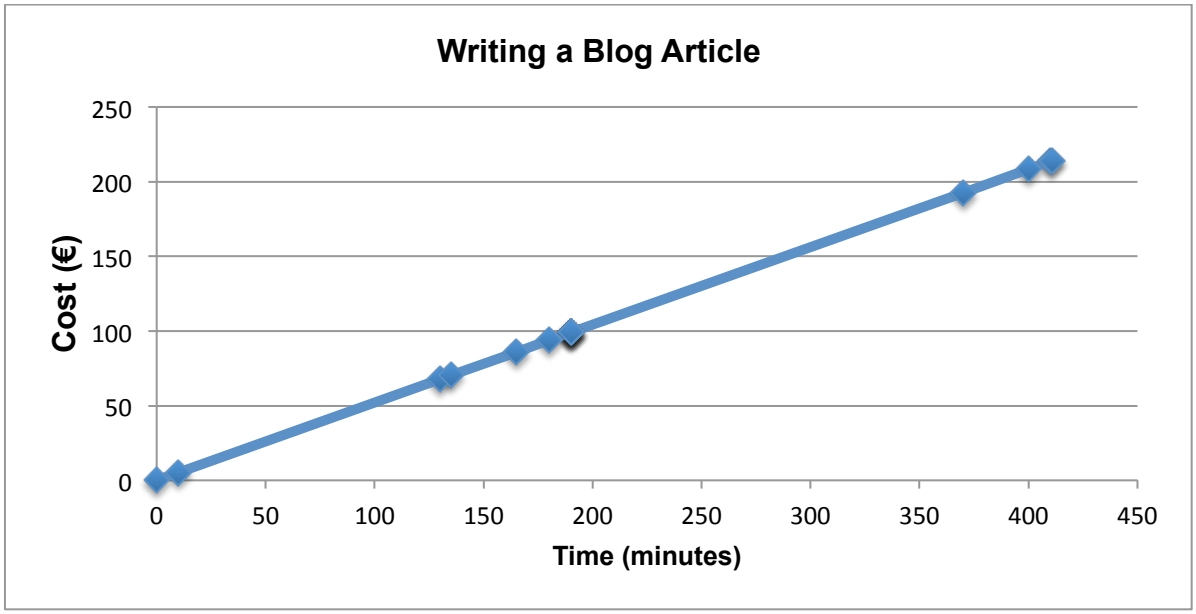



*Figure 4-4: Accumulative cost of the process*

It is easy to observe that time and cost have a proportional relation and that as time increases, so does cost. So, after having calculated the total cost of the process of writing a blog article, what is really interesting to see is how CAC changes with the increase of acquired customers. Table 4-12 and Figure 4-5 show the relationship between CAC and the efficiency of the process, which is the number of customer acquired.

*Table 4-12: Parameters to show relationship between CAC and customers*

| Phase | Week | Parameter | Visits | Total visits | Conversion Rate | Sign-ups | Conversion Rate | Customers | Cost of Blog Article | CAC | CLV | Break-even point (CLV/3) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Introduction | 1 | | 1100 | 1100 | 5% | 55 | 2% | 1 | € 214.06 | € 214.06 | € 50.00 | € 16.67 |
| | 2 | 5% | 1155 | 2255 | 5% | 112 | 2% | 2 | € 214.06 | € 107.03 | € 50.00 | € 16.67 |
| | 3 | 5% | 1212 | 3467 | 5% | 173 | 2% | 3 | € 214.06 | € 71.35 | € 50.00 | € 16.67 |
| Growth | 4 | 15% | 1393 | 4860 | 5% | 243 | 2% | 4 | € 214.06 | € 53.52 | € 50.00 | € 16.67 |
| | 5 | 15% | 1601 | 6461 | 5% | 323 | 2% | 6 | € 214.06 | € 35.68 | € 50.00 | € 16.67 |
| | 6 | 15% | 1841 | 8302 | 5% | 415 | 2% | 8 | € 214.06 | € 26.76 | € 50.00 | € 16.67 |
| | 7 | 15% | 2117 | 10419 | 5% | 520 | 2% | 10 | € 214.06 | € 21.41 | € 50.00 | € 16.67 |
| Maturity | 8 | 5% | 2222 | 12641 | 5% | 632 | 2% | 12 | € 214.06 | € 17.84 | € 50.00 | € 16.67 |
| | 9 | 4% | 2310 | 14951 | 5% | 747 | 2% | 14 | € 214.06 | € 15.29 | € 50.00 | € 16.67 |
| | 10 | 3% | 2379 | 17330 | 5% | 866 | 2% | 17 | € 214.06 | € 12.59 | € 50.00 | € 16.67 |
| | 11 | 0% | 2379 | 19709 | 5% | 985 | 2% | 19 | € 214.06 | € 11.27 | € 50.00 | € 16.67 |
| | 12 | -1% | 2355 | 22064 | 5% | 1103 | 2% | 22 | € 214.06 | € 9.73 | € 50.00 | € 16.67 |
| Decline | 13 | -7% | 2190 | 24254 | 5% | 1212 | 2% | 24 | € 214.06 | € 8.92 | € 50.00 | € 16.67 |
| | 14 | -7% | 2036 | 26290 | 5% | 1314 | 2% | 26 | € 214.06 | € 8.23 | € 50.00 | € 16.67 |
| | 15 | -7% | 1893 | 28183 | 5% | 1409 | 2% | 28 | € 214.06 | € 7.65 | € 50.00 | € 16.67 |
| | 16 | -7% | 1760 | 29943 | 5% | 1497 | 2% | 29 | € 214.06 | € 7.38 | € 50.00 | € 16.67 |
| | 17 | -7% | 1636 | 31579 | 5% | 1578 | 2% | 31 | € 214.06 | € 6.91 | € 50.00 | € 16.67 |
| | 18 | -7% | 1521 | 33100 | 5% | 1655 | 2% | 33 | € 214.06 | € 6.49 | € 50.00 | € 16.67 |
| | 19 | -7% | 1414 | 34514 | 5% | 1725 | 2% | 34 | € 214.06 | € 6.30 | € 50.00 | € 16.67 |
| | 20 | -7% | 1315 | 35829 | 5% | 1791 | 2% | 35 | € 214.06 | € 6.12 | € 50.00 | € 16.67 |
| | 21 | -7% | 1222 | 37051 | 5% | 1852 | 2% | 37 | € 214.06 | € 5.79 | € 50.00 | € 16.67 |
| | 22 | -7% | 1136 | 38187 | 5% | 1909 | 2% | 38 | € 214.06 | € 5.63 | € 50.00 | € 16.67 |
| | 23 | -7% | 1056 | 39243 | 5% | 1962 | 2% | 39 | € 214.06 | € 5.49 | € 50.00 | € 16.67 |
| | 24 | -7% | 982 | 40225 | 5% | 2011 | 2% | 40 | € 214.06 | € 5.35 | € 50.00 | € 16.67 |

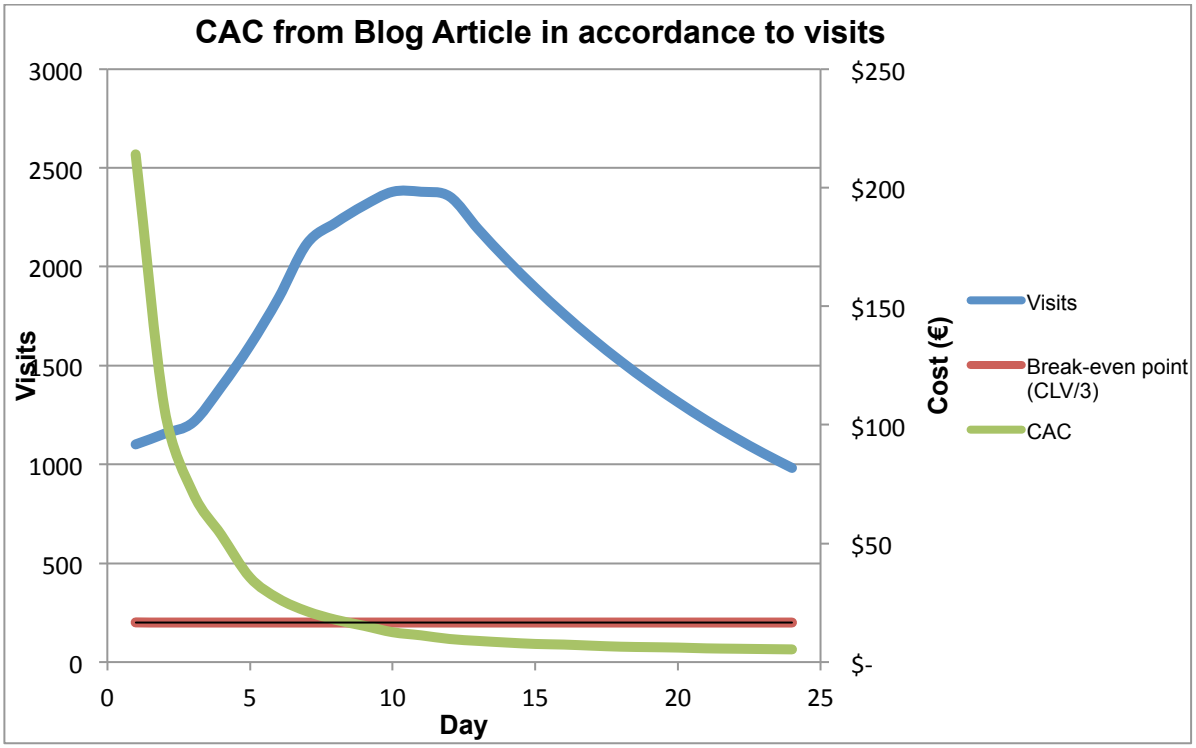



*Figure 4-5: Relation between CAC and visits*

Elaborating on Table 4-12, the lifecycle of the blog article was divided in four phases, according to the product lifecycle. These are:

- Introduction
- Growth
- Maturity
- Decline

Moreover, the *reservoir system* method was implemented once again. According to that, the three reservoirs are total visits, sign-ups, and customers. Each of these three has a conversion rate that clarifies what amount of the previous reservoir moves forward to the next one. In addition, a certain amount of time that a phase takes was set, but out of empirical data so that the model could function. Apart from that, a parameter was also defined, according to which the incline of the curve changes. On the right side of the table, the fixed total cost of writing a blog article is presented, then the CAC is calculated by diving this number by the number of customers acquired, a random CLV value was set and lastly, a break-even point was set. That was using the literature review presented by **SKOK (2013c)**, according to which a healthy SaaS business model must have a CLV to CAC ratio equal or greater than three.

Elaborating on Figure 4-5, as it is normal, at the beginning the CAC is relatively high since all the cost of the process is used to acquire one single customer. But, one can observe that as customers increase, the CAC drops significantly, while the break-even point is reached in only 9 days. Also, the correlation of CAC and the number of visits can be observed,

although not much can be concluded from this figure because the number of visits is not cumulative. One thing that we can conclude is that the break-even point appears when the blog article is at its highest, going through the maturity phase of its lifecycle.

So, the conclusions that can be drawn on how this model can be used and help Soley are the following. First, the managers can see which activity of the process is more time-consuming, thus generating higher cost and where optimizations could be attempted. Also, alternations between managers and working students executing the process can change the cost of the process a lot and one can easily observe that by changing the data. In addition, managers can decide whether or not it is more costly to translate the articles internally or externally. Furthermore, moving backwards, one thing that managers might be interested in is knowing how many customers or how much should the cost of the blog article be, in order to break-even in less time. That is, of course, with a fixed value of the CLV. Lastly, another interesting thing would be realizing the effectiveness of a blog article by seeing the change in the conversion rate from visits to sign-ups and sign-ups to customers.

### 4.3.2 Sales funnel process – CAC

The second quantitative model created was that of quantifying and presenting the relation between the sales funnel process and CAC. The objective of the development of that model is to analyze in detail and quantify the sales funnel process. That would enable the managers of the company to understand where optimizations can be implemented in order for more leads to becoming customers faster. In addition, that model shows the costs involved in the whole process until and after a lead becomes a customer. Using that model would enable the managers to see:

- The phase of the sales funnel process that is the most costly
- The change in costs depending on the time that each phase takes
- The total sales cost in a certain amount of time
- The CAC
- The revenue made (taking into account a value of the CLV)
- The profit
- The time required for the company to break-even or start making profit

Similarly to the previous model, the first things that were done in the course of developing this model was to note down the data required for the calculations. These data include:

- The cost per hour of a sales man
- The time spent by a sales man per lead and per week
- The time, in weeks, that each phase of the sales funnel process takes and the conversion rate of each phase
- The CLV

Tables 4-13 to 4-16 present these data as used in the excel model. That said, these data are, again, randomly selected and do not represent real data of the company.

*Table 4-13: Hourly cost of salesman*

| Person | Cost/Month | Cost/Week | Working hours/week | Cost/Hour |
|---|---|---|---|---|
| Salesman | € 5,000 | € 1,250 | 40 | € 31.25 |

*Table 4-14: Effort per lead per week by a salesman*

| Effort per Lead/week | | |
|---|---|---|
| Idea | 0.125 | hours |
| Qualified | 0.5 | hours |
| Opportunity | 0.75 | hours |
| Proposal | 1.5 | hours |
| Contracting | 0.5 | hours |

*Table 4-15: Time of each phase and conversion rate*

| **Sales Funnel** | | | | | | |
|---|---|---|---|---|---|---|
| | IDEA | QUALIFIED | OPPORTUNITY | PROPOSAL | CONTRACTING | **Total** |
| Time (weeks) | 4 | 6 | 9 | 11 | 2 | 32 |
| Probability of winning | 1% | 4% | 14% | 90% | 100% | |
| Conversion Rate | 25% | 29% | 16% | 90% | 100% | |
| Churn Rate | 75% | 71% | 84% | 10% | 0% | |

*Table 4-16: Customer Lifetime Value (CLV)*

| Revenue per customer (CLV) | € 20,000 |
|---|---|

The next step was to integrate the sales funnel process into the excel model. That was done by using the *reservoir system* method, once again, and dividing the incoming leads in weekly cohorts. The model expands for a period of 96 weeks, which is exactly two years. The reason for that was to be able to see the situation when the company is at scale.

Table 4-17 depicts a part of the whole table. In this table leads were separated into new and old in every phase, so that there is a clear distribution in those that have stayed enough in one phase and are ready to move to the next, and those that still remain in the same phase. Zeros have been marked with red for comprehensibility reasons. In addition, a cell with a green fill indicates that a new customer got acquired. During the development of this model most of the above data were used so as to make it interactive. What that means is that if, for example, a value in the duration of each phase changes, then the numbers in the funnel change too.

*Table 4-17: Sales funnel process modeled in Excel with leads divided in weekly cohorts*

| Time period | | IDEA | | | QUALIFIED | | | OPPORTUNITY | | | PROPOSAL | | | CONTRACTING | | | WON |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | New | Old | Total | New | Old | Total | New | Old | Total | New | Old | Total | New | Old | Total | |
| Month 1 | Week 1 | 70.00 | 0.00 | **70.00** | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | **0.00** | 0.00 |
| | Week 2 | 50.00 | 70.00 | **120.00** | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | **0.00** | 0.00 |
| | Week 3 | 40.00 | 120.00 | **160.00** | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | **0.00** | 0.00 |
| | Week 4 | 60.00 | 160.00 | **220.00** | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | **0.00** | 0.00 |
| Month 2 | Week 5 | 50.00 | 150.00 | **200.00** | 17.50 | 0.00 | **17.50** | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | **0.00** | 0.00 |
| | Week 6 | 70.00 | 150.00 | **220.00** | 12.50 | 17.50 | **30.00** | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | **0.00** | 0.00 |
| | Week 7 | 30.00 | 180.00 | **210.00** | 10.00 | 30.00 | **40.00** | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | **0.00** | 0.00 |
| | Week 8 | 20.00 | 150.00 | **170.00** | 15.00 | 40.00 | **55.00** | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | **0.00** | 0.00 |
| Month 3 | Week 9 | 30.00 | 120.00 | **150.00** | 12.50 | 55.00 | **67.50** | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | **0.00** | 0.00 |
| | Week 10 | 10.00 | 80.00 | **90.00** | 17.50 | 67.50 | **85.00** | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | **0.00** | 0.00 |
| | Week 11 | 40.00 | 60.00 | **100.00** | 7.50 | 67.50 | **75.00** | 5.00 | 0.00 | **5.00** | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | **0.00** | 0.00 |
| | Week 12 | 20.00 | 80.00 | **100.00** | 5.00 | 62.50 | **67.50** | 3.57 | 5.00 | **8.57** | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | **0.00** | 0.00 |
| Month 4 | Week 13 | 40.00 | 70.00 | **110.00** | 7.50 | 57.50 | **65.00** | 2.86 | 8.57 | **11.43** | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | **0.00** | 0.00 |
| | Week 14 | 50.00 | 100.00 | **150.00** | 2.50 | 50.00 | **52.50** | 4.29 | 11.43 | **15.71** | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | **0.00** | 0.00 |
| | Week 15 | 0.00 | 110.00 | **110.00** | 10.00 | 40.00 | **50.00** | 3.57 | 15.71 | **19.29** | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | **0.00** | 0.00 |
| | Week 16 | 30.00 | 90.00 | **120.00** | 5.00 | 32.50 | **37.50** | 5.00 | 19.29 | **24.29** | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | **0.00** | 0.00 |
| Month 5 | Week 17 | 10.00 | 80.00 | **90.00** | 10.00 | 30.00 | **40.00** | 2.14 | 19.29 | **21.43** | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | **0.00** | 0.00 |
| | Week 18 | 80.00 | 40.00 | **120.00** | 12.50 | 35.00 | **47.50** | 1.43 | 17.86 | **19.29** | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | **0.00** | 0.00 |
| | Week 19 | 90.00 | 120.00 | **210.00** | 0.00 | 40.00 | **40.00** | 2.14 | 16.43 | **18.57** | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | **0.00** | 0.00 |
| | Week 20 | 5.00 | 180.00 | **185.00** | 7.50 | 37.50 | **45.00** | 0.71 | 14.29 | **15.00** | 0.78 | 0.00 | **0.78** | 0.00 | 0.00 | **0.00** | 0.00 |
| Month 6 | Week 21 | 40.00 | 175.00 | **215.00** | 2.50 | 35.00 | **37.50** | 2.86 | 11.43 | **14.29** | 0.56 | 0.78 | **1.33** | 0.00 | 0.00 | **0.00** | 0.00 |
| | Week 22 | 10.00 | 135.00 | **145.00** | 20.00 | 32.50 | **52.50** | 1.43 | 9.29 | **10.71** | 0.44 | 1.33 | **1.78** | 0.00 | 0.00 | **0.00** | 0.00 |
| | Week 23 | 30.00 | 55.00 | **85.00** | 22.50 | 42.50 | **65.00** | 2.86 | 8.57 | **11.43** | 0.67 | 1.78 | **2.44** | 0.00 | 0.00 | **0.00** | 0.00 |
| | Week 24 | 20.00 | 80.00 | **100.00** | 1.25 | 52.50 | **53.75** | 3.57 | 10.00 | **13.57** | 0.56 | 2.44 | **3.00** | 0.00 | 0.00 | **0.00** | 0.00 |
| Month 7 | Week 25 | 15.00 | 60.00 | **75.00** | 10.00 | 53.75 | **63.75** | 0.00 | 11.43 | **11.43** | 0.78 | 3.00 | **3.78** | 0.00 | 0.00 | **0.00** | 0.00 |
| | Week 26 | 20.00 | 65.00 | **85.00** | 2.50 | 56.25 | **58.75** | 2.14 | 10.71 | **12.86** | 0.33 | 3.78 | **4.11** | 0.00 | 0.00 | **0.00** | 0.00 |
| | Week 27 | 20.00 | 55.00 | **75.00** | 7.50 | 56.25 | **63.75** | 0.71 | 10.00 | **10.71** | 0.22 | 4.11 | **4.33** | 0.00 | 0.00 | **0.00** | 0.00 |
| | Week 28 | 30.00 | 55.00 | **85.00** | 5.00 | 43.75 | **48.75** | 5.71 | 9.29 | **15.00** | 0.33 | 4.33 | **4.67** | 0.00 | 0.00 | **0.00** | 0.00 |
| Month 8 | Week 29 | 90.00 | 70.00 | **160.00** | 3.75 | 26.25 | **30.00** | 6.43 | 12.14 | **18.57** | 0.11 | 3.89 | **4.00** | 0.00 | 0.00 | **0.00** | 0.00 |
| | Week 30 | 5.00 | 140.00 | **145.00** | 5.00 | 28.75 | **33.75** | 0.36 | 15.00 | **15.36** | 0.44 | 3.44 | **3.89** | 0.00 | 0.00 | **0.00** | 0.00 |
| | Week 31 | 20.00 | 125.00 | **145.00** | 5.00 | 23.75 | **28.75** | 2.86 | 15.36 | **18.21** | 0.22 | 3.44 | **3.67** | 0.70 | 0.00 | **0.70** | 0.00 |
| | Week 32 | 10.00 | 115.00 | **125.00** | 7.50 | 26.25 | **33.75** | 0.71 | 16.07 | **16.79** | 0.44 | 3.00 | **3.44** | 0.50 | 0.70 | **1.20** | 0.00 |
| Month 9 | Week 33 | 50.00 | 35.00 | **85.00** | 22.50 | 26.25 | **48.75** | 2.14 | 16.07 | **18.21** | 0.56 | 2.89 | **3.44** | 0.40 | 1.20 | **1.60** | **0.70** |
| | Week 34 | 10.00 | 80.00 | **90.00** | 1.25 | 43.75 | **45.00** | 1.43 | 12.50 | **13.93** | 0.00 | 2.67 | **2.67** | 0.60 | 1.60 | **2.20** | **0.50** |
| | Week 35 | 20.00 | 70.00 | **90.00** | 5.00 | 41.25 | **46.25** | 1.07 | 7.50 | **8.57** | 0.33 | 2.33 | **2.67** | 0.50 | 2.20 | **2.70** | **0.40** |
| | Week 36 | 70.00 | 80.00 | **150.00** | 2.50 | 41.25 | **43.75** | 1.43 | 8.21 | **9.64** | 0.11 | 2.44 | **2.56** | 0.70 | 2.70 | **3.40** | **0.60** |
| Month 10 | Week 37 | 5.00 | 100.00 | **105.00** | 12.50 | 38.75 | **51.25** | 1.43 | 6.79 | **8.21** | 0.89 | 2.22 | **3.11** | 0.30 | 3.40 | **3.70** | **0.50** |
| | Week 38 | 15.00 | 95.00 | **110.00** | 2.50 | 43.75 | **46.25** | 2.14 | 7.50 | **9.64** | 1.00 | 3.00 | **4.00** | 0.20 | 3.70 | **3.90** | **0.70** |
| | Week 39 | 30.00 | 90.00 | **120.00** | 5.00 | 23.75 | **28.75** | 6.43 | 7.50 | **13.93** | 0.06 | 3.56 | **3.61** | 0.30 | 3.90 | **4.20** | **0.30** |
| | Week 40 | 5.00 | 50.00 | **55.00** | 17.50 | 27.50 | **45.00** | 0.36 | 12.50 | **12.86** | 0.44 | 3.39 | **3.83** | 0.10 | 4.20 | **4.30** | **0.20** |
| Month 11 | Week 41 | 50.00 | 50.00 | **100.00** | 1.25 | 40.00 | **41.25** | 1.43 | 11.79 | **13.21** | 0.11 | 3.39 | **3.50** | 0.40 | 4.30 | **4.70** | **0.30** |
| | Week 42 | 45.00 | 85.00 | **130.00** | 3.75 | 38.75 | **42.50** | 0.71 | 11.79 | **12.50** | 0.33 | 2.94 | **3.28** | 0.20 | 4.00 | **4.20** | **0.10** |
| | Week 43 | 90.00 | 100.00 | **190.00** | 7.50 | 30.00 | **37.50** | 3.57 | 11.07 | **14.64** | 0.22 | 3.28 | **3.50** | 0.40 | 3.70 | **4.10** | **0.40** |
| | Week 44 | 60.00 | 185.00 | **245.00** | 1.25 | 35.00 | **36.25** | 0.71 | 12.50 | **13.21** | 0.17 | 3.17 | **3.33** | 0.50 | 3.70 | **4.20** | **0.20** |
| Month 12 | Week 45 | 40.00 | 195.00 | **235.00** | 12.50 | 31.25 | **43.75** | 1.43 | 6.79 | **8.21** | 0.22 | 3.22 | **3.44** | 0.00 | 3.60 | **3.60** | **0.40** |
| | Week 46 | 80.00 | 190.00 | **270.00** | 11.25 | 26.25 | **37.50** | 5.00 | 7.86 | **12.86** | 0.22 | 2.56 | **2.78** | 0.30 | 3.10 | **3.40** | **0.50** |
| | Week 47 | 20.00 | 180.00 | **200.00** | 22.50 | 36.25 | **58.75** | 0.36 | 11.43 | **11.79** | 0.33 | 1.78 | **2.11** | 0.10 | 2.70 | **2.80** | 0.00 |
| | Week 48 | 50.00 | 140.00 | **190.00** | 15.00 | 55.00 | **70.00** | 1.07 | 11.07 | **12.14** | 1.00 | 2.06 | **3.06** | 0.80 | 2.50 | **3.30** | **0.30** |

Thus, with the use of this model Soley can calculate the required amount of leads at a certain time, so that it will have acquired a specific number of customers after some time. In addition, by changing numbers such as the time of phase and the conversion rate, the managers of Soley can simulate several scenarios, thus predicting future performance. Furthermore, a model like this would make Soley more accountable since it would be able to not only clearly show what happened in the past, but also predict what will happen in the future.

The next step of the development of this quantitative model was to calculate the working hours required to achieve the aforementioned results and the cost that is derived from this work. Calculating that is done by multiplying the hourly effort per lead per week of the salesman with the number of leads each week. Of course, calculating the cost is done by

multiplying the hours with the cost per hour of the salesman. Tables 4-18 and 4-19 present those results.

*Table 4-18: Working hours required to achieve the above results*

| Time (hours) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Time period | | IDEA | QUALIFIED | OPPORTUNITY | PROPOSAL | CONTRACTING | Total |
| Month 1 | Week 1 | 8.75 | 0.00 | **0.00** | 0.00 | 0.00 | **8.75** |
| | Week 2 | 15.00 | 0.00 | **0.00** | 0.00 | 0.00 | **15.00** |
| | Week 3 | 20.00 | 0.00 | **0.00** | 0.00 | 0.00 | **20.00** |
| | Week 4 | 27.50 | 0.00 | **0.00** | 0.00 | 0.00 | **27.50** |
| Month 2 | Week 5 | 25.00 | 8.75 | **0.00** | 0.00 | 0.00 | **33.75** |
| | Week 6 | 27.50 | 15.00 | **0.00** | 0.00 | 0.00 | **42.50** |
| | Week 7 | 26.25 | 20.00 | **0.00** | 0.00 | 0.00 | **46.25** |
| | Week 8 | 21.25 | 27.50 | **0.00** | 0.00 | 0.00 | **48.75** |
| Month 3 | Week 9 | 18.75 | 33.75 | **0.00** | 0.00 | 0.00 | **52.50** |
| | Week 10 | 11.25 | 42.50 | **0.00** | 0.00 | 0.00 | **53.75** |
| | Week 11 | 12.50 | 37.50 | **3.75** | 0.00 | 0.00 | **53.75** |
| | Week 12 | 12.50 | 33.75 | **6.43** | 0.00 | 0.00 | **52.68** |
| Month 4 | Week 13 | 13.75 | 32.50 | **8.57** | 0.00 | 0.00 | **54.82** |
| | Week 14 | 18.75 | 26.25 | **11.79** | 0.00 | 0.00 | **56.79** |
| | Week 15 | 13.75 | 25.00 | **14.46** | 0.00 | 0.00 | **53.21** |
| | Week 16 | 15.00 | 18.75 | **18.21** | 0.00 | 0.00 | **51.96** |
| Month 5 | Week 17 | 11.25 | 20.00 | **16.07** | 0.00 | 0.00 | **47.32** |
| | Week 18 | 15.00 | 23.75 | **14.46** | 0.00 | 0.00 | **53.21** |
| | Week 19 | 26.25 | 20.00 | **13.93** | 0.00 | 0.00 | **60.18** |
| | Week 20 | 23.13 | 22.50 | **11.25** | 1.17 | 0.00 | **58.04** |

*Table 4-19: Costs related to the above working hours*

| Cost (€) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Time period | | IDEA | QUALIFIED | OPPORTUNITY | PROPOSAL | CONTRACTING | Total |
| Month 1 | Week 1 | € 273 | € - | € - | € - | € - | **€ 273** |
| | Week 2 | € 469 | € - | € - | € - | € - | **€ 469** |
| | Week 3 | € 625 | € - | € - | € - | € - | **€ 625** |
| | Week 4 | € 859 | € - | € - | € - | € - | **€ 859** |
| Month 2 | Week 5 | € 781 | € 273 | € - | € - | € - | **€ 1,055** |
| | Week 6 | € 859 | € 469 | € - | € - | € - | **€ 1,328** |
| | Week 7 | € 820 | € 625 | € - | € - | € - | **€ 1,445** |
| | Week 8 | € 664 | € 859 | € - | € - | € - | **€ 1,523** |
| Month 3 | Week 9 | € 586 | € 1,055 | € - | € - | € - | **€ 1,641** |
| | Week 10 | € 352 | € 1,328 | € - | € - | € - | **€ 1,680** |
| | Week 11 | € 391 | € 1,172 | € 117 | € - | € - | **€ 1,680** |
| | Week 12 | € 391 | € 1,055 | € 201 | € - | € - | **€ 1,646** |
| Month 4 | Week 13 | € 430 | € 1,016 | € 268 | € - | € - | **€ 1,713** |
| | Week 14 | € 586 | € 820 | € 368 | € - | € - | **€ 1,775** |
| | Week 15 | € 430 | € 781 | € 452 | € - | € - | **€ 1,663** |
| | Week 16 | € 469 | € 586 | € 569 | € - | € - | **€ 1,624** |
| Month 5 | Week 17 | € 352 | € 625 | € 502 | € - | € - | **€ 1,479** |
| | Week 18 | € 469 | € 742 | € 452 | € - | € - | **€ 1,663** |
| | Week 19 | € 820 | € 625 | € 435 | € - | € - | **€ 1,881** |
| | Week 20 | € 723 | € 703 | € 352 | € 36 | € - | **€ 1,814** |

Two additional tables were made in order to provide more insight and analysis to whoever

uses this model. One table calculating the accumulated costs was made with the scope of providing insight on which phase of the sales funnels process is more costly. Then, a second table calculates the CAC by relating the total sales costs to the customers acquired. Tables 4-20 and 4-21 present those two tables, and Figures 4-6 and 4-7 present a graphic overview.

*Table 4-20: Accumulated costs by phase and total*

| Accumulated Costs (€) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Time period | | IDEA | QUALIFIED | OPPORTUNITY | PROPOSAL | CONTRACTING | Total |
| Month 1 | Week 1 | € 273 | € - | € - | € - | € - | € 273 |
| | Week 2 | € 742 | € - | € - | € - | € - | € 742 |
| | Week 3 | € 1,367 | € - | € - | € - | € - | € 1,367 |
| | Week 4 | € 2,227 | € - | € - | € - | € - | € 2,227 |
| Month 2 | Week 5 | € 3,008 | € 273 | € - | € - | € - | € 3,281 |
| | Week 6 | € 3,867 | € 742 | € - | € - | € - | € 4,609 |
| | Week 7 | € 4,688 | € 1,367 | € - | € - | € - | € 6,055 |
| | Week 8 | € 5,352 | € 2,227 | € - | € - | € - | € 7,578 |
| Month 3 | Week 9 | € 5,938 | € 3,281 | € - | € - | € - | € 9,219 |
| | Week 10 | € 6,289 | € 4,609 | € - | € - | € - | € 10,898 |
| | Week 11 | € 6,680 | € 5,781 | € 117 | € - | € - | € 12,578 |
| | Week 12 | € 7,070 | € 6,836 | € 318 | € - | € - | € 14,224 |
| Month 4 | Week 13 | € 7,500 | € 7,852 | € 586 | € - | € - | € 15,938 |
| | Week 14 | € 8,086 | € 8,672 | € 954 | € - | € - | € 17,712 |
| | Week 15 | € 8,516 | € 9,453 | € 1,406 | € - | € - | € 19,375 |
| | Week 16 | € 8,984 | € 10,039 | € 1,975 | € - | € - | € 20,999 |
| Month 5 | Week 17 | € 9,336 | € 10,664 | € 2,478 | € - | € - | € 22,478 |
| | Week 18 | € 9,805 | € 11,406 | € 2,930 | € - | € - | € 24,141 |
| | Week 19 | € 10,625 | € 12,031 | € 3,365 | € - | € - | € 26,021 |
| | Week 20 | € 11,348 | € 12,734 | € 3,717 | € 36 | € - | € 27,835 |

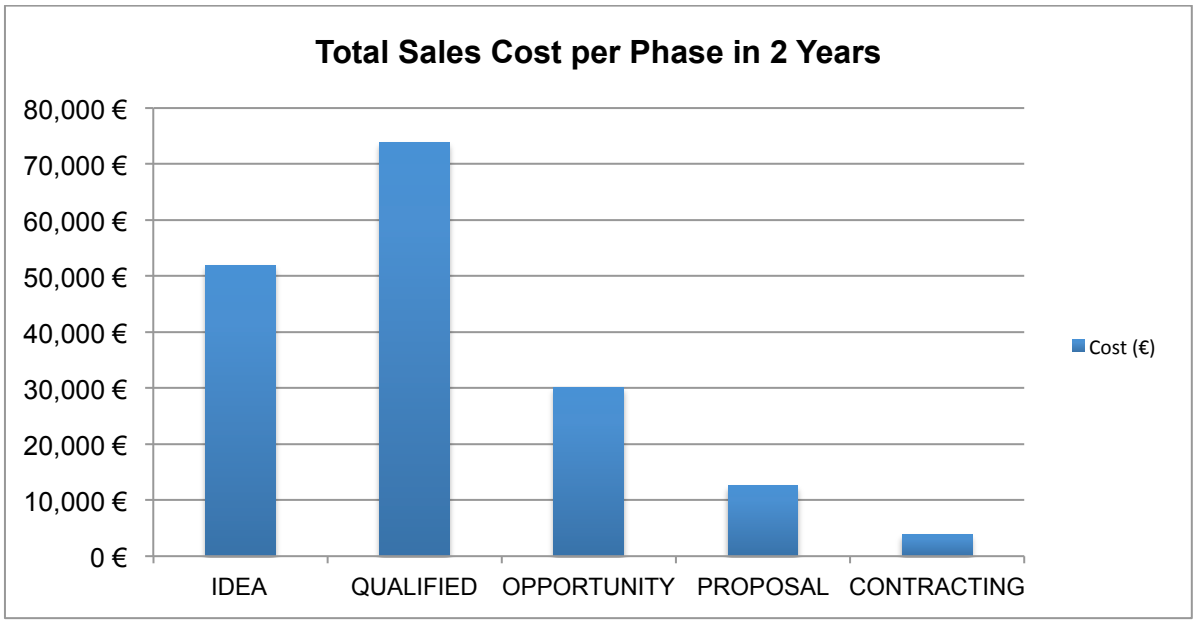



*Figure 4-6: Total sales cost per phase in a timespan of two years*

*Table 4-21: Customer Acquisition Cost (CAC)*

| Total Sales Cost/Customer | | | | |
|---|---|---|---|---|
| Time period | | Total Customers | Total Sales Cost | CAC |
| Month | Week | | | |
| Month 1 | 1 | 0.00 | € 273 | #N/A |
| | 2 | 0.00 | € 742 | #N/A |
| | 3 | 0.00 | € 1,367 | #N/A |
| | 4 | 0.00 | € 2,227 | #N/A |
| Month 2 | 5 | 0.00 | € 3,281 | #N/A |
| | 6 | 0.00 | € 4,609 | #N/A |
| | 7 | 0.00 | € 6,055 | #N/A |
| | 8 | 0.00 | € 7,578 | #N/A |
| Month 3 | 9 | 0.00 | € 9,219 | #N/A |
| | 10 | 0.00 | € 10,898 | #N/A |
| | 11 | 0.00 | € 12,578 | #N/A |
| | 12 | 0.00 | € 14,224 | #N/A |
| Month 4 | 13 | 0.00 | € 15,938 | #N/A |
| | 14 | 0.00 | € 17,712 | #N/A |
| | 15 | 0.00 | € 19,375 | #N/A |
| | 16 | 0.00 | € 20,999 | #N/A |
| Month 5 | 17 | 0.00 | € 22,478 | #N/A |
| | 18 | 0.00 | € 24,141 | #N/A |
| | 19 | 0.00 | € 26,021 | #N/A |
| | 20 | 0.00 | € 27,835 | #N/A |
| Month 6 | 21 | 0.00 | € 29,658 | #N/A |
| | 22 | 0.00 | € 31,379 | #N/A |
| | 23 | 0.00 | € 33,109 | #N/A |
| | 24 | 0.00 | € 34,799 | #N/A |
| Month 7 | 25 | 0.00 | € 36,533 | #N/A |
| | 26 | 0.00 | € 38,277 | #N/A |
| | 27 | 0.00 | € 40,020 | #N/A |
| | 28 | 0.00 | € 41,684 | #N/A |
| Month 8 | 29 | 0.00 | € 43,400 | #N/A |
| | 30 | 0.00 | € 45,036 | #N/A |
| | 31 | 0.00 | € 46,662 | #N/A |
| | 32 | 0.00 | € 48,251 | #N/A |
| Month 9 | 33 | 0.70 | € 49,958 | #N/A |
| | 34 | 1.20 | € 51,499 | **€ 42,916** |
| | 35 | 1.60 | € 52,941 | **€ 33,088** |
| | 36 | 2.20 | € 54,609 | **€ 24,822** |

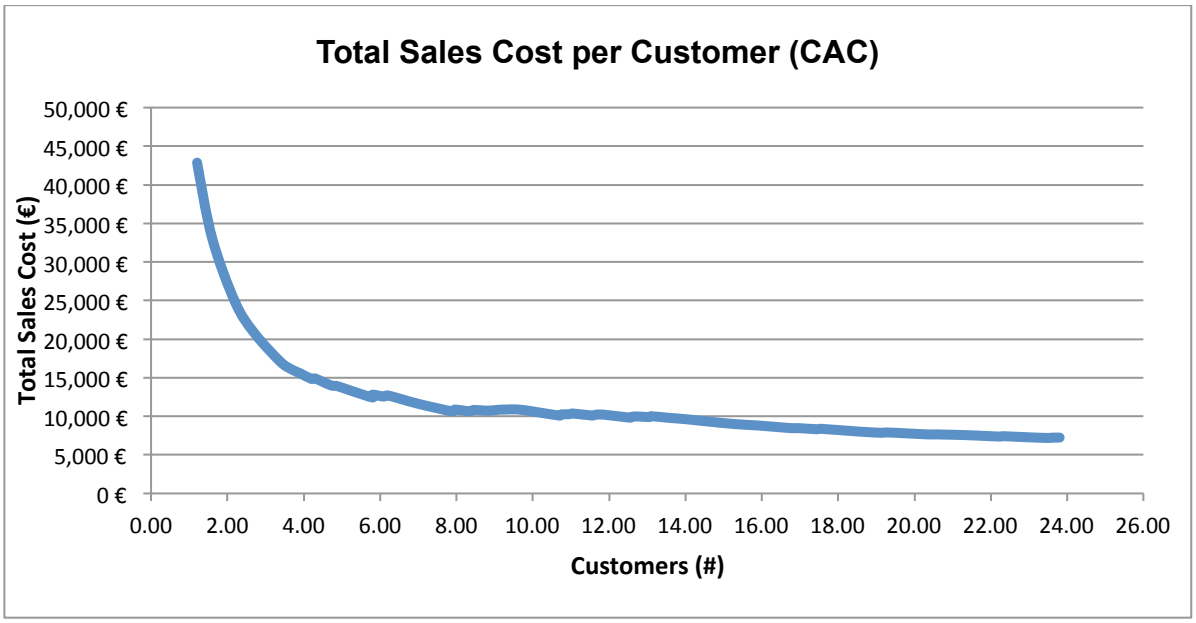



*Figure 4-7: Customer Acquisition Cost (CAC)*

Figure 4-6 enables the managers of the company to have a clear overview of the costs related to each phase of the sales funnel process, thus enabling them to take decisions on reducing the cost of the most costly one. In addition, Figure 4-7 provides a graphic overview of the scaling of CAC during a time of two years. That allows for future planning and a break-even analysis.

Finally, the last steps made to finish with the development of this extensive model were the following: First, the revenue made by the company was calculated, according to the value of CLV provided at the initial data. Second, the profit of the company was also calculated by simply subtracting the total cost from the total revenue. These last steps allow for a break-even analysis and a clear insight on the months needed in order for the company to make profit. Tables 4-22 and 4-23 present the results of these two steps.

*Table 4-22: Revenue made by the company the first five months*

| **Revenue (€)** | | | | |
|---|---|---|---|---|
| Time period | | Customers | Revenue | **Total Revenue** |
| Month 1 | Week 1 | 0.00 | € - | **#N/A** |
| | Week 2 | 0.00 | € - | **#N/A** |
| | Week 3 | 0.00 | € - | **#N/A** |
| | Week 4 | 0.00 | € - | **#N/A** |
| Month 2 | Week 5 | 0.00 | € - | **#N/A** |
| | Week 6 | 0.00 | € - | **#N/A** |
| | Week 7 | 0.00 | € - | **#N/A** |
| | Week 8 | 0.00 | € - | **#N/A** |
| Month 3 | Week 9 | 0.00 | € - | **#N/A** |
| | Week 10 | 0.00 | € - | **#N/A** |
| | Week 11 | 0.00 | € - | **#N/A** |
| | Week 12 | 0.00 | € - | **#N/A** |
| Month 4 | Week 13 | 0.00 | € - | **#N/A** |
| | Week 14 | 0.00 | € - | **#N/A** |
| | Week 15 | 0.00 | € - | **#N/A** |
| | Week 16 | 0.00 | € - | **#N/A** |
| Month 5 | Week 17 | 0.00 | € - | **#N/A** |
| | Week 18 | 0.00 | € - | **#N/A** |
| | Week 19 | 0.00 | € - | **#N/A** |
| | Week 20 | 0.00 | € - | **#N/A** |

*Table 4-23: Profit made by the company the first five months*

| Profit (€) | | | | |
|---|---|---|---|---|
| Time period | | Customers | Profit | **Total Profit** |
| Month 1 | Week 1 | 0.00 | -€ 273 | **-€ 273** |
| | Week 2 | 0.00 | -€ 469 | **-€ 742** |
| | Week 3 | 0.00 | -€ 625 | **-€ 1,367** |
| | Week 4 | 0.00 | -€ 859 | **-€ 2,227** |
| Month 2 | Week 5 | 0.00 | -€ 1,055 | **-€ 3,281** |
| | Week 6 | 0.00 | -€ 1,328 | **-€ 4,609** |
| | Week 7 | 0.00 | -€ 1,445 | **-€ 6,055** |
| | Week 8 | 0.00 | -€ 1,523 | **-€ 7,578** |
| Month 3 | Week 9 | 0.00 | -€ 1,641 | **-€ 9,219** |
| | Week 10 | 0.00 | -€ 1,680 | **-€ 10,898** |
| | Week 11 | 3.75 | -€ 1,680 | **-€ 12,578** |
| | Week 12 | 6.43 | -€ 1,646 | **-€ 14,224** |
| Month 4 | Week 13 | 8.57 | -€ 1,713 | **-€ 15,938** |
| | Week 14 | 11.79 | -€ 1,775 | **-€ 17,712** |
| | Week 15 | 14.46 | -€ 1,663 | **-€ 19,375** |
| | Week 16 | 18.21 | -€ 1,624 | **-€ 20,999** |
| Month 5 | Week 17 | 16.07 | -€ 1,479 | **-€ 22,478** |
| | Week 18 | 14.46 | -€ 1,663 | **-€ 24,141** |
| | Week 19 | 13.93 | -€ 1,881 | **-€ 26,021** |
| | Week 20 | 11.25 | -€ 1,814 | **-€ 27,835** |

From this table one cannot observe when exactly the company will make profit because the table is not complete due to restricted space. Nevertheless, Table 4-22 allows for the development of Figure 4-8 that shows how total revenue and total sales cost scale in a timespan of two years. In this graph, one can easily realize when the company will actually make revenue.

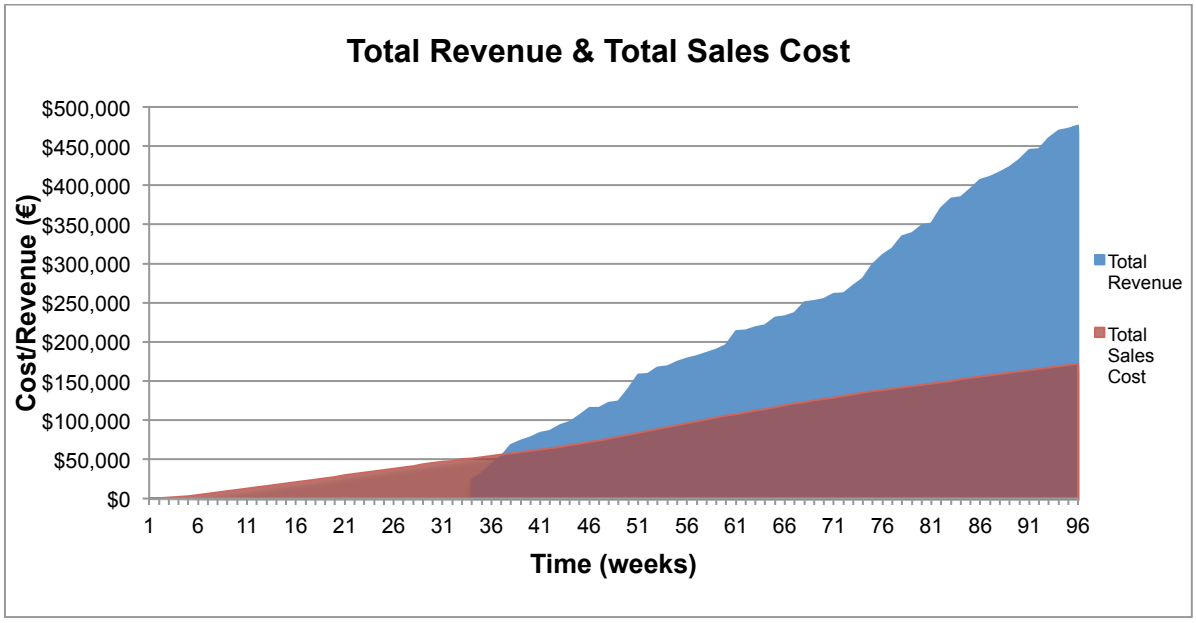



*Figure 4-8: Graph showing the total revenue and total sales cost in a timespan of two years*

Elaborating on Figure 4-8, it is clear that the company starts to make profit after the 37th week. It can also be observed that the company starts making revenue only after the 33rd week. This kind of information would allow the managers of the company for future planning, predictions and accurate goals. In addition, presenting a figure like this to the investors of the company would prove that the company is now accountable and can prove its growth and progress that it is making.

So, the integration and use of this quantitative model from the company offers the following: The company can clearly see the flow of the leads in the sales funnel, but also by going backwards in the funnel calculate how many leads should enter the funnel each week in order to achieve a certain goal. Furthermore, the model provides the managers of the company with a clear view of the costs related to sales funnel process. That gives them the advantage to selectively reduce the time spent at a specific phase so that the sales cost are reduced. Additionally, one of the most important insights provided by this model is the course of the CAC. Managers can clearly see the effect that the time of a phase and the effort given by a salesman have on CAC. Apart from that, the time needed for CAC to scale can be easily seen in the model. Lastly, the model provides the company with a break-even analysis, clearly depicting the time needed for the company to make revenue and profit.

## 4.4 Business handbook

The primary objective of this thesis is to create a business handbook for Soley. That business handbook should include all departments and divisions of the company and clarify their inputs and outputs, thus recognizing the interactions between the departments of the company. In addition, it should specify the purpose or the goal of every department, but also describe the processes that are involved in order to achieve the purpose of each department.

Furthermore, it should also include the KPIs that are related with measuring the performance of each department.

In other words, the business handbook consists of all the results that came out from the implementation of the approach. Thus, this whole document constitutes the business handbook for Soley describing its business structure and all the aforementioned results.

## 4.5 Evaluation of the results

After presenting and discussing the results of this thesis, the purpose of this section is to reflect on the aforementioned results. That is done by stating a conclusion on each result separately and then an overall conclusion about the total results of the project.

To begin with, Section 4.1 presents the results regarding the development of a business structure for Soley. It is clear that the objective was achieved, which is, developing a business structure for the company. However, the approach implemented involved a lot of fast drafts and quick iteration, which results in model of the business structure that lacks a bit on the quality side. But, that could be an incentive for future work and will be discussed later.

Moreover, Section 4.2 presents the results that came out during the effort of measuring the performance of the company. As stated in this section, KPIs have been defined and filtered carefully so that the company can focus on the most important metrics. On the other hand, from the business processes side many things did not go according to plan. The goal was to model much more processes than those that were actually modeled eventually. The reason for this setback is the lack of experience in process mapping and modeling and also the time lost while trying to figure out a solution to that problem. However, many of the processes of the company were actually recognized and noted down, something that would allow for future modeling and optimization of more processes.

Section 4.3 presents the results of the quantitative analysis conducted with the scope finding a way to relate critical business processes to critical KPIs. The analysis conducted was successful and managed to provide a lot of insight regarding the correlation of two business processes and Customer Acquisition Cost. Nevertheless, again, the goal was to develop more models relating processes to KPIs, but that was not achieved because of the lack of modeled processes and the lack of time.

The results overall were successful increasing the transparency and the accountability of the company towards its investors, but also towards its own employees.

# 5 Discussion and future work

The work presented in this thesis contributes to the goal of Soley to become more structured, well-defined and make the next level towards rapid growth. This chapter discusses the overall contributions of this thesis, such as which of the initial goals were achieved. In addition, the second part of this chapter discusses what is left open and presents the potential opportunities for future work.

## 5.1 Contributions

At the beginning of this thesis, in Section 1.4, the overall goals of this project were mentioned. This section describes what was achieved during the implementation of this project. Also, it reflects on the goals that were set at the beginning of the project, presenting a discussion on which ones were achieved entirely, which ones were partially achieved, and which ones were not achieved.

The goals of this project were the following:

- **Goal 1**: Increase transparency
- **Goal 2**: Model and optimize business processes
- **Goal 3**: Achieve accountability

As depicted in Figure 3-1, developing a business structure for the company contributes to achieving Goal 1. After the presentation of the results in the previous section, it is clear that the company now has a business structure with defined departments and divisions. In addition, most of the inputs and outputs of the departments were clarified, thus identifying the interactions between them. Hence, it would be safe to conclude that Goal 1 of increasing the transparency in the company was achieved. However, it is one thing to increase and another thing to achieve transparency in its entirety. Although, the transparency was increased, achieving complete transparency would be an objective far too extensive for this thesis.

The goal of modeling and optimizing business processes (Goal 2) was addressed by the third step of the approach, as depicted in Figure 3-1. That is, measuring the performance of the company. While many metrics and KPIs were defined, the lack of experience in the field of process mapping and modeling resulted in not many business processes being modeled. Thus, although a complete set of metrics was created for the company, measuring its performance could not be addressed by this project because of its research-oriented nature. So, the conclusion is that Goal 2 (model and optimize business processes) was addressed partially, but was not achieved in its entirety.

The third and last goal of this thesis was to contribute in the effort of Soley to achieve accountability towards both investors and employees. In the course of contributing to that effort and in turn achieving the third goal of the project, a quantitative analysis was

conducted. Quantitative models were developed that connect critical business processes to important KPIs. Reflecting on that, models were created successfully being able to provide insights on the performance of the company. Although the development of those models contributes to achieving Goal 3 (achieve accountability), addressing this goal in its entirety is an objective too extensive for this thesis. So, to conclude, the third goal was partially achieved.

## 5.2 Future work

This section presents and discusses what was left open after the completion of the project. Additionally, it describes potential opportunities for future work. So, things that were left open and could create opportunities for future work are the following:

**Better documentation of business structure**

Although the business structure of the company is defined, the nature of the approach implemented required the development of fast drafts and quick iteration. Even though, it was successful, it has disadvantages. One of the most important ones is the fact that it does not allow for extra time to improve something a lot. In the case of the business structure, what could constitute an opportunity for potential future work is the fact that the structure is not documented that well. As a result, when the company grows bigger, it would be difficult to communicate that to new employees.

**Modeling and optimizing more processes**

As mentioned in the previous section, Goal 2 (model and optimize business processes) was not achieved completely. The reason for that was the small number of processes being modeled. So, if there was a chance for further work on this project, an objective would definitely be to model and optimize much more processes.

**Development of more quantitative models**

The last thing that was partially left open and could be addressed in the future is the last step of the approach. That is, conducting a quantitative analysis. Although, two models were developed, one of which is even quite extensive, there are much more processes connected to CAC, which is the most critical KPI at the moment. Thus, developing those models would be a motivation for future work.

# 6 References


Chinosi, M., & Trombetta, A. (2011). BPMN: An introduction to the standard. *Computer Standards and Interfaces*, *34*(1), 124–134.

Croll, A., & Yoskovitz, B. (2013). *Lean Analytics: Use Data to Build a Better Startup Faster*. "O'Reilly Media, Inc."

Gharajedaghi, J. (2011). *Systems Thinking: Managing Chaos and Complexity: A Platform for Designing Business Architecture*. Elsevier.

Harel, D., & Rumpe, B. (2000). Modeling Languages: Syntax, Semantics and All That Stuff Part I: The Basic Stuff.

Homer, J. B. (1996). Why We Iterate: Scientific Modeling in Theory and Practice. *System Dynamics Review*, *12*(1), 1–19.

Lesh, R., & Doerr, H. M. (2003). Foundations of a Models and Moldeing Perspective on Mathematics Teaching, Learning, and Problem Solving. In *Beyond constructivism: Models and modeling perspectives on mathematics problem solving, learning, and teaching* (Vol. 31, pp. 3–33).

Magretta, J. (2012). *What Management Is: How it works and why it's everyone's business*.

Maria, A. (1997). Introduction to modelling and simulation. *Winter Simulation Conference*, 7–13.

Mayer, R. J., Painter, C. M. K., & DeWitte, P. S. (1992). IDEF Family of Methods for Concurrent Engineering and Business Re-engineering Applications. *Concurrent Engineering*, 1–77.

McClure, D. (2007). Startup Metrics for Pirates: AARRR. Retrieved from http://www.slideshare.net/dmc500hats/startup-metrics-for-pirates-long-version

Melnyk, S. A., Stewart, D. M., & Swink, M. (2004). Metrics and performance measurement in operations management: Dealing with the metrics maze. *Journal of Operations Management*, *22*(3), 209–217.

Parmenter, D. (2010). *Key Performance Indicators: Developing, Implementing, and Using Winning KPIs*.

Presley, A., & Liles, D. H. (1995). The Use of IDEF0 for the Design and Specification of Methodologies. *The Use of IDEF0 for the Design and Specification of Methodologies*, (July).

Rerych, M. (2002). Wasserfallmodell. Retrieved June 8, 2016, from http://cartoon.iguw.tuwien.ac.at/fit/fit01/wasserfall/entstehung.html

Royce, W. W. (1970). Managing the Development of Large Software Systems. *Proceedings of IEEE WESCON 26*, 1–9.

Skok, D. (2013a). SaaS Metrics 2.0 – A Guide to Measuring and Improving What Matters. Retrieved May 20, 2016, from http://www.forentrepreneurs.com/saas-metrics-2/

Skok, D. (2013b). SaaS Metrics 2.0 – Detailed Definitions. Retrieved May 20, 2016, from http://www.forentrepreneurs.com/saas-metrics-2-definitions-2/

Skok, D. (2013c). Startup Killer: the Cost of Customer Acquisition. Retrieved May 20,

2016, from http://www.forentrepreneurs.com/startup-killer/

White, S. A. (2004). Introduction to BPMN. *BPTrends*, 1–11.

# 7 Appendix

## 7.1 Business structure

**Customer Acquisition (CA)**
- Marketing (CA_MA)
- Sales (CA_SL)
- Partnering (CA_PA)
- Academic Alliance (CA_AA)

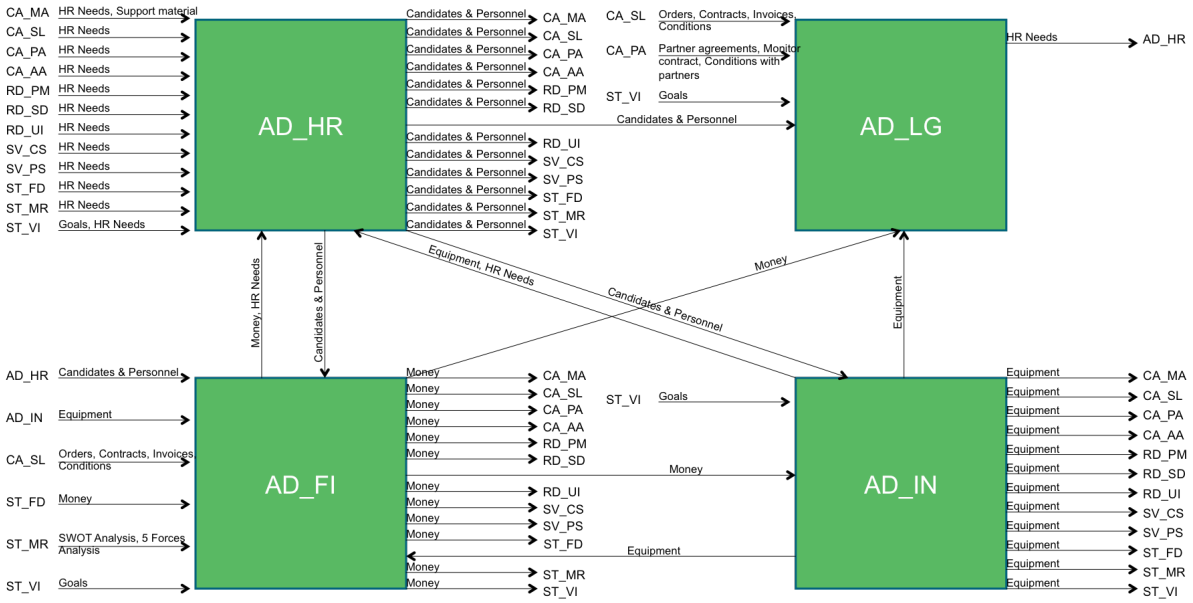
**Services (SV)**
- Customer Services (SV_CS)
- Professional Services (SV_PS)

**Administration (AD)**
- Human Resources (AD_HR)
- Finances (AD_FI)
- Infrastructure (AD_IN)
- Legal (AD_LG)

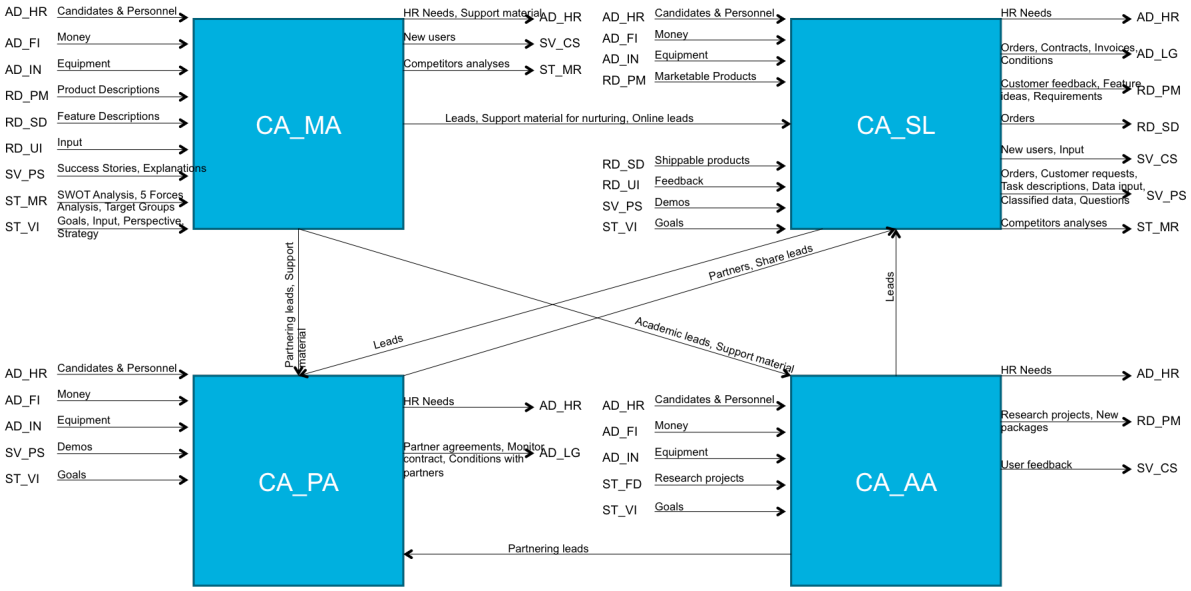
**R&D (RD)**
- Software Development (RD_SD)
- Product Management (RD_PM)
- User Intelligence (RD_UI)

**Strategy (ST)**
- Funding (ST_FD)
- Vision (ST_VI)
- Market Research (ST_MR)

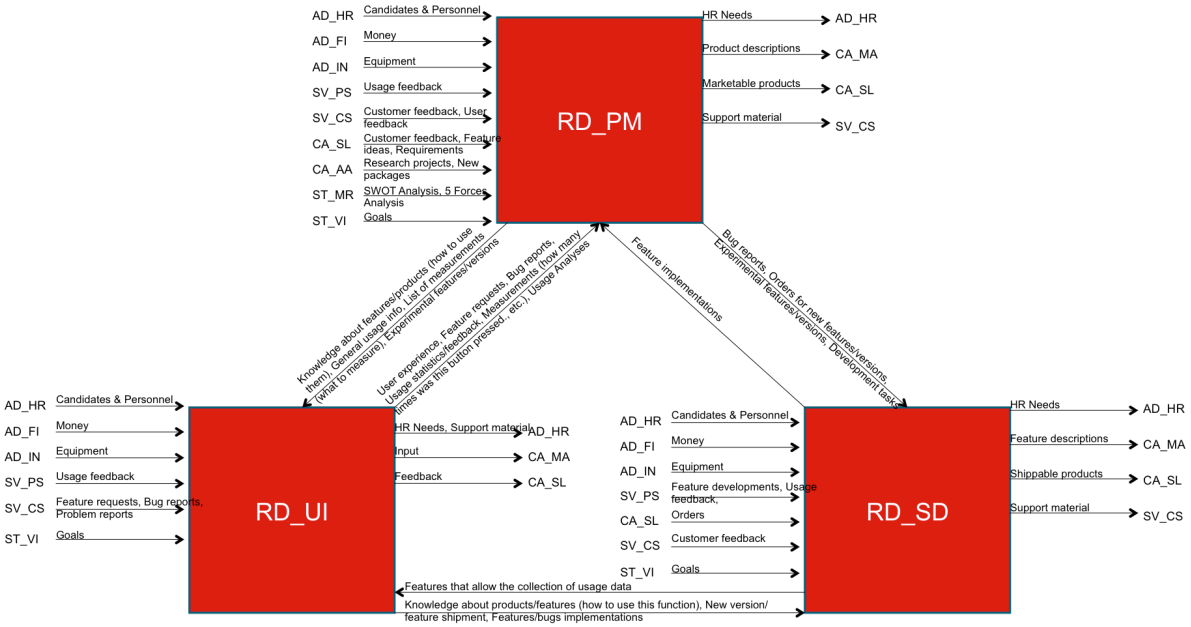
### 7.1.1 Administration (AD)



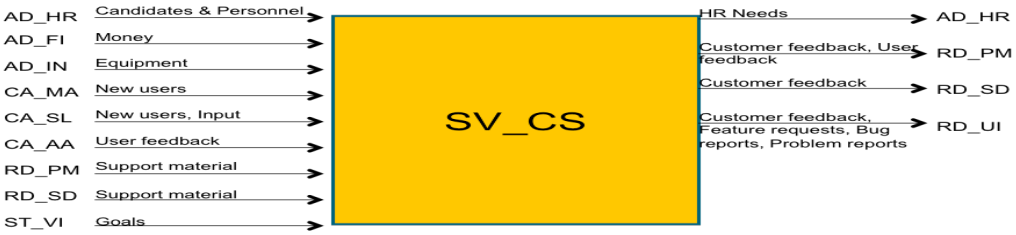
## 7.1.2 Customer Acquisition (CA)

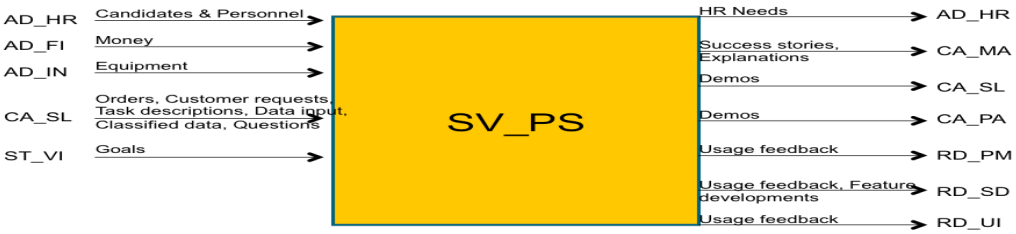



## 7.1.3 Research & Development (RD)



### 7.1.4 Services (SV)




### 7.1.5 Strategy (ST)