



A software development

Business plan and feasibility assessment

Daníel Auðunsson

Thesis of 30 ECTS credits

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Abstract

This thesis examines how to build a perfect business plan and use the information to determine the presumptions for a feasibility assessment. When developing software it is important to confirm that there is a demand from the market. If there is a demand then the next question is if it is possible to gain profits. An overview of the innovation community in Iceland is presented, as well as a brief overview of a business plan buildup, which will be used as a guide for the case study along with feasibility methods.

The case study illustrates the use of building a business plan and a feasibility assessment model for Verkvaki software development. The conclusion is that despite a need from the market and a promising cash flow, software development is an expensive process and in this case not feasible. Support from the innovation society in forms of grants or venture capitalists are essential and exportation should be considered from the beginning to gain more buyers.

Keywords: software development, innovation, entrepreneurs, financial feasibility, business plan

Útdráttur

Þessi ritgerð skoðar hvernig byggja á hina fullkomnu viðskiptaáætlun og nota upplýsingarnar úr henni sem forsendur fyrir arðsemismat. Við hugbúnaðarþróun er mikilvægt að staðfesta að það sé þörf frá markaðnum. Ef þörfin er til staðar er hægt að skoða hvort hugmyndin sé arðbær. Yfirlit yfir frumkvöðlaumhverfið á Íslandi er kynnt auk yfirlits yfir hvernig byggja á viðskiptaáætlun sem notað verður sem leiðarvísir fyrir rannsóknardæmi þar sem gert verður að lokum arðsemismat.

Dæmið mun sýna fram á hvernig byggð er viðskiptaáætlun og arðsemismat í kringum hugbúnaðinn Verkvaki. Niðurstöðurnar gefa til kynna að þrátt fyrir góða hugmynd og upprennandi fjármagnsstreymi þá er hugbúnaðarþróun dýr og í þessu tilfalli ekki arðbær. Stuðningur frá frumkvöðlaumhverfinu í formi styrks eða áhættufjárfesti er nauðsynlegur auk þess sem huga ætti að útlutningi strax frá fyrstu skrefum.

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1. Introduction

Before an investment is made it is important to look into it and analyze if it is profitable. Even though the standard procedure is to make a feasibility analysis and then do a business plan, we will do both to follow up on the idea no matter how profitable the idea is. A software company called Leda will be used as a case study where the software Verkvaki is the product.

The objective of this thesis will be summarized in the following three questions:

1. Is there a need on the market for a solution like Verkvaki?
2. How would one plan and perform the Verkvaki software development?
3. Is the solution feasible?

These questions will all be answered with a business plan that goes through the whole process.

This thesis examines how to take an idea about making software and putting it to the next level by making a business plan and feasibility assessment. At first the innovation society in Iceland will be examined, what support it has to offer and how entrepreneurs can fund their ideas.

The theory comes afterwards and is divided into three sections: the theory of innovation, the theory of a perfect business plan, and in the end the theory of a feasibility assessment.

The business plan of Verkvaki is the largest part of this thesis. It goes through the description of the product. After that the market is analyzed and an inner and outer analysis is performed. Leda does market research and uses the solutions to estimate the quantity of the sales and the price of the product. After that there is an overview of the operation, which includes how to market and build the product. The financial model is introduced where we go over financing and the feasibility assessment and after that it is possible to estimate if the company should proceed with the idea or abort. At the end the organizational structure will be briefly introduced.

2. Innovation in Iceland

Innovation has been one of the leading forces in the development of the Icelandic economy from the last decades of the 20th century until today. Ambitious university research in contact with real life companies in the Icelandic economy have led to the foundation of companies that have taken this knowledge to the next level and established an innovation pathway, which documents and makes use of these ideas. [1]

2.1 Support for innovation

There are few organizations that have been very visible when it comes to helping out entrepreneurs in Iceland. Some examples include Nýsköpunarmiðstöð Íslands, Innovit and Klak, which were recently merged, Startup Reykjavík, and Startup Iceland.

Here below there will be summed up the biggest organizations when it comes to innovation support. The reason these companies were picked is because they've been visible to the writer in the process of the research. There are other companies and funds that endorse innovation even though they are not covered in this essay.

2.1.1 Innovation Center Iceland - Nýsköpunarmiðstöð Ísland

The Innovation Center of Iceland (ICI) is a government run organization under the Ministry of Industries and Innovation. The difference between ICI and other supporters of innovation is that this organization takes in research innovators and helps them by giving them a place to stay and the right environment to work in. ICI also runs few incubators for entrepreneurs where they have access to inexpensive desk space, a creative environment among other entrepreneurs, a network of contacts and professional consulting. Some of the places are run with collaboration with companies in the Icelandic economic life. [2]

2.1.2 Innovit and Klak

Innovit

University students founded Innovit in 2007. Innovit was an innovation and entrepreneurship centre and the emphasis was on helping ambitious people with good ideas to make business plans and business opportunities that grow

out of the Icelandic university environment. Innovit offers consulting for entrepreneurs.

The company offers various events for entrepreneurs but the biggest event is the innovation contest “The Golden Egg” (Gulleggið), where entrepreneurs compete with their business plans. With this competition Innovit stimulates and pushes the innovator to take his idea to the next level, make a business plan, and think about every issue when it comes to the idea. Innovit also assists when it comes to Startup Reykjavik, which will be covered in the summation below. [3]

Klak

Klak is an innovation centre, which focuses on education for entrepreneurs. Klak operates the Business Accelerator, which is thought of as a fast track for new companies to speed up a part of their business model. Klak offers consulting to small and medium sized companies alongside hosting various networking events. Like ICI, Klak is an incubator center where they host entrepreneurs in their offices from many different industries. Klak has also worked on Reykjavik Startup with Innovit. [4]

In 2013 Innovit and Klak were merged and a new company was founded, which was given the name Klak Innovit Ltd. [3]

2.1.3 Startup Reykjavik

Startup Reykjavik is a mentorship-driven seed stage investment program. This is an international program, which is held in many countries. Part of the team that are chosen each year are international. The program runs for 10 weeks during summer in Reykjavik, Iceland once a year. Innovation companies apply to be in Startup Reykjavik and early in the year the companies are chosen. Selected companies or ideas, which make it into the program, receive 2m ISK (~\$16.000) in seed funding from the Icelandic Bank Arion Banki. The bank will receive a 6% of the stocks in exchange. Startup Reykjavik founders also get great perks such as free hosting and services, a nice place to work, ten weeks of intensive mentorship, and the chance to pitch to angel investors and venture capitalists at the end of the program. This program is founded by Arion Banki, Innovit and Klak. [5]

2.1.4 Startup Iceland

Startup Iceland is an innovation conference held in Iceland in the summer. The program is one weekend and promotes the development of “antifragile startup ecosystems.” During the weekend entrepreneurs have the opportunity to listen to compelling stories and experiences with the brightest entrepreneurial talent in Iceland and from around the world.

2.2 Funding for Innovation

When new innovators are starting to take their first steps into the funding environment, it can look complicated. Compared to the countries closest to Iceland the environment is getting close to being similar but the Icelandic entrepreneurship environment is not as developed compared to those communities we want to resemble. Here there are fewer angels and venture capitalists. Because there is less experience investing in start-ups, there is not always the understanding that the start-up cannot be value estimated as normal companies that have assets and revenue. The advantage the Icelandic community has is that every person such as CEOs and other are only one phone call away. That gives entrepreneurs the opportunity to have easy access to professional opinion or advise.

2.2.1 The J-curve and the Death Valley

The J-Curve is a curve that describes the lifespan of a startup company in terms of cash flow. In the beginning steps, which are sometimes called the seed stage, startup companies have to finance themselves by getting grants, using their own money or borrowing from a bank or friends/family.

Here below we can see a picture of the cumulative profit/loss for a startup company. At the point where the product becomes a success the curve stops leaning down and takes a turn upwards. When the profit equals the cumulative negative cash flow the graph reaches above zero.

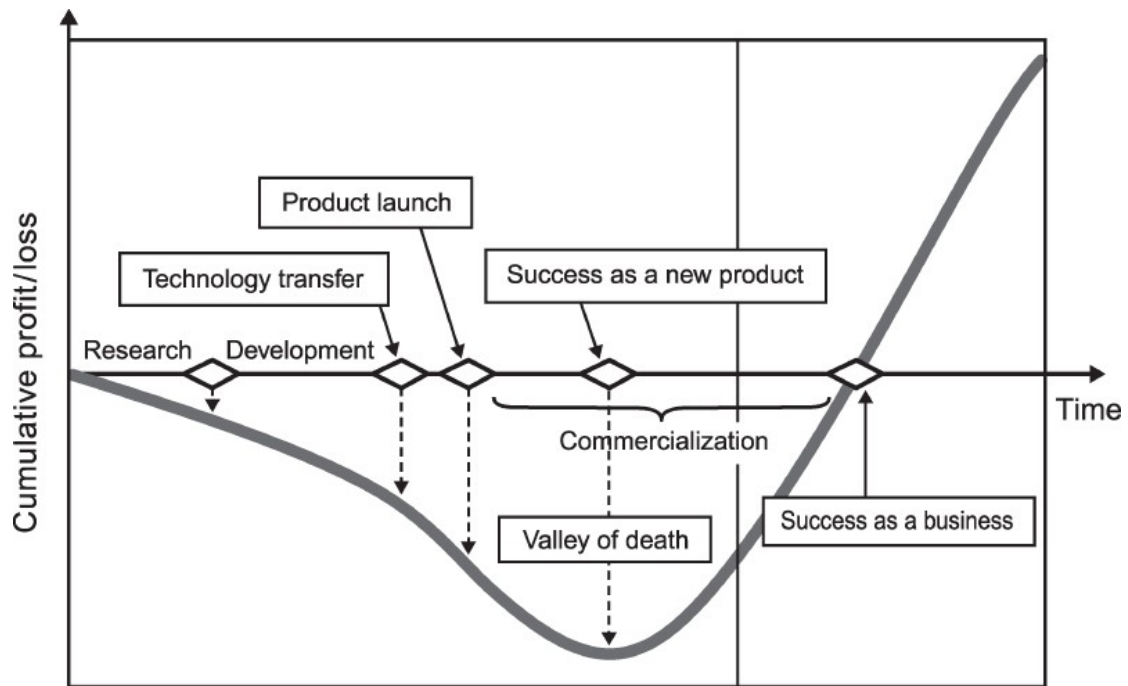


Figure 1: "The valley of death". Cumulative cash flow of a start up. [6]

The “valley of death” is a common term in the startup world. It refers to the difficulty of covering negative cash flow in the early stages of the startup, before their new product or service is bringing in revenue from customers.

According to the Gompers and Lerner study [6], the challenge is very real, with 90% of new startups that don't attract investors failing within the first three years. The problem is that professional investors (angels and venture capital) want a proven business model before they invest; ready to scale, rather than the more risky research and development efforts.

At the early stages, if the idea and the company are good, some startups manage to get angels to invest. Some early stage venture capital firms come in at this point but venture capital usually comes in when the company is more established, meaning that the cash flow is positive. [6], [7]

2.2.2 Grants in Iceland

Grants are usually the first steps in the financing of a startup company. Obviously people try to get grants before they finance a startup with their own money or start borrowing from banks or someone close.

When it comes to funding in Icelandic innovation, grants are listed by the Icelandic banks Arionbanki and Landsbankinn alongside the innovation center. [7] [8]

2.2.3 Angels and Seed forum Iceland

An angel investor, also known as a business angel, is an affluent individual who provides capital for a business startup.

The angel environment is developing in Iceland but in 2004 the global network seed forum came to Iceland. “Seed Forum is a global network of national not-for-profit foundations and national representatives in more than 40 countries. The global collaboration entity of the Seed Forum network is Seed Forum International Foundation working out of London. The Seed Forum concept has grown rapidly since it was founded in Norway in 2002”. [9]

Every year Seed forum Iceland throws a conference for investors interested in the most promising seed and early stage growth companies presenting in Iceland. The companies are nominated and specially selected by an international investor jury.

2.2.4 Venture capital

Venture capital is money provided by investors to startup firms and small businesses with perceived long-term growth potential. This is a very important source of funding for startups that do not have access to capital markets. Most venture capital comes from a group of wealthy investors, investment banks and other financial institutions that pool such investments or partnerships.[10]

In Iceland there are a number of venture capital funds: NSA, Frumtak, Eyrir Invest, Kjölfesta to name a few.

3. Theory of innovation

Introductory definitions are required for the ensuing discussion. Innovation is conceptualized here as a quantified dimension of behavior. We define innovation as the earliness or extent of use by a given organization of a new idea, where “new” means only new to the adopting agent, and not necessarily to the world in general [11, Ch. 19][12]. Our focus, then, is on the willingness

and ability of an organization to innovate in the sense of adopting something new. Although the agent of innovation here is the organization, the theoretical approach should also be applicable to individuals.

Nowadays the popularity of innovation and entrepreneurship is increasing since organizations and governments realize that by encouraging people to innovate, they are directly stimulating the economy in the long run.

Since the computer was invented the possibilities to innovate are infinite and a lot of individuals have made a fortune just by inventing and marketing a good idea.

There is much debate about the theory of innovation since the process of inventing something new and being successful from beginning to end is both complex and nonlinear. Many different variables make it impossible to specify the effect of each and make a comprehensive generalization.

“Theory-building in many social science subfields has apparently reached an impasse. The ability to make the kinds of generalization and prediction that are typically associated with science and models is consistently being undermined by the phenomenon of complexity.” [13]

Today new methodologies are being born, i.e. The Lean Startup by Eric Ries and The Business Model Generation (Business Model Canvas) by Alexander Osterwalder and Yves Pigneur, to name a few. Taken e.g. The Lean Startup, Eric Rice walks us through his experience of making a company and dealing with customers. In the book he suggests different methods, scales to measure or just ideas to promote, and no one of them is correct but could work for different kinds of businesses.

3.1 Costs versus Benefits

When it comes to innovation then costs versus benefits can be a good predictor. Most innovation is not free and resources are necessary to offset the cost. Thus, resources of various kinds would logically become even better, more stable predictors of innovation when the associated costs are also considered. If the costs of the innovation are not specified, the varying

impact of specific resources will frustrate efforts to build a cumulative theory. This same logic leads one to include the idea of benefits, as well, since the costs clearly are more or less important depending on what the potential benefits are. [14]

When building a theory, or a plan around a project, and mapping the costs and benefits will always give a good picture of how realistic the project is.

Developing descriptive innovation theory on the basis of costs and benefits might appear both naïve and unenlightening since any behavior can obviously be reduced to pleasure and pain on equivalent terms. The choice of the model here, however, is a strategic one. [14]

Despite its universal applicability, benefit-cost theory would not recommend itself as the best model for the explanation of all behavior. For the normal, more routine kinds of organizational decision-making, a configuration of concepts including sequential attention to goals, quasi-resolution of conflict, reaction to feedback, and problematic search. [15, Ch. 4]

A benefit cost model is a good descriptive model for innovation because innovation is transformative. It is supposed to achieve a better state. The consequences of change, positive and negative, absorb decision making attention and trigger a comparative rational process, an evaluation of states in terms of the good and the bad, even though the calculations may not be precise nor the information complete or correct.

3.2 Variables

In this section we will talk about particular set of variables that concern innovation. These are costs, benefits, resources, and associated variables that comprise a theory of innovation.

3.2.1 Benefits

There is no single motivation behind innovation at either the individual or organizational level. We can enumerate many different of benefits that have been found to be related to the adoption of innovation, but these invariably seem to fall in to one of three categories [14]

- a) Programmatic benefits: benefits of increased effectiveness and efficiency in accomplishing externally related goals. These benefits are often summarized as “profits” in the private sector.
- b) Prestige benefits: benefits of recognition and approval that accrue to the organization and its members by virtue of their being earlier rather than later adopters of new programs and technologies.
- c) Structural benefits: purely internal benefits such as greater worker satisfaction and better internal relationship.

These varieties of benefits may be interrelated with respect to a given innovation but of course in many cases they will not be.

3.2.2 Costs

When it comes to costs we can divide them into two general categories [14]

- a) Decision cost: the cost of arriving at a decision on whether to implement an innovation or not and, if so, to what extent and at what rate. This could also be called development cost. This category should be broken down into the costs of technical skill and managerial time, the costs of gathering new information, and internal social costs (i.e. costs associated with disrupting the organizations status quo)
- b) Implementation costs: The costs associated with the actual implementation of the innovation. Subcategories are: equipment costs, manpower costs, and internal and external social costs (the latter being costs associated with disrupting the status quo in the organization's environment; i.e. adopting an innovation that is somehow frowned upon).

Costs differ greatly between organizations. For development you might need only one person, or you might need a whole team of computer programmers. One organization may have an organizational structure or location that makes implementation less costly for it than another. The complexity of the process has a lot to do with the implementation.

The distinction between decision and implementation costs reflects a common division of the process of innovating into a decision or initiation stage and an implementation stage. [16] Although these two categories are composed of some of the same cost elements, they are kept separate since it is likely that various costs have greater consequences during one stage than another. For example, decision makers might be much more reluctant to expand manpower resources during the decision stage than during the implementation stage. This being true, an innovation that costs a large amount of manpower resources during the decision stage is likely to be less adoptable than another innovation requiring the same amount of resources during the implementation stage.[14]

3.2.3 Resources

The centrality of resources in any model of the determinants of innovation has long been acknowledged. Wealth in particular has figured in studies on both the organizational and individual levels. Nevertheless, much remains to be learned about the relative importance of different kinds of resources. Five types of resources whose impacts appear to warrant inclusion are: wealth, manpower, expertise and time, equipment, information, and staff tolerance for change.

The amount of resources considered to be available for an innovation depends upon the return rate associated with those resources. Should decision makers be confronted with an innovation believed to produce a benefit-cost ratio of 1/3, it is unlikely that they would consider any of the organizations holdings or unused credit to be excessive, not even cash reserved lying idle in the bank. This is true because the rates of return, which its resources are currently yielding, are almost certainly greater than that of this innovation. On the other hand, if the decision makers judged the innovation to have a benefit-cost ratio of 30/1, it is probable that they would consider virtually everything that they could beg, borrow, or steal to be investable. Resources already committed elsewhere would, within legal and practical bounds, quickly be diverted to the new project. [14]

When it comes to private entrepreneurs with small companies and resources then it is almost always the wealth resource that is lacking, but on the other hand an entrepreneur would be unlikely to participate in a project with a low benefit-cost ratio.

3.2.4 Discounting factor

Equivalence in the basic benefit and cost calculations made by two organizations is no guarantee that they will respond to the innovation in an identical fashion. This is true because the values that they attach to benefits and costs are likely to vary. Four factors that play a significant role in determining the utility functions of organizational decision makers with respect of benefits, costs, and resources are:

- a) Risk: degree of concern over possible “catastrophe”
- b) Average cost of discontinuance: the average cost associated with cancelling the innovation between 0% adoption and full implementation.
- c) Uncertainty: the lack of confidence that the organization has in its benefit-cost calculations.
- d) Instability in the future stream of benefits: fear that the benefit-cost ratio will unexpectedly decrease at some date beyond the point where the adopter thinks he can foresee benefits and costs. The instability could be due to depreciation, obsolescence, and more.

4. Steps behind a perfect business plan

Making a good business plan is crucial when it comes to attracting venture capitalists, bankers or others to invest in your company or your solution. A business plan can reveal if a certain project is feasible or profitable, and can save a lot of time and money for both the entrepreneur and the investor.

Making the perfect business plan can be quite relative since it depends on the context and the person you are trying to reach. It is hard to find a scientific paper on the subject but there are many well-written articles and books. The source material used for this chapter follows. [17] [18] [19] [20] [21]

4.1 The investor

Some investors may read over a hundred business plans a year and most will not even read past the executive summary. They want to see exactly where their money is going, so the plan must map a specific and clearly defined route on how you are going to meet your goal, and how their investment will help you do this. [17]

According to a Harvard business review [20], it is a problem that most entrepreneurs waste too much ink on numbers and devote too little to the information that really matters to the investors. An experienced investor knows that financial projections for a new company that stretch out month-by-month for more than a year is not a reliable source for the success of the company. According to the review, what really matter to the investors are four key elements.

The People. The men and women starting and running the venture, as well as the outside parties providing key services or important resources for it, such as its lawyers, accountants, and suppliers.

The Opportunity. A profile of the business itself—what it will sell and to whom, whether the business can grow and how fast, what its finances are, who and what stands in the way of success.

The Context. The big picture—the regulatory environment, interest rates, demographic trends, inflation, and the like—basically, factors that inevitably change but cannot be controlled by the entrepreneur.

Risk and Reward. An assessment of everything that can go wrong and right, and a discussion of how the entrepreneurial team can respond.

4.2 Structure

Executive summary

This is the abstract of the business plan, a summary of everything you will say in greater detail in the ensuing pages. It points out the goals of the plan, emphasizing all the highlights. This section is key for seeking outside funding as it introduces potential investors to the business. What to include is the background about your company, the market opportunity, the capital requirements, a mission statement, an overview of management, competitors,

your business' competitive advantages, and a summary of your financial projections over the next three years.

The summary should not be longer than 1-2 pages and should interest the investor from the first paragraph. A good guideline is to spend around two paragraphs on each of the key areas and not go too deep into any details.[19]

Company overview

The company overview is designed to provide more information about your company and your business: why and when it was formed, its mission, business model, strategy, and any existing strategic relationship. [19]

Business description

The business description usually begins with a short description of the industry. When describing the industry, discuss the present outlook as well as future possibilities. You should also provide information on all the various markets within the industry, including any new products or developments that will benefit or adversely affect your business.

Next, you describe what you are selling or offering. If you are selling a product then specify where you are in the chain: manufacturer, distributor, or retailer. Take the product and tell about your manufacturing process, availability of materials, how you handle inventory and fulfillment, etc. If you provide services, describe those services. Make sure to address any new product lines or service lines that you expect to enter into in the future.[21]

Marketing strategies and competitive analysis

Here you should spell out your marketing strategy and give your opinion on the market analysis. Doing a marketing analysis forces the entrepreneur to look into all the aspects of the market so the target market can be defined and the company can be positioned in order to garner its share of sales, and even reach out to a possible buyer and see what how he will value your product. In this section the entrepreneur can reveal why his business will be successful, backing that up with market research that identifies the target market and industry and customer trends.[19]

The purpose of the competitive analysis is to determine the strengths and weaknesses of the competitors within your market, strategies that will provide you with a distinct advantage, the barriers that can be developed in order to prevent competition from entering your market, and any weaknesses that can be exploited within the product development cycle.[21]

Strategy and implementation

The purpose of this section is to provide investors with a description of the product's design, chart its development within the context of production, marketing and the company itself, and create a development budget that will enable the company to reach its goals.[21]

A good development plan covers three areas

- Product development
- Market development
- Organizational development

Each of these elements needs to be examined from the funding of the plan to the point where the business begins to experience a continuous income. This includes laying down the cost for the development plans, including material and employees and featuring sales forecasts. Overall, the company should lay out their milestones so the investor can realize the dates and deadlines.

Operation and Management plan

The operation and management plan describes how the business will function on a continuing basis. It lists how the organization is set up and how the responsibility is distributed in the management team.

There are two areas that need to be accounted for when planning the operations of the company. The first area is the organizational structure, and the second is the expense and capital requirements associated with its operation. After this chapter the company should list out all the costs for the financial chapter.[21]

Financial projection

Financial data is always at the back of the business plan but that doesn't mean that it is less important than the project, business concept or the team.

There are three financial statements in the business plan: a cash flow statement, an income statement and a balance sheet. [21]

- The income statement is a report that states how the business and its sources will generate cash. The income statement will also state cost of goods, taxes, operation cost, and gross and net profit at different stages. Following the income statement is a short note analyzing the statement.
- Cash flow statement is one of the most critical information tools since this shows how the business is going to meet all its obligations, when revenue will be required and from where the money will be received.
- The balance sheet is the last financial statement. It uses all the information listed in the previous sections of the business plan. The balance sheet is generated on an annual basis and is a summary of all the preceding financial information broken down into three areas: assets, liabilities and equity.

5. Theory of feasibility assessment

5.1 The purpose of financial feasibility analysis

When entrepreneurs are starting a project it doesn't only have to meet technical and performance requirements - it must also be financially viable. The investor must see from the analysis that the proposed investment in the project is at least equal in return to a similarly risky investment. The concept of using return on investment (ROI) is appropriate for most projects, both in the private and the public sector. If we take the private sector, for example, a manufacturing facility making an investment must make enough cash flow from operating the facility to pay for construction and ongoing operating expenses and, in the end, have a decent rate of return. Similarly, in publicly funded projects, those ratepayers who provide the funding for each project expect the project to have benefits, either in monetary terms or non-quantifiable measures, and that those benefits will be at least equal to the funds invested in that project. Estimates of the costs of operating and maintaining a manufacturing plant, as well as the income its operation is expected to generate, will be essential in determining financial viability. [22]

In few words it could be said that a feasibility study is the analysis of the viability of an idea. Feasibility studies can be used in many ways, but focus primarily on proposed business ventures. The study addresses the essential question of whether companies should proceed with a proposed project idea. The conclusion of a feasibility study should outline various scenarios and the implications, strengths and weaknesses of each. Feasibility studies are not necessarily definitive. When you collect a great deal of information and investigate alternatives, neither negative nor positive may emerge. It can sometimes be unclear if a company should proceed with a project. Sometimes the weaknesses can be overcome and rarely does the analysis come out as extremely positive. The study will help you assess the tradeoff between the risks and rewards of moving forward with the business project. [23]

Reasons to Do a Feasibility Study

Hofstrand and Holz-Clause, [23, p. 3] put forward a number of reasons to conduct a financial feasibility study:

- Gives focus to the project and outline alternatives
- Narrows business alternatives
- Identifies new opportunities through the investigative process
- Identifies reasons not to proceed
- Enhances the probability of success by addressing and mitigating factors early on that could affect the project
- Provides quality information for decision making
- Provides documentation that the business venture was thoroughly investigated
- Helps in securing funding from lending institutions and other monetary sources.
- Helps to attract equity investment.

5.2 Feasibility Study vs. Business Plan

There is a danger of confusing the role of two tools in project development – the feasibility study and the business plan. The feasibility study is not a business plan. The feasibility study starts an investigation around the question, “Is this idea or is this project profitable,” but the business plan provides the planning function.[23]

The business plan outlines the action needed to realize an idea. The feasibility study often outlines and analyzes several alternatives and methods to achieve the project’s success. It narrows down the scope of the projects and helps to identify the best scenario. The business plan only deals with one plan or scenario. Often in a company there is a group that works on the feasibility study to identify the best alternative. This forms the basis of the business plan.

The business plan is then created after the feasibility study, when project details (which required assumptions in the feasibility study) have been decided. Standard business plans include details such as key management

personnel, business location, the financial package, product flow, and possible customers. Although this difference is not as important for project development considerations, the feasibility study is only applicable for the developmental stage of a project. Businesses continue to use and revise their business plans after a project has been implemented. As the feasibility study refines the group's initial ideas, the business plan uses information from the study to further prepare the project to evolve into an operating business.[24]

5.3 Criteria of financial feasibility

There are certain tools for measuring the feasibility of an investment. The feasibility can be measured on the basis of accounting or the projected cash flow of the project. There are several methods used, such as Net Present Value (NPV), Internal Rate of Return (IRR), Annual Equivalent worth (AE) and Benefit-Cost ratio (B/C). Since the feasibility assessment is a small part of the thesis we will only use NPV and IRR to estimate the feasibility of the project.[25]

Net Present Value

Net present value is defined as the sum of the present values of incoming and outgoing cash flows over a period of time. Incoming and outgoing cash flows can also be described as benefit and cost cash flow, respectively. The NPV can help determine whether or not an investment project is an acceptable investment.

The interest rate used to calculate the NPV is often referred to as MARR, which is the Minimum Attractive Rate of Return[25, p. 795], and it represents the opportunity cost of the investment. The planning period of the project has to be determined as well as the cash flow for each period.

The formula for NPV is:

$$\text{Where } NPV(i) = \frac{A_0}{(1+i)^0} + \frac{A_1}{(1+i)^1} + \dots + \frac{A_N}{(1+i)^N} = \sum_{n=0}^N \frac{A_n}{(1+i)^n}$$

A_n = Net cash flow at the end of period n ;

i = MARR;

N = service life of the project

[25, p. 216]

If the NPV is greater than zero it does not only mean that the investment will return profits but also that it gives greater profits than any alternative investment, which is an option that the investor can always choose.

From an Economical Engineering perspective the decision heuristic is:

If $NPV(i) > 0$, accept the investment;

If $NPV(i) = 0$, remain indifferent to the investment;

If $NPV(i) < 0$, reject the investment;

When comparing alternatives the one with the greatest positive NPV is selected. When comparing alternatives it is important to use the same interest rate over the same period of time.

Internal Rate of Return

IRR, also known as the discounted cash flow rate of return (DCFROR), is a rate of return calculated when NPV given the IRR (denoted i^*) is set equal to zero. It is used in capital budgeting to measure and compare the profitability of investments.

The definition of IRR (i^*) is:

$$NPV(i^*) = \sum_{n=0}^N \frac{A_n}{(1+i^*)^n} = 0$$

[25, p. 326]

Investors will usually institute a minimum investment policy, which can then be defined relative to MARR, in which case the IRR and the MARR are used as a measurement for a project's feasibility. The heuristic for simple projects is as follows:

If $IRR > MARR$, accept the investment;

If $IRR = MARR$, remain indifferent to the investment;

If $IRR < MARR$, reject the investment.

6. Case Study - The Verkvaki business plan

6.1 Summary

What is Verkvaki

Verkvaki is software for companies with on-site management and time registrations. With Verkvaki, administrators can follow employee's progress in real-time and employees can clock-in each task through their smartphone, when they arrive at the workplace.

Advantage

The biggest advantage of Verkvaki is the time registration and work progress updates, which are all logged in real-time and can be followed as the task is being worked on. With the Internet connection on every Smartphone, data can flow between the user, other users, and the administrator. Management overview will improve, tasks will be more transparent and efficient, and less time will be spent on information flow and administration.

Need / Problem

Many companies have problems following up on tasks and projects. They spend much time keeping track of data, and often it is hard to monitor how time and work is spent.

Funding

The feasibility assessment showed that according to this plan, the solution is not feasible. With more marketing in foreign countries and large development contracts with companies, the solution could be feasible.

Goals and vision

Verkvaki solves a real problem in an efficient and simple way. With Verkvaki companies can optimize the use of time, which might make the software really important for companies. The goal of Verkvaki is to lead in mobile time registering in Iceland, in the future.

6.2 Verkvaki explained

What does Verkvaki do?

Verkvaki collects data on time-registration and work progress, and stores the information in a database. The project and task information can be accessed by any employee signed to the job at any time.

How?

The administrator creates a project in the software, either using a tablet or a computer. The user can then clock in on each task of the project using their mobile device. The progress of each task in the project updates in real time. All information flow goes through the internet, either through local area wireless technology (WiFi) or 3G/4G.

For whom?

Verkvaki is for everyone that manages many projects and/or people and wants to make their project more transparent, increase quality control, and save time. The software could be of huge benefit to many different companies such as real-estate, insurance companies, contractor companies, municipalities, and other public entities.

Why?

In recent years Internet speed has been developing dramatically. Nowadays technology has made it possible for information to flow in and out of our smart devices in real time. For example, 4G will soon be standard equipment in every smartphone.

Has this been done before?

Using your phone to clock-in to work has been used for quite some time, but in the past this was done by phone call (which cannot transfer much data, unlike software online). On the international market there are similar solutions, but they can be expensive.

Supporting Parties

During requirement analysis we used the assistance of two Icelandic companies: VÍS, which is an insurance company, and Öryggismiðstöðin, which is a security company. It was very helpful to use these companies to visualize how the software would be built up and also to realize the need it will solve.

6.3 The Company Leda Ltd.

Leifur Björnsson and Daníel Auðunsson founded the company Leda around a graduation project in the University of Reykjavík. The idea originated when an insurance company approached Leifur with the idea. The company was interested in developing software that could keep track of all their projects and time schedules. After thinking about the idea and getting positive feedback, the colleagues decided to found the company Leda.

6.3.1 Goals and vision

Fast development of smartphones and the data that they can transfer opens up new ways to facilitate time registration and project overview. Companies that have many employees traveling around and working on many different projects need to keep track of their projects and time registrations. Smartphones and tablets are ideal tools to collect all this information in real time, save overall management, and return a more clear and professional outcome that will benefit both the buyer and the contractor.

Since smartphones and tablets are still fairly new on the market there are many ideas still developing. In Iceland there is no software like Verkvaki so it is important to enter the market as quickly as possible. The Software will increase the competitiveness of Icelandic companies, while also giving Leda the experience to develop the software faster.

Looking to the future the goal for Leda is to fully develop the product in Iceland and take it from there to market it elsewhere. Scandinavia will be the first market since it is the closest to us in culture.

6.4 The Software Verkvaki

Verkvaki is software that connects the administrator and the user. The administrator creates a project in the system and the user works on the project. The user clocks in and out of each task in the project through a mobile interface, and the project will update in real time.

6.4.1 Important features of Verkvaki

Important features for the administrator

- See where each employee or contractor is placed at all times
- Progress of tasks is updated in real time
- Hours spent on the project are updated in real time
- The work report gets done alongside the project so no time is spent on it afterwards
- Transparency in the workflow
- The software can support quality control with ample documentation
- Can solve arguments since more data is registered
- Can return useful statistics to increase efficiency and the use of human resources

Important features for the user

- The workflow is registered in real time
- The user can plan his work better since now he can see when preceding work gets done
- The user can send in pictures, notes and voice messages to support the final report
- Better overview of the project
- Better time management that will give better service for the buyer

6.4.2 The users

Verkvaki is software made for project administrators and contractors to make time registration easier, and facilitate easy access to each project's overview.

The system is useful to everyone who is managing real-estate, real-estate organizations, insurance companies, contractor companies, municipalities, public counterparts, etc. Verkvaki increases transparency in projects, helps with quality control, collects hours for invoice making, and collects data for job reports, in addition to being very convenient when solving arguments.

Here below the user interface is explained: first the user interface for the administrator, and then the user interface for the user.

6.4.2.1 The Administrator

The administrator will have to make the project, which then he will assign to a different user. Here below we go through a simple process of making a project and a task list.

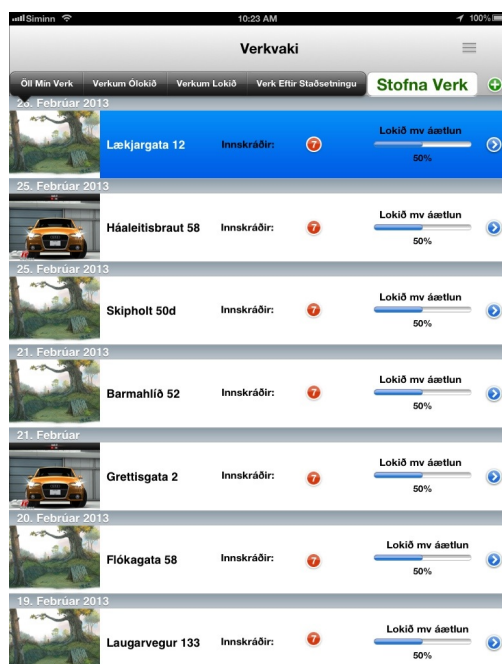


Figure 2: The admins start project screen

The first screen shows a list of all the projects that the administrator is supervising. This is an example of how it would look in a tablet, but the admin could be using a smartphone or a computer. In this situation we will let him use the command “Stofna Verk” but that means that he will make a new project in the database.

Figure 3: Projects information screen

When the admin has made the project he fills in all the information for the person who will work on it, such as employee, address, pictures, drawings, list of tasks, contacts and timeframe.

Figure 4: Screen for projects task list

When all the information on the project is finished the admin can create a task list for the project. The admin can either insert text or drag pre-made tasks into the list. When the task list is ready the admin saves the project.

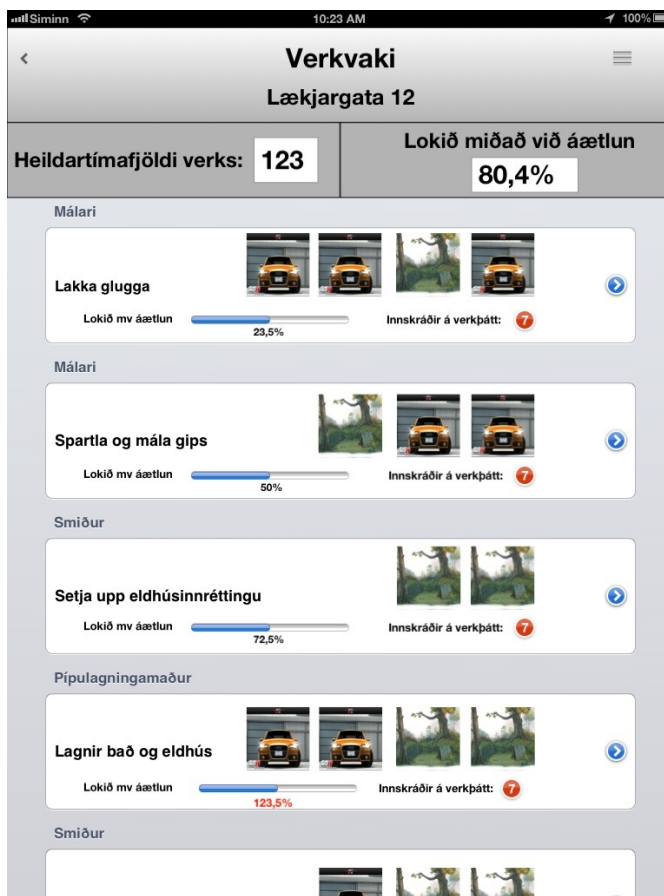


Figure 5: The home screen of the project

Then he can go back to the front page of the project, where he can follow up on all the information in the project: man-hours spent, whether the project is following the time schedule, the schedule of each individual task, which worker is registered into each task, and pictures of each task.

6.4.2.2 The User

The user works on the projects and tasks that have been assigned to him. Below we can see how his user interface will look.



Figure 6: The mobile home screen of user

When the user chooses a project from the home screen he will see a list of tasks and by each task he will see its progress. If the task is over the estimated time limit, it starts being marked red. Tasks are often connected to other users, so the task screen will also reflect when tasks are dependent on others before a user can start his work. On this screen the user will pick a task that he is going to work on.

The first screen of the user will be an overview of all the different projects that are assigned to him, and he has agreed to take. The user can access each project if he needs to check out some information or work on the projects.



Figure 7: Mobile screen for the task list



In each task the user sees a site with a counter. The user can then clock in to the task, at which point Verkvaki will start counting the time and collecting the data concerning the task. His status will then up-date in real time and if an administrator is following up on him as other users, they can see which task he is working on and how many hours he is spending on it.

Figure 8: Mobile screen for the clock in

6.4.3 Description

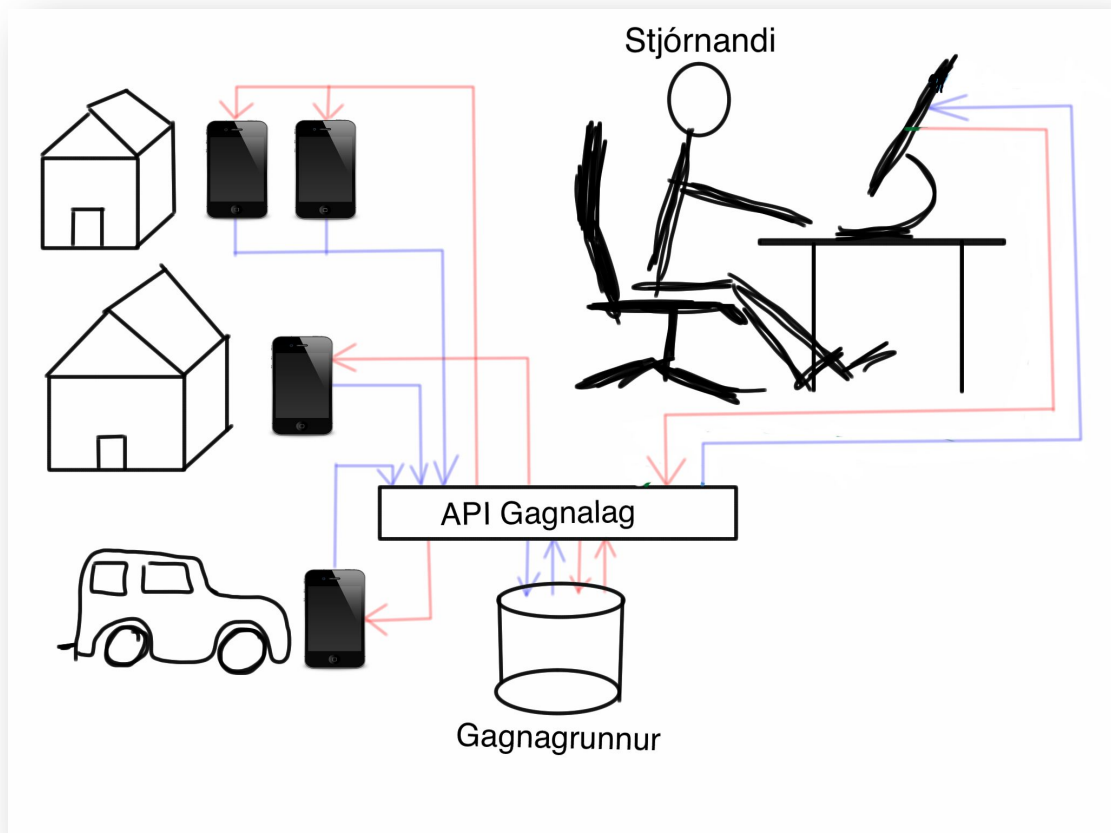


Figure 9: Administrator supervising users around town

While the user is working he uses his smartphone to collect the data. He collects everything that he values as suitable for the final report, voice messages with comments, pictures, etc. When he finishes the task, or finishes the workday, he signs out of the task with the phone and the software will update the status of the whole project. Now all the data should be saved in the database and be accessible to all users and administrators connected to the project. With this the administrator can overview the whole project, if the time schedule is on track, and whether there are any unforeseen events that have come up.

6.4.4 The need

During requirement analysis for Verkvaki with our supporting parties, we realized that companies in Iceland use very primitive methods for collecting

data. Usual methods are writing everything down on paper and then either storing the paper or entering it in the computer afterwards. This system is expensive and time consuming. (See better chapter 6.5.4.1.7 Supporting parties.) In chapter 6.5.1.Competition analysis, there are listed out all the solutions that are available on the domestic market that companies can buy. There is not much software that the companies can use so there is still an important need that Verkvaki will solve. It is very important that software like Verkvaki has a simple user interface and clear native-language instructions so it will be easier to get a market share in the country. With the arrival of the 4G system in Iceland, and also the increase in smartphone usage in recent years, there are no technical barriers that stand in the way.

6.4.4.1 Customer's feasibility assessment

Leda did a feasibility assessment for a potential customer to test the need for the software and to realize how much companies can gain from the solution. The cooperative company has around 3000 tasks a year. The contact person with the company said that by using software like Verkvaki their inspection person would not have to come into the office since all the tasks were accessible from the software and the customer could get instant solutions after each visit.

The inspectors that travel around town can finish around 5 projects a day since they have to come into the office in the morning, plan the route and then do the paperwork at the end of the day. After doing a few analyses there was decided that the software could increase the efficiency from 5 to 7 tasks a day. The contact person also assumed that software like this could cut down on communication since the company could assign contractors into the system, where they could access all the information about the project. To give us a value it was assumed that the software could save 5 minutes on each task.

To calculate the Net Present Value of the solution the cost had to be assumed for the company. The cost assumed was 1 m ISK for setup cost and 100k ISK as a subscription fee.

Table 1: Monthly savings from software efficiency

Monthly savings	
2 task increase a day	449.309
5 min less com/task	93.606

Table 2: Net present values with cost and savings included

	1 year	3 years
NPV	4.098.274	13.140.832

If the 3 year NPV is divided between each month the average amount is 365k ISK savings a month after paying subscription fee and setup cost. What these numbers expose is that there is a need for this kind of software and it can benefit companies highly.

6.4.5 Technical knowledge of user

Since the user interface will be simple, there will be no need for the user to have any technical skills to use Verkvaki. The interface should be as simple as can be and be in the user's native language. There will be almost no areas that require written text, and mobility will be as standardized as possible. The user interface should then be usable for everyone who is able to use a smartphone. The administrator, on the other hand, has to have minimum computer knowledge since his part will be more complex as there are more available features, but it will be as standardized and as simple as possible.

6.4.6 Quality and upgrades

Leda will constantly work on new upgrades to make the software more user friendly and more developed. The target is to have many updates the first two years after the product goes on market. During those developments, Leda believes it is important to listen to the needs of their customers to optimize the efficiency of the work that is put into the development. The newest version of the software will always be fully tested before it is released.

6.4.7 Service and maintenance

When companies buy Verkvaki, Leda will install the software on the administrator's computer and teach him how to use the software. Many companies will choose to host their own data if their security level is high, but Leda can also help companies to host the data elsewhere. Companies will then pay for the installation of the software, plus related tasks. The price then collected will be a monthly payment dependent on how many users each company has. If there are any non-software problems concerning Verkvaki, Leda will charge for an hourly price for a technician.

6.5 Market and demand curve

In the beginning the market area will be bound to Iceland in order to build up experience and develop the software. In Iceland Leda can try out different methods of marketing, whether to large companies, small ones, or even single workers. Leda concludes that it is important to have a finished and thoroughly-tested product before moving it to a bigger scale where there is not the same presence with those markets as with the Icelandic market. Leda can build up a starting cash flow in the domestic market, which makes it possible for the company to go abroad, building up more cash flow and market share.

6.5.1 Competition Analysis

There are number of solutions available in the world with different emphases. Below I will try to clarify the market, both domestic and foreign, to see how reasonable it is for Leda to proceed with the development and the marketing of Verkvaki.

6.5.1.1 Domestic market

Looking at the Icelandic market, there is an increasing development in software management tools. There is no software in Iceland that does exactly what Verkvaki does, but the clock-into work functionality has been around for a long time, though in many cases it is quite primitive. The competitors in Iceland are listed in the table below.

Table 3: Domestic Competitors

System	Seller	Price
Tímon	Trackwell	Given price was for 10 people Start cost was 6.757 p/user Monthly subscrp. 1.003 kr.p/ user
Bakvörður	Advania	Not available
Tempo	TM Software	Few types of packages Monthly subscription \$10 for 10 users \$150 for 100 users \$500 for 2000 users

Tímon

With the software Tímon you can look over the attendance of employees, see the absences and holidays, and sum up the cost of the salary. It is easy to transfer the salary data into the accounting system and each project into the project account. Some of the qualities that Tímon names on the webpage are more accurate time registrations and easier follow-up on each project margin. You can sign into each project with a smartphone or a tablet.

The benefit of Verkvaki over Tímon is that Verkvaki has better micromanagement options. With Verkvaki, information can go back and forth, and the projects can change as they go along in real time. The job report is created alongside the project so no time is wasted on job reports afterwards. [26]

Bakvörður

In Bakvörður, employees clock in and out of their project at their workplace, through a mobile device, and managers/foremen can see who are present through a browser. Each foreman can access the time registration for his employees, and by the end of each salary period the foreman can view their time report. Bakvörður connects to the work registration system, so all the data can be moved to the company's system and from there matched with the accounting. Managers and other administrators can use the reports from Bakvörður to value the status of each project after each day, value the efficiency of each employee or each project, and follow up on wasted hours.

Advania is a strong company with good connections, big capital, and a lot of experience. Advania could definitely develop software like Verkvaki fast if they would show it any interest. Bakvörður is similar to Tímon so again the advantages of Verkvaki are the micro-management process plus the fact that you can make the job report alongside the project. [27]

Tempo

Tempo offers an overall solution when it comes to project accounting, project management, resource management, and business analysis alongside other things. Tempo was built as an add-on to the solution from JIRA, which is task request and service software from the Australian company Atlassian.

There are three Tempo products: Tempo timesheets, Tempo Planner, and Tempo books. The Timesheet software takes care of time registrations on each project, the Planner offers planning and project management, and the Books is used to make cost and budget planning.

TM Software might be the strongest competitor of these three above. Verkvaki still has the advantage over this software from the micromanagement angle, in that you can communicate with your employee and follow up on the report as it goes along. [28]

6.5.1.2 Foreign Market

It is hard to find a good sample of the solution on the foreign market but below I will list two interesting potential competitors.

Table 4: Foreign Competitors

System	Seller	Price
In4mo	In4mo	Price given for a major company Setup cost: 14 m ISK Subscription 7 m ISK each year Hosting included
Click Software	Click Software	Not available

In4mo

The company In4mo is a Finnish company founded in 2007. The company offers a similar product as Verkvaki. Their biggest strength over Verkvaki is that they have already developed a very strong product and are selling it. The company is growing and developing, but they are very expensive in set-up and price. In4mo only allows the data to be saved through their system and they charge a fee for it, which is higher than the price in Iceland.

When comparing Verkvaki to this software then In4mo is a role model for Verkvaki. Verkvaki could compete with In4mo on the basis of price. Verkvaki is also closer to the Icelandic market, which will give it an advantage.

Click Software

ClickSoftware is a company that manages all workplace time-related services with a single platform. They optimize the workflow so every employee can arrive at their work site as accurately as possible in real time. It is a complete

end-to-end solution where you have planning & forecasting, shift management, scheduling & dispatch, mobile field execution and performance measurements.

From the webpage and from the videos it is clear that ClickSoftware is a very powerful tool. But ClickSoftware is that it doesn't log as much information as Verkvaki during the process.

6.5.2 The Four P's



Taking the product and fitting it into the 4 P's helps putting everything in context. The process of starting to develop a product, pricing it, placing it, and promoting it is a huge process. Here below the 4 P's will be used to help defining the whole process and contextualize the product.

6.5.2.1 Product

Product: The Software Verkvaki connects administrators with users and simplifies their connection. The need that the product solves is that it collects the hours that the user/contractor spends on a certain project and collects all the data for that project, which the user logs through a mobile device such as a smartphone or tablet. The data that the software collects includes: hours spent on a certain task of the project, pictures taken during the project, voice messages and later, as the software develops, even changes in drawings.

The software saves both time and office supplies such as:

- Time in report making
- Paper printed, since everything is saved in the computer

- Time in travelling, since all information goes through the internet and the user never has to get anything physical from the administrator

Product types: The plan is to have four types of product. In the beginning there will be a prototype and from that we will develop three types of subscription where each subscription appeals to different sizes of companies, from individuals to large companies.

Product Collaboration: Part of the product will be development contracts with companies, where Leda comes into a company and develops the product into their process.

For more info see chapter 6.4 The software Verkvaki

6.5.2.2 Price

When it comes to the pricing of the product the guideline will be the amount the company saves using Verkvaki that is feasibility assessment from the point of the customer. This will be taken into context alongside with the Gallup poll market research, collecting information straight from potential customers.

Similar products: There are similar products on the market, so it will be good to compare with those when it comes to prices.

6.5.2.3 Place

Distribution places: To begin with, there will only be the company Leda that is distributing Verkvaki in Iceland. Because of Iceland's small size, Leda concluded that the best and the cheapest way to sell Verkvaki is through direct interaction with companies.

Since part of Leda's model is setting up and helping companies start a workflow with the software, there might have to be an office or a co-operating party close to the place where Leda is selling, but it will be estimated whether it might be cheaper to fly an individual employee in for each case.

Distribution channels: The buyer will mostly find Verkvaki through the Internet or he will be contacted by a salesperson of Leda. Word-of-mouth will of course always be a factor but not something that Leda controls.

Companies that could buy the product: The software Verkvaki is for all companies that have employees or contractors travelling around town. It is the clock-in, job registration and follow-up that will save both time and money.

Companies with one employee could even use it just to follow up on their own work, and save time by letting Verkvaki register the information.

6.5.2.4 Promotion

The promotion will be covered in the marketing plan. See chapter 6.5.6.

6.5.3 Inner and outer analysis

A number of elements determine the direction it is reasonable to take in developing a company. For an example, look at the political and legislative factors that the company is working in. Technical developments are very important in this case, and the need of the users is one of Leda's main concerns. Figure 10 below shows influences and influential factors in a company's environment.

The strategic planning will start by making a PESTLE analysis and SWOT analysis.

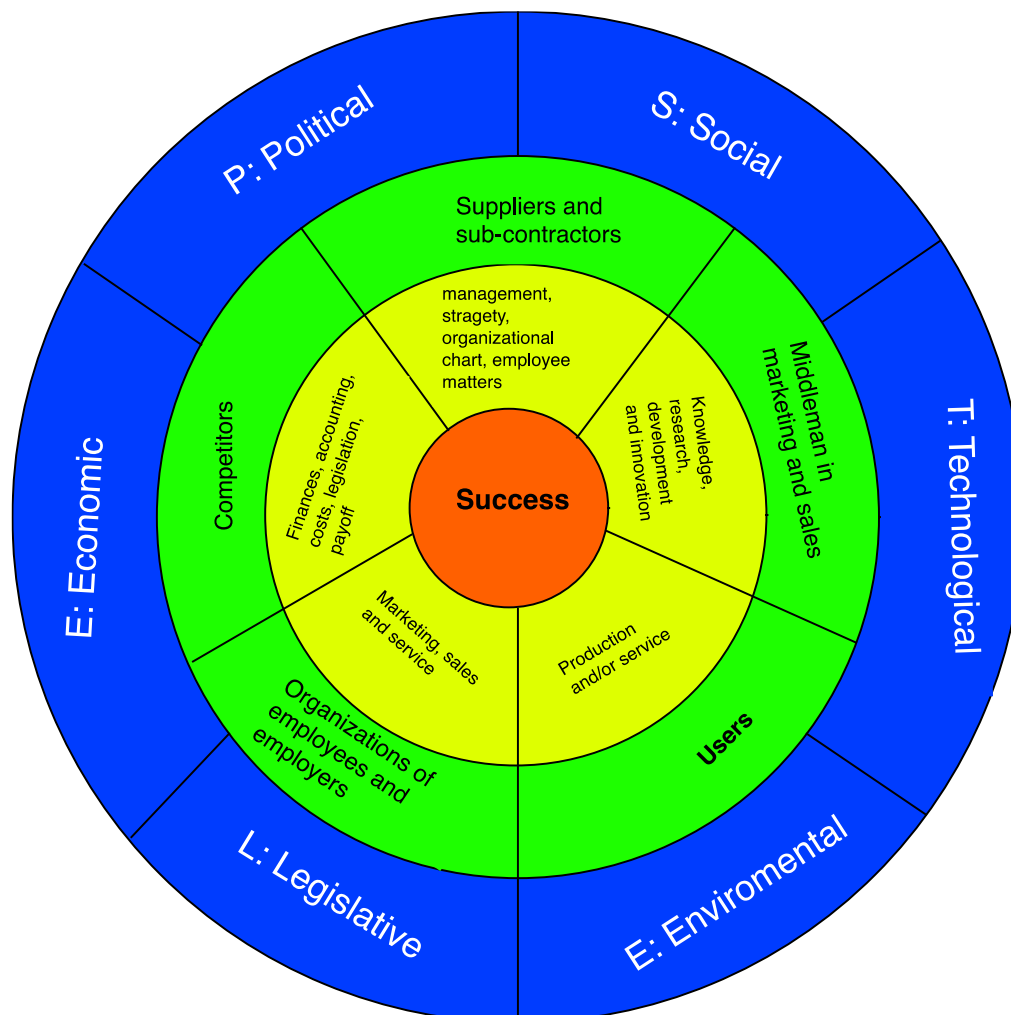


Figure 10: Influences and influencing factors in a company's environment [29]

6.5.3.1 Inner analysis

The inner circles in figure 10 are the internal features of the company. By considering these there are estimated the strengths and weaknesses of Leda and the software Verkvaki, and also estimate their competitive position.

Knowledge, research, development and innovation: In this project students are taking their first steps in making software and working with the business of a company. The software is developed as a final project at the University of Reykjavik, both B.Sc. and M.Sc. As such there is access to specialists and support with the development. By having the help of professors and specialists, critique is received early in the development phase, and good advice concerning development and business strategy is given out. The weak point is, of course, lack of experience. The innovation is clear in that there is no such program on the Icelandic market.

Production and/or service: Since it is digital code that Leda is producing there is not much initial cost. Usually in software companies the biggest cost is salary, since most employees are computer scientists. The working area is sponsored by the government so it is not very expensive. Service cost is an issue that will be dealt with later, but it comes in an even ratio with customers.

Marketing Sales and Service: Leda believes that personal service is best when it comes to marketing and sales. In the beginning Leda will make a video to get the attention of potential customers. The video will be less than 5 minutes long so the person watching it won't lose interest, and in the video Leda will try to connect to people's situations and explain how the software can help them out.

The video will probably cost a bit of money, but when it comes to the marketing Leda will use cheaper methods. Social media like Facebook is a good network to target customers. Contacting potential customers directly will be our main marketing strategy.

Finances, accounting, costs, legislation and payroll: When it comes to overall finances Leda will try to do as much as they can themselves. One member of the team, a graduating student from management engineering, will take care of most of the finances, including accounting. Leda will have an accountant for counseling if needed, especially for the payroll. There will be no need for legislation in the beginning. When Leda starts making contracts

there will be need for a lawyer, but at that time there will income on the way to justify the expenses.

Management strategy, organizational chart and employee matters: In the beginning there are five employees in the company: one takes care of all the finances and the other four will take care of planning and programming the software. The financial manager will also be the main manager of the company. One of the programmers and owners of the company will be the chairman and CEO. Together these two, plus one person from outside the company, will form the board.

The other three programmers will work equally alongside with the CEO, since each of them has an equal say in designing and building the software.

6.5.3.2 Outer analysis – PESTLE analysis

The outer circles from Figure 10 show the external factors. The green circle shows the consumers, supporting parties and competitors. The factor that has the biggest impact on that circle is the consumers. If they don't like the product it won't be successful on the market, so it is very important to please them. The competitors also have great impact on the product since many of them have a similar product and are often seeking out similar consumers. Third party resources in marketing and sales are mostly the media the company chooses to use. It can be expensive but since Leda is going to do much of the marketing on a personal basis then that factor is not important. Leda does not have suppliers, since the product is code, but sub-contractors are important if they get Leda in contact with their contractors and let them implement Verkvaki.

The outer circle on Figure 10 forms the so-called PESTLE analysis. The PESTLE analysis includes six categories, and below is an analysis that accounts for these factors.

P: Political

- The communication channels are very short in Iceland, which makes applications like patents or permits easy to access, making software development possible.

- The Icelandic government does not support high-tech companies like some governments do, for example through tax discounts. Factors like this make it harder to run the company since software development is an expensive process.
- The government has started to put more money into institutions that support entrepreneurship, which gives great access to supporting a small business.

E: Economic

- Companies have started to use software more in the past years, but as usage is rising supply has been rising enormously as well.
- The Icelandic economy is getting more stable since 2008. Companies are more willing to spend some money on software that makes all processes easier.
- It is expensive to hire a computer programmer in Iceland, which makes it expensive to develop software in Iceland.
- Foreign currency is strong in relation to the Icelandic krona, which means that it might be easier to sell the software to other countries. It would be cheaper to buy, and possible to earn more money on foreign deals.

S: Social

- Verkvaki could establish more trust between the administrator and the worker or the buyer and the seller.
- The software's statistics will make a better example of how much time it will take to finish a job.
- More documentation supports the trend of quality control. It may be a selling point to some companies that Verkvaki is used in the process.
- Verkvaki saves money for companies by cutting down on administration costs.
- Buying Verkvaki is much cheaper than hiring an extra employee.
- Administrators are divergent in quality. With a good overview the software might make it less important how good the employee is.

T: Technological

- More Internet speed and faster and more developed devices make this the perfect for the industry to start using smart devices to make work easier.
- Other companies have similar products, so they could start developing similar software. The longer Leda waits with the launch, the likelier it is that some other company does the same and/or that our solutions will be out of date, considering how fast everything develops.
- Everybody related to the project is a recent university graduate, which means that there is not a lot of experience in the team.

L: Legal

- Leda Ltd applied for a patent on the brand Verkvaki and received the permit. There is another company with a similar name, but since these two companies were not in the same business or industry we were allowed to have it as well.
- The company Leda will run as cheaply as possible in the beginning, even giving away shares to some employees but making sure to honor every employment law.

E: Environmental (ecological and placement)

- It is possible to expand to other markets, even worldwide as distribution happens online.
- It should be fairly easy to get in touch with the internal market by contacting companies first hand.
- One of the best things about Verkvaki when it comes to nature is that it focuses on eliminating all paperwork from the workflow, leaving some tasks without paper permanently.
- Less travelling to follow up on tasks means less traffic.
- Danger that rivals starts developing similar products and invade the same companies.

6.5.3.3 SWOT analysis

It was reasonable to do two types of SWOT analysis. The first analysis was focused on the company and the second analysis focused on the software Verkvaki.

Table 5: SWOT analysis for the company Leda

Inner analysis	Outer analysis
Strengths <ul style="list-style-type: none">• Good and ambitious team• The company is in no debt• The prototype is being developed as a final project in a Bachelor's program so a lot of progress will be made despite of little cash flow• If the company is successful in getting clients then the cash flow is steady due to the software subscription program	Opportunities <ul style="list-style-type: none">• If the prototype is successful, Verkvaki could be the leading software of its kind in Iceland.• Where Leda has introduced the product, Leda has received very positive feedback.
Weaknesses <ul style="list-style-type: none">• No income yet• Hard to keep employees with no cash flow• It is very expensive to have many employees when developing software, including training costs• Hard to estimate how long it will take Leda to finish a product that is ready to offer to customers	Threats <ul style="list-style-type: none">• Companies with strong capital and much more experience could be quicker to develop such software.• Danger is that Leda will not be able to collect any capital to finish the project

Table 6: SWOT analysis for the software Verkvaki

Inner analysis	Outer analysis
Strengths <ul style="list-style-type: none"> • Leda knows that the need for Verkvaki is there • Companies can save much money on using the software which makes it easier to price the software higher • When the users realize how easy Verkvaki is to use and get used to it, they will stay loyal • The supporting parties are very co-operative and will give Leda feedback to make better software • When Leda starts getting income it is possible to speed up the development of the software by working longer hours or hiring more people • Good supervision from professionals during the first stages of the designing 	Opportunities <ul style="list-style-type: none"> • Might get a reasonable market share in Iceland since there are no solutions that do exactly the same as Verkvaki • With an increasing share in Iceland, there will also open up more opportunities with more and smaller customers. • With a cash flow there are possibilities to start working on bigger markets with a software that is fully tested and being used in Iceland • Increasing cash flow and more customers adds faster development and more sales
Weaknesses <ul style="list-style-type: none"> • In the beginning it will be hard to pin down how long it will take to develop the software. Many barriers will be in the way before Verkvaki will be ready to sell • Uncertain what companies and organizations would be ready to pay for the software • Development in the computer and software industry is extremely fast so Leda has to get the software out as fast as they can 	Threats <ul style="list-style-type: none"> • That other companies will bring to the market a similar software that will take over the Icelandic market. From there it is hard to become self-sufficient.

The SWOT analysis shows many strengths and opportunities, mostly that there is no such software in the Icelandic market and the developing cost is very low in the beginning. Companies can save much money by using Verkvaki and make the workflow simpler, without the administrator driving around town to follow up on employees' work.

Concerning threats and weaknesses, it is hard to keep doing software development if there is no cash flow, and you really have to watch out if other stronger and more experienced companies start looking into the same market. They have both more experience and more capital to do everything faster. Even though the software could save companies a lot of money, that doesn't mean that they are willing to pay a part or even a fraction of that profit for it.

6.5.4 Product and researching the need

6.5.4.1 Market overview

Before doing a market research Leda did an overview on the market.

6.5.4.1.1 Size of the domestic market

Data from the registry office in Iceland show that in Iceland there are around 70 thousand companies registered in 2012. Most of these companies are single workers and possible customers of Leda are of course only a fraction of this number, but it gives an idea of customers in Iceland. Leda will only take into account companies that are more than one employee. In the chapter 6.5.4.3 Product model are listed out a better analysis on the domestic market.

6.5.4.1.2 Scandinavia

Scandinavia is closer to Icelanders in culture and of course geography. The languages are similar and English skills on average good, which would mean that communications between the nations are good. Financial stability has been greater in these markets than has been in Iceland in recent years, so it might be more likely that companies are willing to spend money on better management and documentation through software. It is very hard to estimate how many possible customers are in the Scandinavian countries. In all the population of these countries are 80 times the populations of Iceland so it is a much bigger ensemble. It would be possible to have only one office for the whole region.

6.5.4.1.3 The European market and other markets

The European market and other markets are very big. Cultures differ between countries, so it may be necessary to have an office in each country. Many of the European countries are financially strong, so there should be the same opportunity as with the Scandinavian market.

6.5.4.1.4 Target groups

At first Verkvaki will meet the needs of companies and organizations that maintain many employees and/or much real estate. This group includes construction companies, insurance companies, real estate agencies and safety services companies. Later the development will expand to smaller businesses, which is much bigger group than the former one.

The reason Leda would choose the bigger companies to develop the software is, first, that it is more likely that these companies would be willing to develop Verkvaki to their needs. If it is possible to adjust Verkvaki for two to three companies then Leda would have a variety of different situations, which will lead to more developed software. The smaller contractors often work for the bigger ones, so they would start using the software through them.

6.5.4.1.5 Companies

Big companies and organizations often spend much time and investment on management and data collection connected to projects and tasks. It is common for big companies to recruit subcontractors that specialize in certain projects. In modern society companies require good time management and good planning to optimize the use of human resources and time. Verkvaki is the perfect solution to optimize this area.

6.5.4.1.6 Single Worker

When the user interface is more developed and all the main functions added, then it will be time start offering the software to single workers and small companies, as an edition of Verkvaki that will be specially designed for their needs. This will help them to make bills and make plans if they need to be at many places over a short period of time.

6.5.4.1.7 Supporting Parties

In the process of development, Leda has had the opportunity to work with two companies that have given the process valuable information in the development process.

VÍS

In the beginning it was the insurance company VÍS that contacted one of the owners of Leda about developing this type of software. In their business VÍS

is in need of a system like Verkvaki. After they had looked at what was available on the market, they concluded that there was no software on the market that suited them at a reasonable price. The process VÍS uses today to collect the data is time consuming and also uses a lot of human resources. VÍS hires contractors in the capital area for 700 million Icelandic krona on a yearly basis but 90% of the amount is divided between 10 main contractors. The sum of different tasks is around 5000 on a yearly basis and many of them need much more attention than others. During requirement analysis the software team worked closely with Þorsteinn Þorsteinsson, administrator in the damage claims department. Þorsteinn thought that by involving Verkvaki in their workflow the company could save up to 25 – 30 million krona on a yearly basis

Öryggismiðstöðin

Leda made a requirement analysis for Öryggismiðstöðin and spoke to Jóhann S. Ólafsson, a manager of the technical area in Öryggismiðstöðin. Jóhann was very positive towards Verkvaki and gave the company many useful ideas for the development. He has 40 different technicians around town putting up equipment, but the work orders are around 18.000 – 20.000 annually. Jóhann thinks that the biggest advantage of Verkvaki is that he can follow up on employees and see where they are placed, then the software can register their hours and up-date everything in real-time so the administrator can always have the newest information. Time registration takes a lot of time for the employees, but Jóhann thinks that by involving Verkvaki in the company's workflow they could save up to 15 million krona a year.

6.5.4.2 Market Research

To estimate how many companies would be willing to buy the solution and how much they are willing to pay for it, Leda sent out an opinion poll. The website <https://www.surveymonkey.com/> was used to make the poll, and to introduce the product we used the website prez.com to make a slideshow which would give survey participants enough information to make up their mind. The full questionnaire can be found in Appendix A with the extra figures. The questions asked in the opinion poll were:

1. What kind of company / foundation do you work for?
2. What is your position in the company/foundation?
3. How many people does your company / foundation employ?
4. Do you use any software to follow up on the jobs that our software tracks?
5. If you answered yes to the software question, then how much do you spend on software connected to these jobs on monthly basis?
6. How do you manage people working around town today? (here you can choose multiple choices)
7. Do you think that time registration would improve employees' efficiency?
8. Do you think that your company / foundation would have a use for this kind of software?
9. How much would you be willing to spend on software like this on a monthly basis, per person? "Please bear in mind the time such software could save, and potentially even the work of an employee. You can choose two options if you think the sum you would spend is somewhere between the given values.
10. Do you think your company would be open to interacting with a startup company for software usage?

The survey was sent out to 75 companies and the sample included project managers, administrators, managers and anyone else we thought would have authority over people or decisions to buy software. Each company was personally called before sending the survey. Sometimes Leda only spoke to the receptionist, who pointed at the most suitable person and handed out an e-mail, but in some cases Leda was put in contact with the person who was supposed to answer the survey. This method was chosen since it was suspected that the success rate would be higher than choosing blindly from the Internet. The survey was sent from Daniel's university mail, since Leda believed that people would feel more positively about helping out a university student. All these thoughts on methodology are likely to have worked quite well since 32 people answered and made the success rate as high as 43%.

Here below there are listed out the conclusions that are significant for this study.

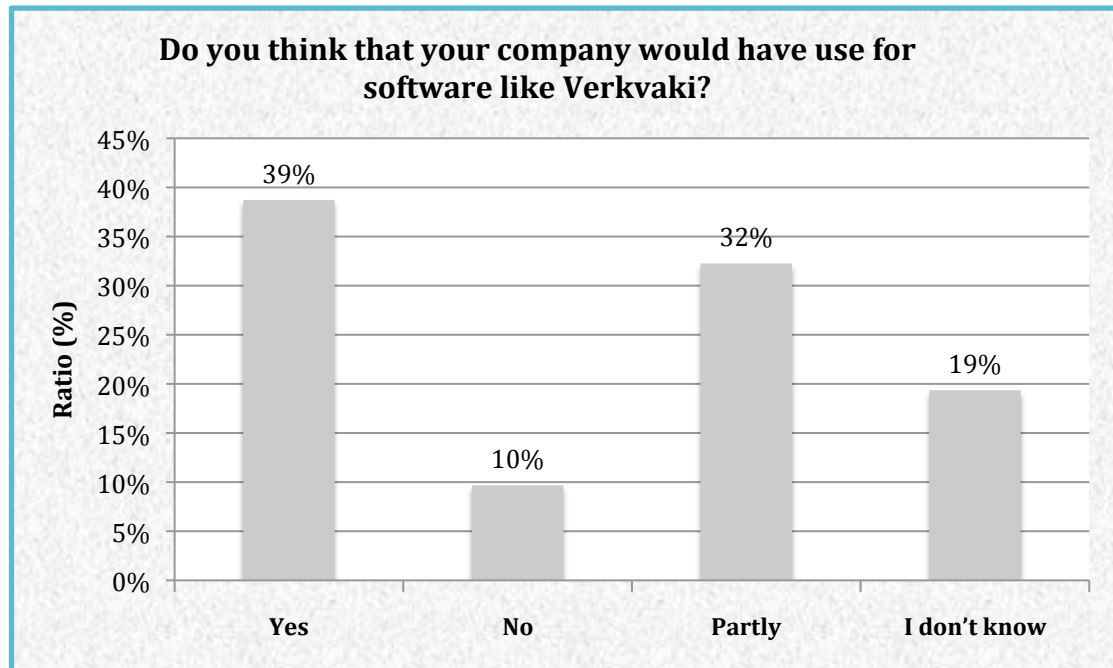


Figure 11: Companies' opinion

39% of the companies answered that they would have use for it and 32% answered that they could use it for part of their operation. Only 10% did not see any use in the software and 19% that they didn't know if they had any use. This is a promising outcome. With good marketing and development of the software there is a chance to reach part of the companies that are not certain. That would make 70-80% of the companies looking at Verkvaki as a product that would benefit them.

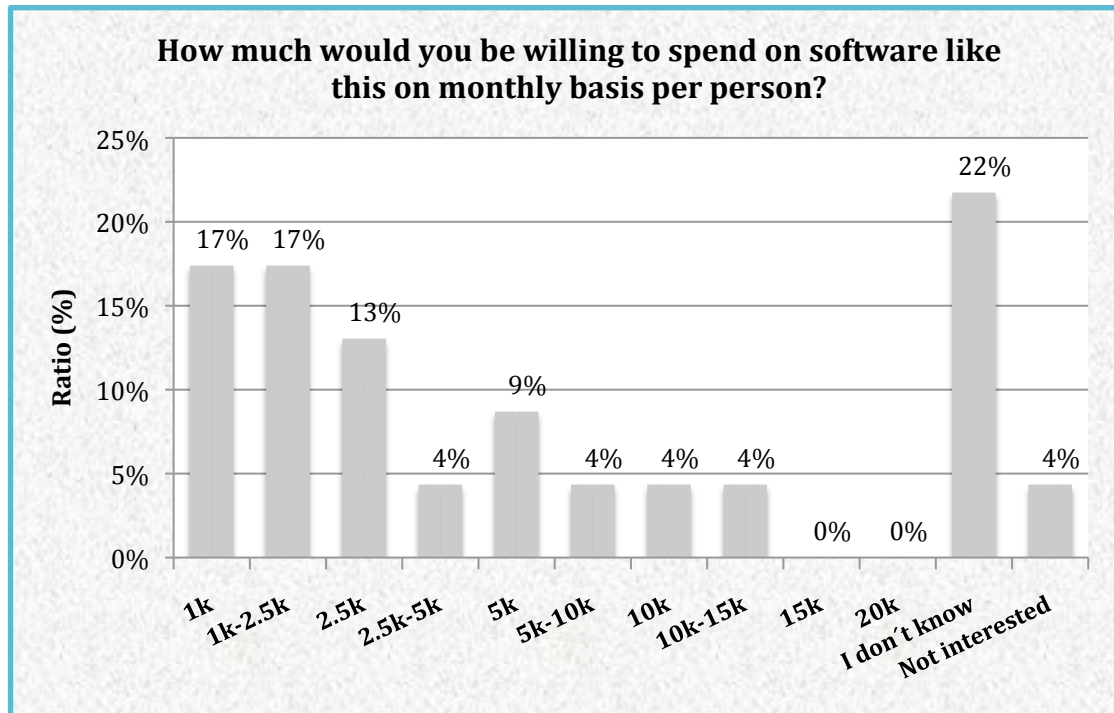


Figure 12: Customers value estimation

When it came to naming the price there was a broad distribution. Most companies answered that they would be open to paying 1k krona or between 1k and 2.5k krona per person using the software. Leda made the mistake of not requiring an answer for this question and only 23 of 32 answered this question. The most frequent answer was “I don’t know” but those respondents can still be considered open to paying for the solution.

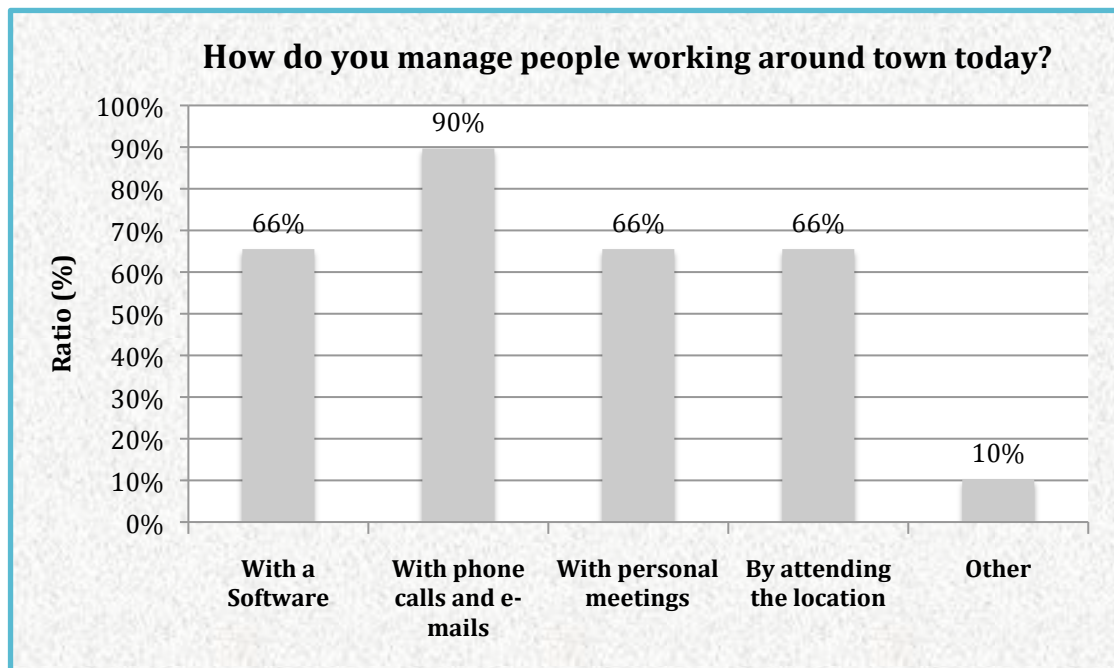


Figure 13: Communication channels

From the communication channels it appears that 66% of the companies use some kind of software to communicate with people. Here the respondents could choose multiple answers since some companies use all of these methods. From the answers it is evident that Verkvaki could save many of these companies valuable time through streamlined processes.

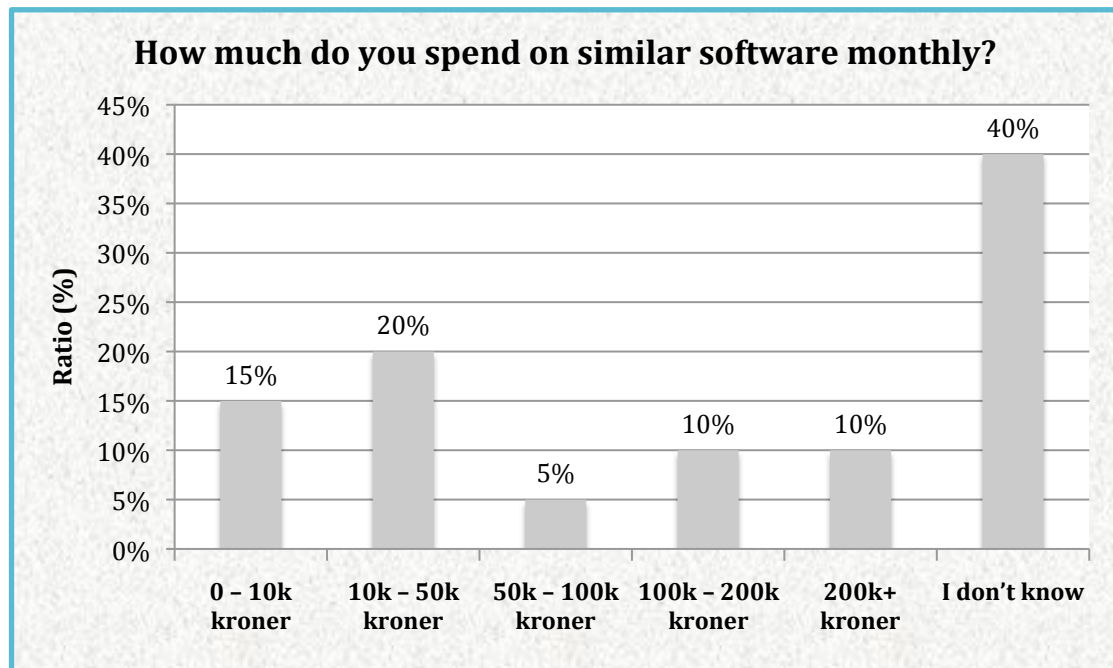


Figure 14: Money spent on project-related software monthly

66% of the respondents use software. Of these companies the distribution of the amount spent monthly is quite even. From these numbers Leda suspects that the original ideas for the pricing of Verkvaki are not so far from reality. The original ideas were around 5k ISK for each license.

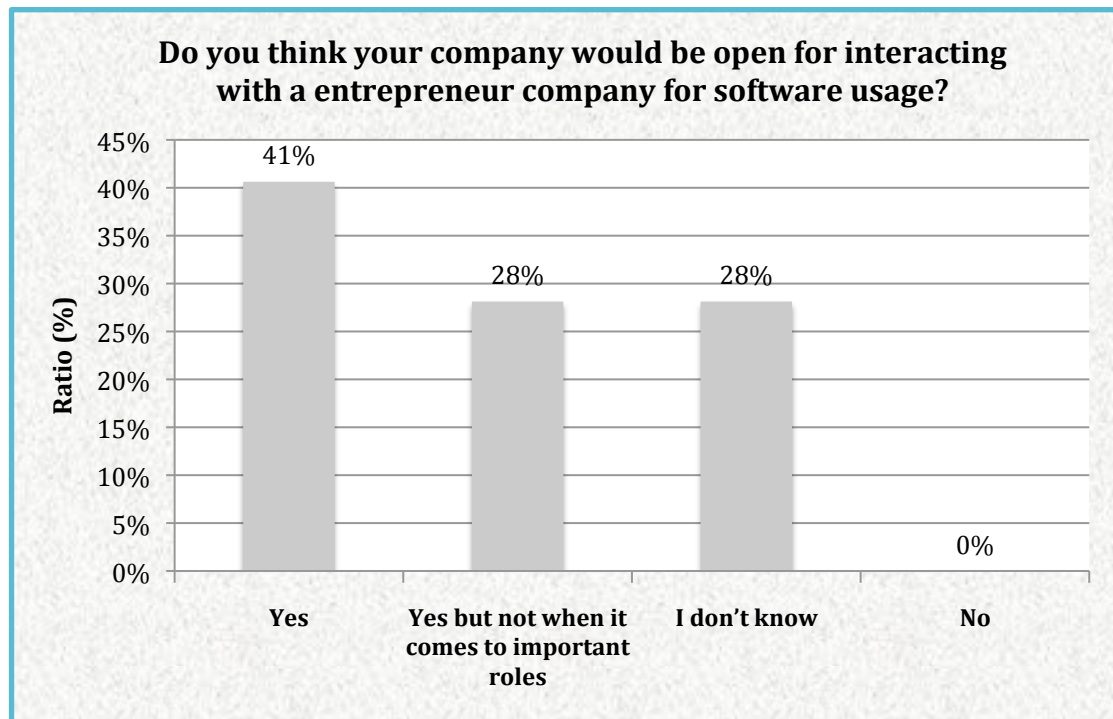


Figure 15: Companies' notion towards participating with start-ups

With the prospect of trying to sell a software solution to established companies it is good to know that they have a positive disposition towards entrepreneurs. Nobody gave the answer No to this question.

6.5.4.3 Product model

The first year the software is for sale there will only be one subscription plan called Verkvaki A and at that point Leda will try to sell that solution at an introduction price to bigger companies. The year after Leda will launch more features with three subscription plans and then expect solution A to split into subscription plan 2 and 3.

The solutions are the following:

Solution A

- This solution will be a first phase solution in the first year. It will be similar as solution 2 but have some of the features of solution 3

Solution 1

- 2 administrators and up to 4 users

Solution 2

- 4 administrators and up to 8 users

Solution 3

- No restriction on administrators and users.
- Each solution customized to suit the needs of each company's system.

Listed in the table below are industries likely to use the software and the number of companies in that industry, counting more than one person. If Leda would take all companies in Iceland the number would be closer to 70 thousand. All numbers were taken from the registry office but the newest data was since 2005.

Table 7: Industries, numbers and statistics

Type of category	Total	Positivity	Estimated fraction	Total sales
Industry	1230	71%	5%	44
Utilities, Supply systems	22	71%	5%	1
Residential and industrial building constructions	1575	71%	5%	56
Transport	375	71%	2,50%	7
Real estate, renting and specialized service	1598	71%	2,50%	28
Government institution	164	71%	2,50%	3
Insurance				2
Aluminum smelters				2
Security Service				2
			Total	144

From the survey sent to companies a very favorable attitude towards Verkvaki was noted. To keep expectations down the ratio of companies that answered that they could use the software and the companies that answered that they could partly use the software were summed. Only 10% said no and the ones not knowing will be left out of the statistic. It is very hard to estimate which companies are task driven and whose employees need to travel around town so Leda used an estimated fraction of the positive answers, subject to how well the software applies to a certain category. Sales expectations were also downgraded for the estimated fraction. The number of sales is then “total number in a category”, times the “positivity”, times the “estimated fraction”. The last three yellow lines are then an estimated number of buyers based on experience.

Table 8: Number of companies divided by number of employees

Type of category / Nr.Employees	2-9	10-19	20-49	50-99	100-249	249+
Industry	819	181	138	51	27	14
Utilities, Supply systems	13	3	0	3	1	2
Residential and industrial building constructions	1347	138	62	17	8	3
Transport	278	42	31	10	4	10
Real estate, renting and specialized service	1352	136	66	27	13	4
Government institution	64	20	19	23	21	17

In the table above there are a number of companies in each category sorted by the number of employees. This information will be used in the following steps. The reason the companies are grouped like that in table 8 is that this is similar as the sorting on the registry office. The groups 100-249 and 249+ are later merged. All numbers are from the registry office of Iceland.

Table 9: Estimated distribution of sales

Type	Employees	Solution 1	Solution 2	Solution 3
Small businesses	2-9	100%		
M.Small businesses	10-19	50%	50%	
Medium businesses	20-49		100%	
B.Medium businesses	50-99		50%	50%
Big businesses	101+			100%

To distribute the sales calculated in each category Leda made the presumption that small businesses would only buy solution 1, medium-small businesses would be divided between solution 1 & 2, etc. This assortment is then used to divide the sales in the next table.

Table 10: Sales of each solution

Type of Industry	Total sales	Solution 1	Solution 2	Solution 3
Industry	43,7	32,3	9,0	2,4
Utilities, Supply systems	0,8	0,5	0,1	0,2
Residential and industrial building constructions	55,9	50,3	5,0	0,7
Transport	6,7	5,3	1,0	0,3
Real estate, renting and specialized service	28,4	25,2	2,6	0,5
Government institution	2,9	1,3	0,7	0,9
Insurance	2			2
Aluminum smelters	2		2	
Security Service	2			2
Total	144,3	114,9	20,4	9,0
Rounded	144	115	20	9

By using the numbers of companies at a certain size in a category and dividing them by the total number of companies in that category then that will show the ratio of sales for that category. That ratio is then used with Table 9 to make presumptions of expected sales for each solution in every category. The yellow lines from Table 10 are estimated sales based on experience. The reason for this is that originally the idea comes from the insurance company VÍS and while doing the market research Leda was contacted by another insurance company looking for a solution like Verkvaki. The safety service Öryggismiðstöðin was really fond of the software and Leda knows that the other big company on the market is looking for similar software. The aluminum smelters in Iceland are among the biggest buyers of contractors' services in the country so Leda estimates that it is highly likely that a solution nr. 2 would be optimal for them.

Table 11: Estimated sales during the first year

Year 1	
Solution A	14

The first year of sales will start slowly and Leda will focus only on big companies in the beginning. They will start using the software and then inspire the smaller companies and contractors to use the software. In the first year Leda estimates sales of 14 subscriptions of solution A. After the first

year Leda estimates that these subscription plans will divide between solution 2 and solution 3, with 10 of the former and 4 of the latter.

Table 12: Estimated sales during the second year

Year 2	Solution A splits	Planned sales	Total	Total subscribers
Solution 1	0	40%	46	46
Solution 2	10	30%	6	16
Solution 3	4	30%	3	7

In the second year Leda will emphasize sales to smaller companies, estimating 40% of 115 companies will buy the solution. Since many of the big companies have already been targeted in the first year Leda estimates added 30% sales of solution 2 & 3, but that is only 6 and 3 sales.

Table 13: Estimated sales during the third year

Year 3	Rest of the sales	Total	Total subscribers
Solution 1	60%	69	115
Solution 2	22%	4	20
Solution 3	25%	2	9

The third year sees even less sales of solution 2 & 3 since there are not that many big companies in the Icelandic market. The sales to the smaller companies will keep on rising though since they are more numerous.

6.5.4.4 Product and market conclusions

See the tables below for estimated sales from the three first years of Verkvaki sales. In the table the yellow squares only show how Solution A will split. The total sum is then only of Solution 1,2 and 3 but not from Solution A.

Table 14: Estimated sales over the first three years

Years	1	2	3	Total
Solution A	14			14
Solution 1		46	69	115
Solution 2	10	6	4	20
Solution 3	4	3	2	9
Total	14	55	75	144

Table 14 shows new sales of each solution in the following year. From the table it is clear that the sales are increasing between years but that is mostly due to solution 1.

Table 15: Cumulative subscription from sales

Years	0	1	2	3
Solution A	0	14		
Solution 1		0	46	115
Solution 2		10	16	20
Solution 3		4	7	9
Total subscribers		14	69	144

The software has a subscription model. Table 15 shows the cumulative number of subscribers through the first 3 years of sale.

6.5.5 Demand Curve

6.5.5.1 Sales Quantity

The sales quantity is built on the data from chapter 6.5.4.4. Figure 15 shows new sales during the following year built on data from table 14 and figure 16 shows the cumulative subscribers built on data from table 15.

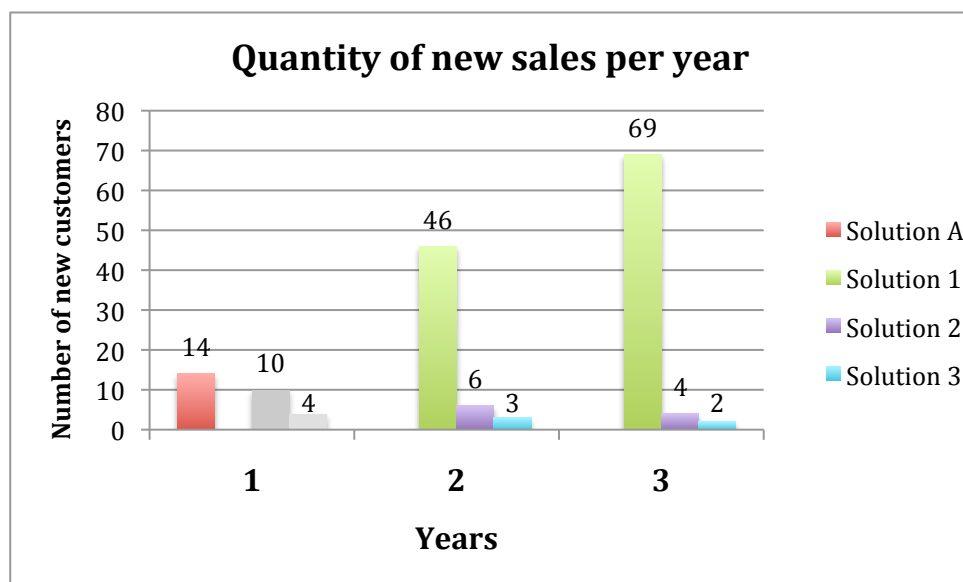


Figure 16: Sales during the first 3 years

The first year solution A is sold which then divides into two other subscription plans. In the figure Leda added two light gray columns the first year interpreting the division of solution A.

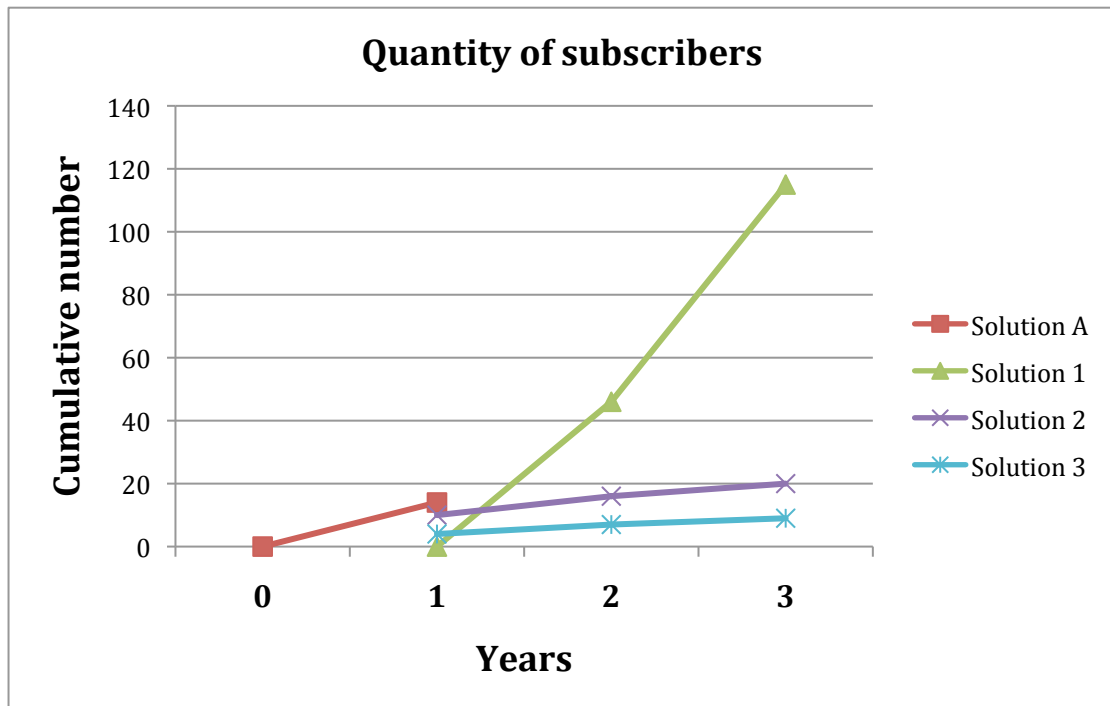


Figure 17: Cumulative subscribers of each solution

From the sales Leda expects the sales forecast to be evenly distributed over the year. Figure 16 starts from year zero to show how the number of subscribers rises through the years.

6.5.5.2 Product price and sales

To decide the price for the product Leda made few biases. It was a mutual agreement that the price should be decided from the potential value for the customer.

Bias 1

Table 16: Average amount of respondent in ISK

	Answers	Sum
Total sum from the survey	17	62.250 ISK
Average		3.662 ISK

The average amount from the respondents of the survey was 3.662 ISK. The average amount is then used as a bias in the price making.

For Solution 1 it is expected to be 4 users. Let's call that Bias 1a.

For Solution 2 it is expected to be 8 users. Let's call that Bias 1b.

For Solution 3 it is expected to be 16 users. Let's call that Bias 1c.

Bias 2

For Bias 2 we use a feasibility assessment made for one of the potential customers and given data from that company. That company was sure that they could increase the efficiency on field and saved enormous time in communication by using the software. The company had 3000 projects a year. Leda made a few diagnoses where each of them had different kinds of efficiency. The one used in the end was that an inspector could review 7 cases a day instead of 5 and the company would save 5 minutes in communication on each task worked on during the year.

Table 17: Profitability estimation from using Verkvaki

Monthly Savings	543k	Monthly
NPV (1 year) Int*rate (8%)	4.098k	342k
NPV (3 years) Int*rate (8%)	13.140k	365k
Customer will pay 30% of what he earns		110k

Monthly savings were 543k ISK. It was estimated that the company would pay 1000k ISK for setup and 100k ISK for a monthly subscription. Net present value analysis made then made on the cash flow for 1 year forward in time and 3 years forward. Estimated interest rates were 8% compared to a loan with 5% interest rate and 3% index. The 3 year profit was then used to dilute the setup cost and divided on the months. It was estimated that a customer would be open to paying for 30% of the value that he can possibly receive. That makes Bias 2 equal 110k ISK.

Bias 3

This is the simplest bias and only used for Solution 3. In4mo is a company that is the most similar to Verkvaki. From a supporting party Leda had the numbers of In4mo charging 14m ISK for the setup and 7m ISK for the hosting and subscription on early basis. Leda decided only to take the early subscription divided by months in the year, which makes Bias 3 equal 583k ISK.

Prices

In Table 18 each price is calculated with a different weight on each bias. The price for Solution 1 is mostly estimated from the survey or 95%. Small companies do not have as many tasks and cannot reach as much value from the solution in the form of many tasks. As the company grows Bias 2 gets bigger and for Solution 3 there is a good value of Bias 2 and just 5% of Bias 3 to blend in the effect of a program that has similar operation as Verkvaki.

Table 18: Calculated prices for each subscription

	Bias 1a	Bias 2	Bias 3	Total
Solution 1 Cost	95%	5%	0%	19.390
	13.915	5.475	0	
Adjusted				20.000 ISK
	Bias 1b	Bias 2	Bias 3	Total
Solution 2 Cost	90%	10%	0%	37.315
	26.365	10.950	0	
Adjusted				40.000 ISK
	Bias 1c	Bias 2	Bias 3	Total
Solution 3 Cost	60%	35%	5%	102.645
	35.153	38.325	29167	
Adjusted				100.000 ISK

Solution A is thought of as an introduction solution and will be offered at 30k ISK a month.

The estimated quantity of the sales according to chapter 6.5.5.1 will be divided evenly throughout the years to calculate the cash flow from each solution. The figure below shows rising monthly earning from each solution between years.

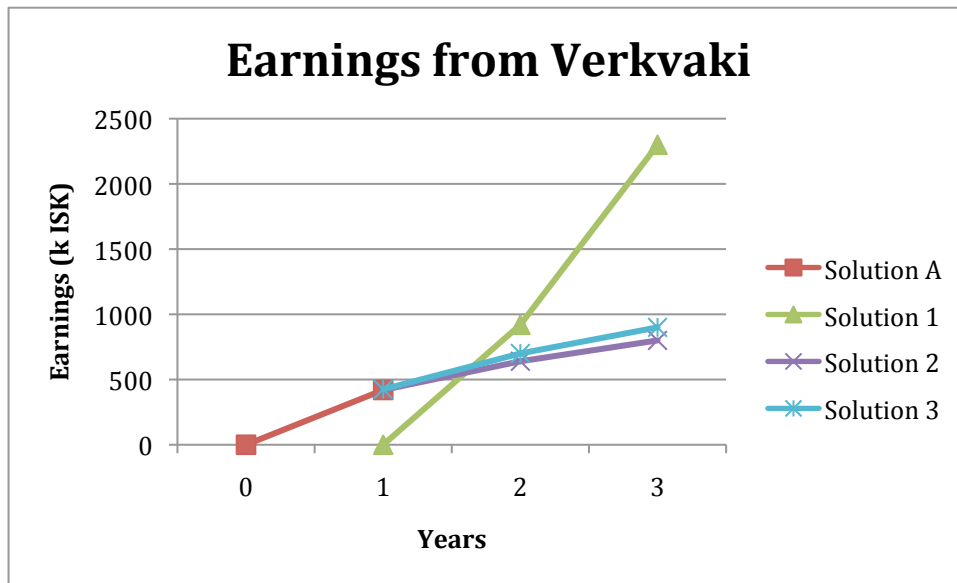


Figure 18: Rising monthly earnings from each solution

Summing up the monthly gives us the yearly earning. See Table 19 below

Table 19: Early earnings

Years	1	2	3
Solution A	2730		
Solution 1		5980	20010
Solution 2		6360	8720
Solution 3		6750	9700
Total	2730	19090	38430

6.5.6 Marketing plan

The first plans are that the prototype of Verkvaki will be released in the spring. Even though delays are common in software developing, Leda is optimistic to start working with the supporting parties in fall at the latest. When the collaborations start the main emphasis will be on fixing bugs and refining the software so it can suit more companies on average. If the software is ready for sale sooner, then Leda might even start charging the supporting parties for minimum “good will” fee.

6.5.6.1 Vision

In the beginning the priority is to get the attention of bigger companies and implement the product from top-down. When approaching the relevant person in each company, it is important to let the person see or realize that with Verkvaki their company will get more done, save money, and improve quality control and service.

While the Software is gaining popularity, the main factor in the marketing will be personal contact. To draw out these communications and to follow up on previous interactions, Leda thinks that tools like a website, a good explanation video, and commercials alongside word-of-mouth will be the tools to use.

6.5.6.2 Webpage

The software will be run through browser while it is being developed, so by default there will be daily traffic through the website. Considering how everything is developing towards the Internet these days, having a strong and interesting website is crucial. All the marketing tools mentioned here below will be united in the website which leads to the company’s homepage, the centerpiece of the marketing. The website should be simple with not too detailed information. The most important details will be how the software works and how to contact Leda. Information on price will be available in more detail later, since system setup and custom solutions might turn out to be the biggest income of the company.

Design and layout is very important in all aspects of the company. The homepage is the strongest representation of Leda towards customers.

Therefore it should be exemplary of the company and a symbol of what the software will look like.

6.5.6.3 Video

People are inundated with information today, and from daily experience it is hard to reach people when they have to put in some effort. Leda concludes that videos are the best way to transfer information to people since it has both words and images. The viewer only needs to push play to receive the message, and from the length of the video it is clear how much time it will take.

The plan is to produce a sales pitch video in which the functionality of Verkvaki is introduced alongside workflow efficiency. Financial gain will be an underlying message since it is the most important selling point.

When companies are contacted the video will follow to open up for a personal meeting. Since the video will be on the website, Leda might expect occasionally to be contacted by potential customers.

6.5.6.4 Commercials

Since Verkvaki ushers in a paperless environment, it is not aligned with the company's image to print brochures or paper handouts. Net banners that lead to the website or to our sales pitch video are more in keeping with the company's direction. The most viable pages have not been identified at this stage in the process, but these would be more abstract pages appealing to possible customers.

6.5.6.5 Word-of-Mouth

Word-of-mouth is a strong tool. If the marketing is good, and the product optimal and reliable, then with time Verkvaki will be presented to people by users. This is, of course, an equally strong possibility in the opposite direction if the software does not operate as it should, is full of flaws, or the user interface too complicated for people to adapt.

6.5.6.6 Personal Sales

With all the tools mentioned above Leda believes that personal meetings with companies will always be the tool that convinces the customer to buy the solution.

When the product is ready and fully tested then there will be a sales person going to companies and offering a more detailed overview of the product. The person that will be contacted is usually a manager or a project manager. Even if companies are not interested at the point they are reached, they will be contacted again when the software is more developed.

6.5.6.7 Potential Customer Motivation

All companies that are open to the solution will be given a free trial period from a standard subscription.

Distribution Channel

The distribution channels are quite simple. If the company only needs a standard version of Verkvaki, it is downloaded from the Internet. As mentioned before, a primitive version of the product will be available through a browser, which means it is accessible on any Internet connected device.

Companies that purchase a full package will get a technical assistance from Leda.

6.5.6.8 Service after sale

Customer service will go through e-mails and phone calls. It is also possible to have a message box in the software for error announcements. Each customer will have a set service time each month included in the subscription fee, but when he passes that time he will be charged for time used. If a customer needs a programmer to visit his company, then there will be an hourly rate for a standard programmer.

6.5.6.9 Marketing Cost

The table below lists the expected cost of marketing:

Table 20: Outlined expected costs from marketing

Cost of marketing	Cost
Design of website	ISK300.000
Programming of a website	ISK500.000
Production of a video	ISK300.000
Design of an Internet banner	ISK50.000
Internet commercials	ISK300.000
Total	ISK1.450.000

The cost for the employee, who works on the business plan and marketing all year round, is included in the programming.

The total cost of marketing is estimated 1.450.000 ISK. Leda will buy a service from a graphic designer for the website before releasing the product. The estimated cost is 300.000 ISK, but from that work Leda expects to receive artwork to build on. The website will be programmed by one of Leda's programmers. The estimated cost will be 500.000 ISK, but will be calculated as an investment since one of the owners is a web designer. Production of a video is estimated at 300.000 ISK. The estimate is so low because the owners know a filmmaker who is willing to take on the job. The Internet banner will be built on the website artwork and done by the same designer. The estimated cost is 50.000 ISK. The budget for the Internet commercials is 300.000 ISK. From the list this is the only cost that could be repeated, but following years will not be included unless this method will be successful.

6.5.7 Technical Strategy and implementation

For a graphical representation of the technical strategy see Gantt graph in the chapter 6.5.7.5 Project plan

6.5.7.1 Operational objective

What the buyer expects from the solution is that it will help him to simplify and enlarge his overview of his human resources. The software should cut out office hours after field inspections, and reduce personal communications between project planner and project worker because of information access through the software. In the end the software collects all registered hours and information on the project, and saves them in the company's database where the customer can analyze the results or look up specific cases.

It would be optimal to develop Verkvaki in such a way that it works with other software, since that would open up possibilities such as contractors connecting Verkvaki to their accounting system and immediately billing for all registered hours.

6.5.7.1.1 Technical approach

When programming the prototype the team will use Agile/Scrum methodology divided into 10 sprints. For more information on Agile/Scrum methodology see Appendix B.

The system will be written as a response system, which changes relative to the size of the window or type of device. The API data layer will be programmed first, which will communicate with the database. See Appendix C API architecture.

Tools

The Software will be written in ASP.NET MVC 4, with the Razor 4 view engine. The front end will be written with HTML5, CSS3 and Javascript.

Hosting

Appaharbor will be used to host the website. It takes code from the master branch on Github, translates the code and does unit testing. If the unit test goes through then it will upload the software to run on the newest version. Microsoft SQL database will be used, which is also hosted by Appharbor.

Version Control

Each programmer will make a new branch from the development branch on Github when implementing a new function. Development branches are then merged into a master branch at the end of each sprint, but Appharbor will then unit test before the new features are launched.

6.5.7.1.2 Roles and responsibility

The engineer will be the product owner and one of the programmers will be the scrum master.

The team will be four programmers.

The product owner will decide which task will be operated in each sprint, prioritizing the tasks and the design of the system. He will have the final say in system decisions.

The scrum master is the project manager, who will maintain the sprint setup and make sure that every team member can work unobstructed.

Team members will be responsible for their code even though the product owner is responsible for the project. Work performance should be even and equivalent.

6.5.7.2 Building the prototype

The first milestone of programming is to build a prototype that will function and do basic commands, creating projects and tasks and then logging task hours. The estimated time is 21 weeks. In the Gantt graph we can see how the work is broken down.

6.5.7.2.1 Requirement analysis and system design

In the requirement analysis the programmers will meet with the supporting parties and see what their needs and problems are. For the requirement analysis see supporting parties chapter 6.5.4.1.7. When deciding on the requirements the system design will be planned in line with how it should work. In the end of this period the requirement analysis report will be ready. The estimated time for this task is 4 weeks.

6.5.7.2.2 Planning the programming

Different parts of the programming will be divided between the programmers while they are working on the information from the requirement analysis and doing the system design. The sprint will be set up and the whole period of prototype building scheduled. The estimated time for this task is 4 weeks alongside the first step.

6.5.7.2.3 Setting up the SQL

Microsoft SQL will be the server that will be hosting all the programming work. When the programming starts it will take some time to connect all the tools and get them functioning normally. Appharbor has to connect to Github and then connect the Appharbor MS SQL database. The estimated time for this task is 4 weeks.

6.5.7.2.4 Programming the back-end

When the team starts setting up the system, a part of the team starts programming the back end. The API will be the first task. The estimated time for this task is 8 weeks.

6.5.7.2.5 Programming the front end

The front end is also referred to as the user interface. When everything is up and working with the SQL, a part of the team will start working on the front

end. HTML5 will be used for text, and CSS3 will be used for design. Javascript will then be used for front end function. The estimated time for this task is 8 weeks.

6.5.7.2.6 Programming the admin preferences

The administrator will have more privileges than other users, so when the front end is starting to form the administrator preferences can be adjusted. The estimated time for this task is 4 weeks, alongside the end of the front end development.

6.5.7.2.7 Error testing

At the later part of front end programming, and while programming the admin preferences, there will be some error testing to make sure that everything works. The estimated time for this task is 4 weeks alongside the other tasks.

6.5.7.2.8 Finalizing the prototype

Before the first milestone all functions will be finished and tested to make sure they are usable. The estimated time for this task is 4 weeks.

6.5.7.2.9 Report and documentation

Since this is partly a university project there will be some extra documentation on top of standard documentation. This part will also include a written operation guide and user's guide. The estimated time for this task is 4 weeks.

6.5.7.3 Verkvaki made into a marketable product

When the prototype is ready Leda will start working alongside supporting parties in testing the product. The estimated time for this project is 31 weeks.

6.5.7.3.1 Programming more functions

While working with the companies errors will accrue and needs for a certain functions will appear, which will make the development more to the point. Part of this process will also involve trying to find and make functions that the companies realize that they need. The estimated time for this task is 18 weeks, but 4 weeks of error testing are also estimated alongside the programming.

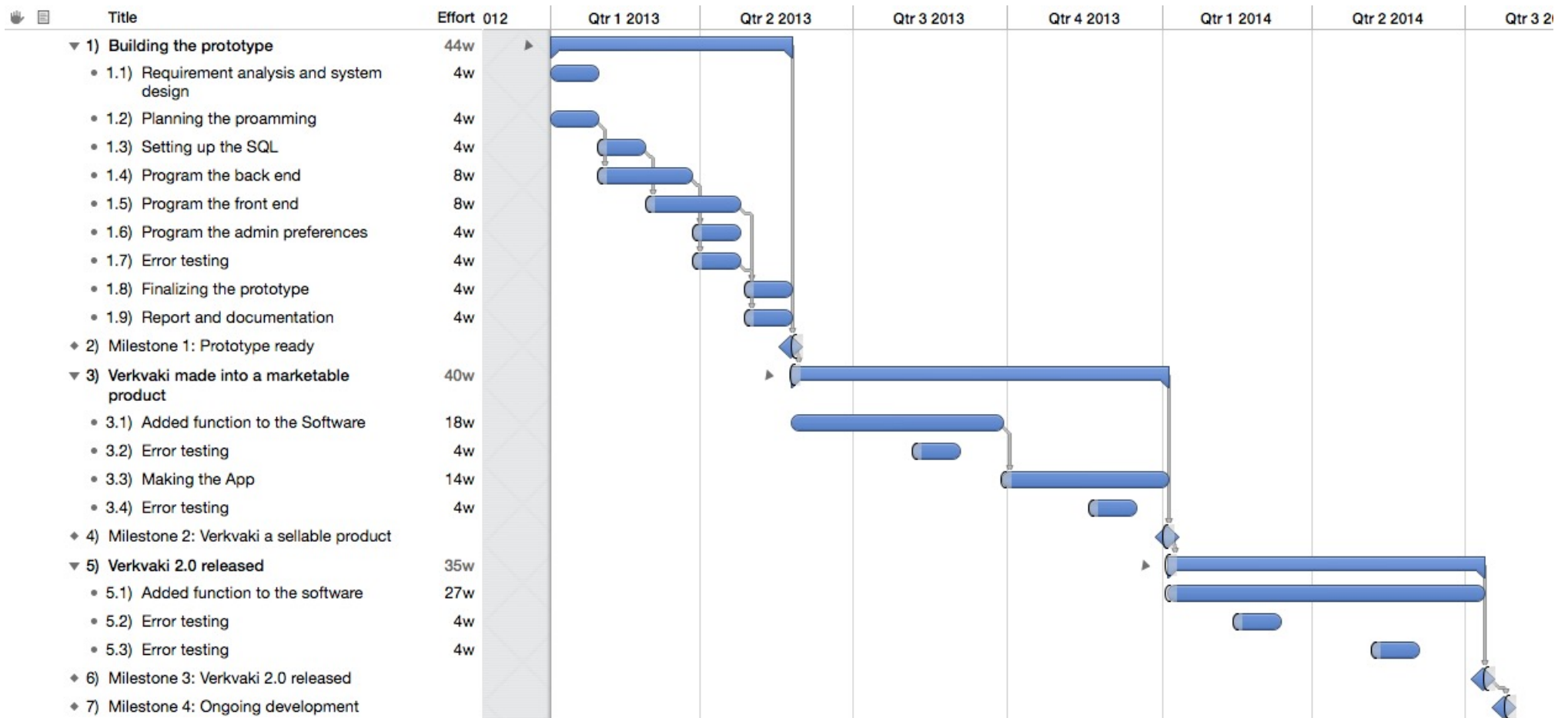
6.5.7.3.2 Making the App

When the programming of a saleable product is finished the company will start working on an app. Before the app all work will have been going through a browser so the smart devices have to be Internet connected all the time. When the app is ready then the devices will be able to collect information to the cache and feed it when they get reconnected. The estimated time for this task is 14 weeks, but 4 weeks of error testing are also estimated alongside the programming..

6.5.7.4 Verkvaki 2.0 and future

When it comes to the future then company will keep developing the functions and appearances of the software. Demands from customers and analysis of customers' usage and behavior will give Leda the experience and overview on which part of the software it is important to prioritize.

6.5.7.5 Project plan - Gantt-Chart



6.5.7.6 Development cost

In the first development phase there will be four programmers and one engineer. The engineer will mostly be working on the business side of the company, but since he is the product owner he will be included in the salary development cost. The project is a bachelor graduation project from the University of Reykjavik so there will be no salary cost in the prototype building. The business part is a M.Sc. project. Despite this, the salary will be calculated as a cost and afterwards it will be calculated as an investment in the feasibility assessment.

The salary is not based on minimum wages from the programmers union since, based on our experience, no programmer starts at that rate of pay. The numbers are monthly salary, estimated 650.000 ISK with all related expenses. Numbers are similar as an engineer for the first years in an engineering firm. Since none of the employers have graduated we estimate that they can claim 65% of a full salary for their monthly work or around 420.000 ISK. It was decided that the engineer would have the same salary.

Here below there is a table with the development cost of Verkvaki during the prototype period. The Gant chart is in quarters but the reason that Leda divides this into Jan – May is that the development period is when all the employees are still studying.

Table 21: Development cost during the first phase in thousand ISK

Position	Jan	Feb	Mar	Apr	May	Total
Programmer 1	420	420	420	420	420	2100
Programmer 2	420	420	420	420	420	2100
Programmer 3	420	420	420	420	420	2100
Programmer 4	420	420	420	420	420	2100
Engineer	420	420	420	420	420	2100
	2100	2100	2100	2100	2100	10500

When the prototype is ready in May, there will be some changes in the company. Leda will have to raise the salary since every employee will have received his certificate. The programmers will be cut down to three and from that point every employee will have a full salary. The owners will take a salary cut as an investment, and if the company has not received any grants then

two of the programmers will be offered the option of lower salary as an investment in the company.

Below is a table with development cost of Verkvaki during the period of making it a saleable product:

Table 22: Development cost during second phase in thousand ISK

Position	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Programmer 1	650	650	650	650	650	650	650	4550
Programmer 2	650	650	650	650	650	650	650	4550
Programmer 3	650	650	650	650	650	650	650	4550
Programmer 4	0	0	0	0	0	0	0	0
Engineer	650	650	650	650	650	650	650	4550
	2800	2800	2800	2800	2800	2800	2800	16400

From these numbers it is visual how extremely expensive software development can be, but the investment needed to get this software up and running is 26.9 Million ISK only in salary cost.

6.5.7.7 Overhead Cost

The preceding chapters have listed out all the income and the development costs. Below are listed out the costs that accumulate around running a business.

6.5.7.7.1 Computers

While the project is being worked on as a final project from the university, each member will use his private computer. After the prototype is ready, each employee will get a monthly 10k ISK grant for using their private computer over the year.

6.5.7.7.2 Software

All software is free during the prototype period since companies usually give free usage to university students. After that, Leda expects to pay for MS SQL and hosting. Other software used while studying will still be valid throughout the year. The estimated cost is around 1k ISK for the MS SQL and 10k ISK for the website domain and hosting of the website and code.

6.5.7.7.3 Office space

When it comes to work space, the support from the innovation environment is good. Accommodation for all employees is only 20k ISK each month out the

year and is provided by the Innovation Center of Iceland. Included in the accommodation is an area for each member, heat, electricity and cleaning. The total cost for the Internet is 5k ISK a month.

6.5.7.7.4 Operating Cost

Coffee will be provided. The estimated monthly cost is 10k ISK each month. All tableware and extra facilities are provided by the housing. The engineer will operate as a business person inside the company. He will cover communications outside the company so the estimated cost for phone bill is 5k ISK monthly. General operational costs will be 20k ISK monthly (office supplies, gifts, conferences, employee entertainment)

6.5.7.7.5 Other Cost

Establishing a company costs 130k ISK, plus a 30k ISK servicing cost around the papers. Getting the brand Verkvaki costs 28k ISK. All accounting will be done by the engineer so in the total overhead there was accounting fee.

6.5.7.7.6 Total Overhead Cost

Table 23: Total overhead cost for the first year

Computer cost	280
Software	77
Rent	240
Internet	60
Coffee	120
Phone	60
Operational cost	240
Establish a company	160
Branding	28
Total	1265

All numbers are in thousands ISK.

6.6 Financial Model

The following chapters consider the financial aspects of the process. More detailed information is in Appendix D.

6.6.1 Capital requirements

Capital requirements are the necessary costs for developing the software like making a business plan, marketing cost and software development cost.

6.6.1.1 Business development

The cost of the business development during the first phase is the salary of the financier or the engineer of the group.

The development phases are all divided into periods of time instead of specific hours of work that goes into each task. A full salary of the engineer with a master's is expected to be around 500k ISK which sums up to 650k ISK with related cost but these numbers are similar to the salary of an engineer that has worked for an engineering firm for 0 – 4 years. Since the engineer is not graduated Leda assumes that he will receive a 65% of a full salary or the amount of 420k ISK and that includes related cost. That gives a cost of 2600 ISK/hour. The business development will take 5 months times 420k ISK a month. The sum is 2100k ISK. Since the financier is one of the owners of the company it will be calculated as equity. The following months after that will be marketing buildup and research. That is 7 months with salary cost of 650k ISK/month. Total for these 7 months is 4550k ISK. Total for the year is then 6550k ISK but part of it will be calculated as equity.

6.6.1.2 Technical design and planning

The first month of the programming is technical design and planning. Four programmers will be working for a month and Leda expects them to have the same salary options as the engineer. 420k ISK cost of each programmer. Total of 1680k ISK. See chapter 6.5.7.6 Development cost.

6.6.1.3 Programming the prototype

Four programmers for 4 months to finish the prototype. And then three programmers for 7 months to develop the software to a sellable product. Total cost of programming in this period is 22.100k ISK. Part of it is calculated as equity. See chapter 6.5.7.6 Development cost. The programmers will also take care of some of the marketing cost since they will program the website.

6.6.1.4 Copyrights and branding

Getting the brand Verkvaki costs 28k ISK. Leda does not expect to get any other patents since the software business changes very quickly.

6.6.1.5 Marketing

See chapter 6.5.6.9 Marketing cost. Estimated marketing cost is 1450k ISK. Part of it is included in the development cost or 500k ISK since the programmers will take care of it.

6.6.2 Basic investment

6.6.2.1 Establishing the company

Establish a company. See chapter 6.5.7.7.5 Other cost. Estimated cost is 160k ISK.

6.6.2.2 Overhead cost

For overhead cost not related to computers, software and company establishment, see chapter 6.5.7.7 Overhead cost. Including office space, internet, operational cost, phone and coffee. Estimated cost 720k ISK during development time.

6.6.2.3 Equipment and software

See chapter 6.5.7.7.1 and 6.5.7.7.2. Estimated cost 357k ISK.

6.6.3 Capital for unseen cost

Estimated amount for unseen cost is 5% of the total cost or around 1450k ISK.

6.6.4 Capital needed for debtors

The capital needed for delay in product payment. Short-time debt and stock. Since the product is software and every customer pays monthly fee there is

no delay in payments. Leda does not need to keep any stock so there is not capital need.

6.6.5 Working capital

The working capital is the capital needed to prevent negative cash flow during the starting years. At this point when Leda has collected all the cost and income, it is time to adjust the working capital compared to the financial need during the development period. At this point it is clear that Verkvaki is not feasible enough to start development. By raising the working capital, Leda avoids the cash account to be negative during the first year(s) but instead the cash account will turn negative because of the payments of the loan. Loans are expensive and it is better to get a venture capitalist but since the investment is unfeasible there would never be any investor ready to invest in it.

6.7 Financing

From this point forward it is quite clear that the development process of the software Verkvaki is not feasible. In the following chapters Leda will follow up on different examples of financing.

The sum of negative cash flow for the first 3 years is almost 56 million ISK or 48 million ISK if calculate the NPV over 3 years with 10% discounting rate.

6.7.1 Owners' equity

In the first year the entrepreneurs will provide 15 million ISK as equity in the form of work which will also be calculated as shares.

6.7.2 Grants

Leda will look into all possible grants. The biggest one is called Tæknipróunarsjóður. The biggest grant from that fund is 15 million ISK a year for 3 years.

6.7.3 Venture capital

Leda will invite venture capitalists to invest for the rest. Both investors and entrepreneurs will have shares and a vote in the company. The only possibility to get a venture capitalist into the project is to get an individual that

has experience in software development or a person that has ideas that the entrepreneur has overlooked.

6.8 Operational model

The tax on companies in Iceland is 20%. No dividend payments are planned in the first years but since the company is not feasible there will be no dividend.

6.8.1 Investment

Investment for the first year is 28.763k ISK and will be depreciated 20% a year. 14.763k ISK is equity from owners. Most of this cost is salary but in the year after it goes under fixed cost.

6.8.2 Operating revenue

See chapter 6.5.5.2 Product price and sales for the quantity of sales. Then Leda also presumes that they will start doing development contract with bigger companies for 200k ISK a month to build a customized solution for them.

6.8.3 Operating expenses

Variable cost

Since the product is only code there is no physical cost, which changes according to stock or purchasing.

Fixed cost

Most cost in the company is defined as fixed cost. The first year all development cost is defined as other investment cost but after that it goes under fixed cost. See chapters on development cost and overhead cost.

6.9 Operational and financial plan

The software Verkvaki is not a feasible business idea. While working on the feasibility assessment Leda tried out few outcomes and will represent as follows.

6.9.1 Working with a venture capitalist

A venture capitalist would supply the money up front for the part of the development investment plus the working capital to overstep the first years.

The VC would have to invest 41.5 million ISK so the cash account would always stay positive.

NPV of cash flow (10 years) = -40.779k ISK

IRR = -2%

6.9.2 Loan

Taking a loan is expensive. When Leda looked into the option of borrowing for the investment and working capital, the results showed that it was not possible to prevent the cash account to go negative.

6.9.3 Getting a grant

Without a doubt that comes out as the best solution since a grant is a boosted revenue. The outcome is as follows.

Big grant from the technical development fund for 15 m ISK early for 3 years

Working capital is 12.5 m ISK to keep the Cash account positive

Loan for 26.5 m ISK.

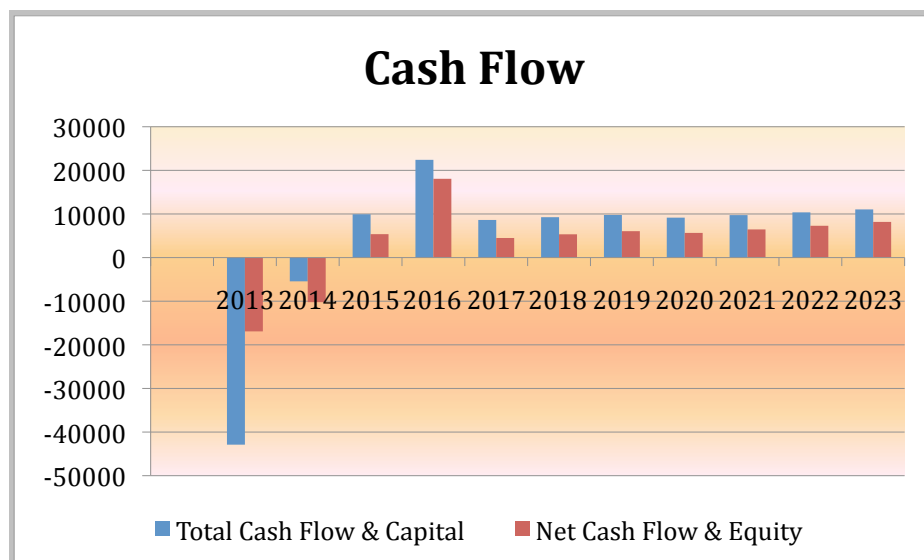


Figure 19: Cash Flow according to receiving a grant

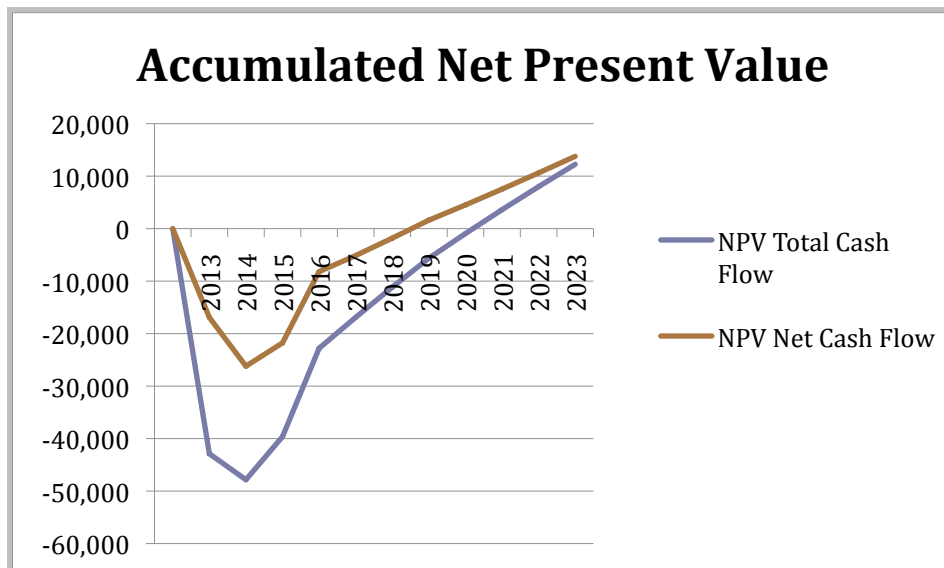


Figure 20: NPV of total CF and Net CF

Table 24: Conclusions compared to case

	Total Cap.	Equity
NPV of Cash Flow	12.261k ISK	13.775k ISK
Internal Rate	15%	21%

From these numbers we see that the only possibility is to get a grant if the company should be a feasible investment.

6.10 Organizational chart

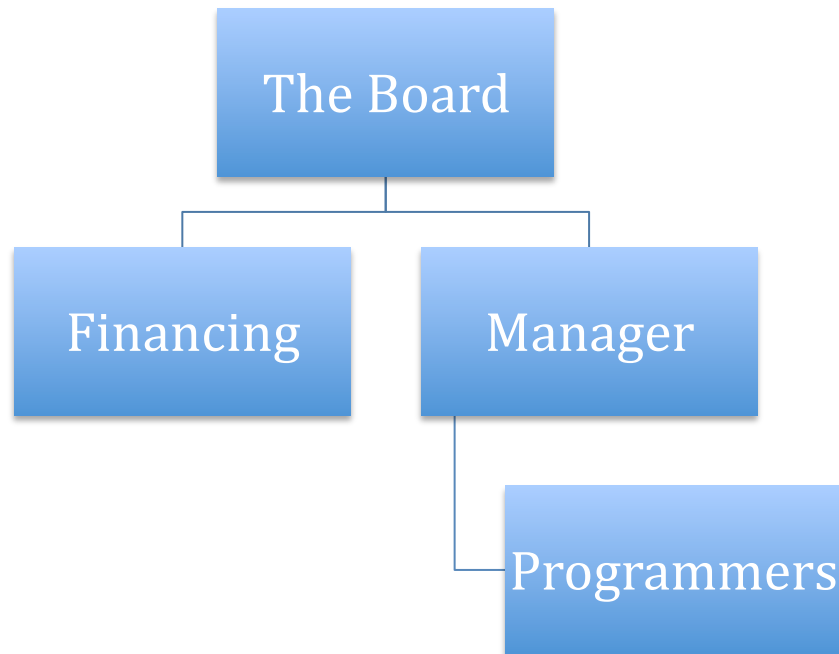


Figure 21: Organizational Chart of the company Leda

In Figure 21 there is the organizational chart. Since the company is small the chart is simple and has the structure of a pyramid. The board is the head of the company and the Chairman/financier are then equal under the supervision of the board. The programmers are under the manager. It should be noted that both the financier and the manager are on the board, so together they make all the decisions since the third member of the board was only added to settle disagreements.

7. Conclusion

In this thesis the whole process of software development has been illustrated and aspects figured out that are determined as essential to the entire operation. A general structure of a business plan has been presented and can be used as an example for people building a business plan from scratch. From the many chapters of the thesis it can be concluded that the most important chapter is 6.5.4.2 Market Research. The market research affects all the questions raised in the introduction and gives vital information regarding the feasibility of the software development.

Three questions were defined at the beginning of the thesis:

Question 1: Is there a need on the market for a solution like Verkvaki?

From the market research and by interacting with companies there is clearly a need for this kind of software. The supporting parties were excellent examples of companies that could profit highly from the software, and from the market research, 71% of the companies were positive towards the usage of Verkvaki.

Question 2: How would you plan and perform the Verkvaki software development?

Throughout the business plan every aspect of the planning is shown, from an introduction of the product through the planning. Risk analysis and market research are made and in the end all financial aspects are introduced with the feasibility assessment. Even though the business plan is the answer to this question, the chapter 6.5.7 “Technical strategy and implementation” goes straight to the point of how to proceed.

Question 3: Is the solution feasible?

From the presumption and calculations made in this business plan the software development is not feasible in this 10-year period calculated. The only possible way is to get a grant, which is improbable with the given premise. Finding a venture capitalist is an option as well but with the given premise it would be difficult to get an investor unless respective could find a wider market or role for the product.

From the research it is quite clear that this software development is not worth taking to the next step with the given premise. The most efficient way to conclude that with the least expenditure would have been to do the market research and the feasibility assessment without the business plan. Throughout the research on the matter it repeatedly came up that companies work on the feasibility assessment before the business plan.

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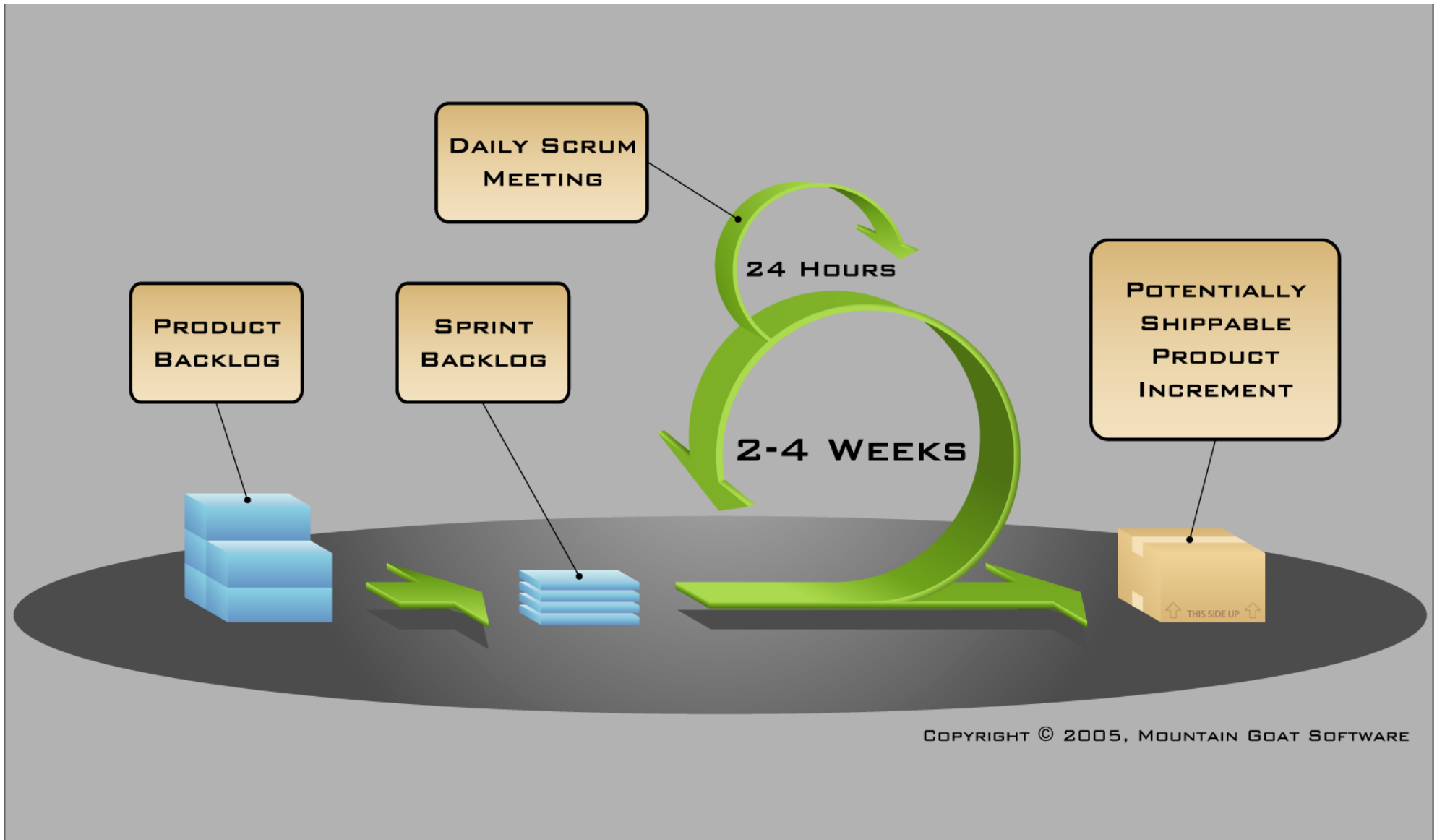
Appendix A – Survey – Full questions and figures left out

The questions from the marketing survey and graphs not presented in the business plan.

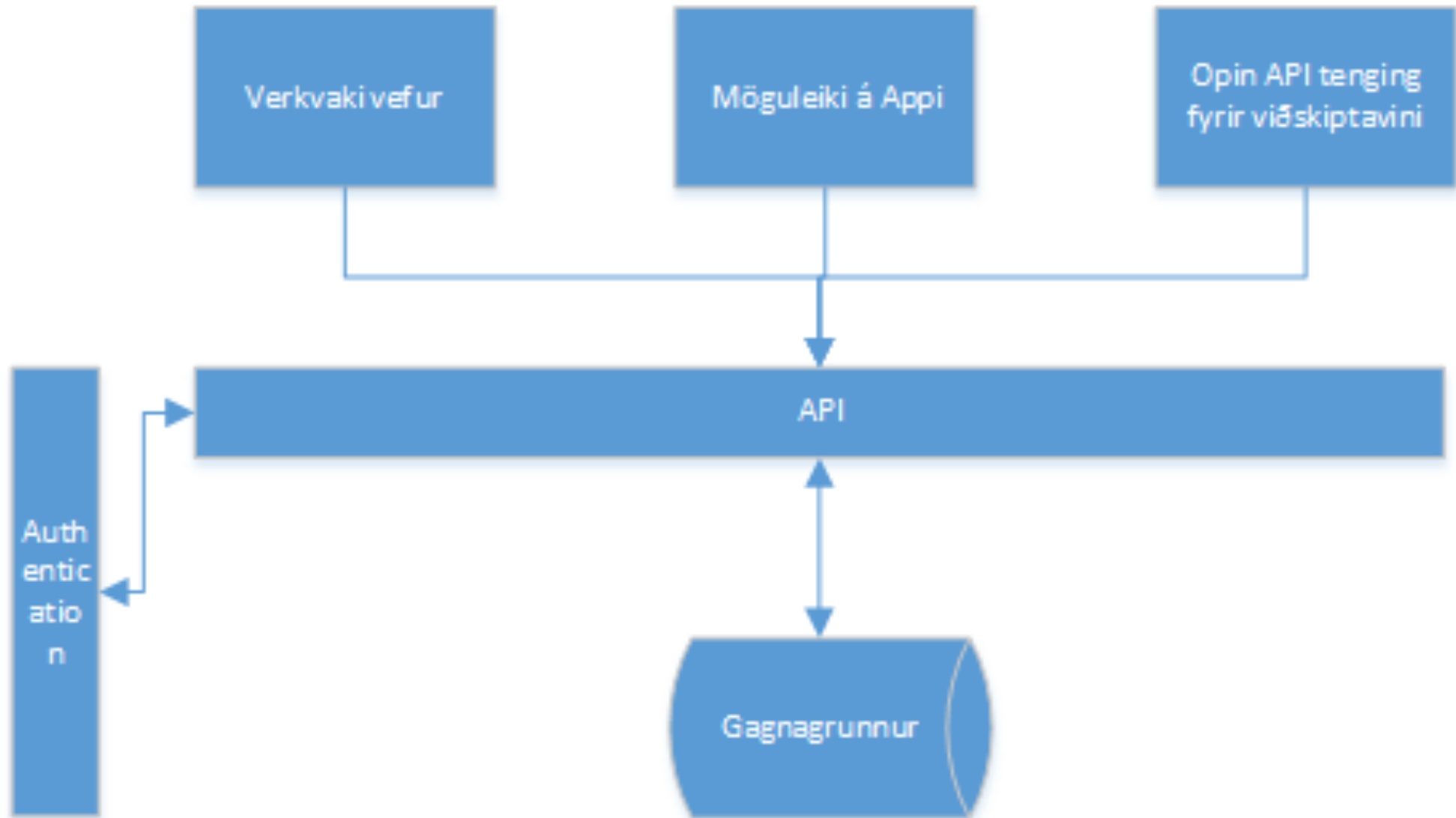
1. What kind of company / foundation do you work for?
 - a. Financial company
 - b. Insurance company
 - c. Production or development company
 - d. Institution
 - e. Service company
 - f. Consultant company
 - g. Engineering firm
 - h. Other
2. What is your position in the company/foundation?
 - a. Manager
 - b. Chief of staff
 - c. Project manager
 - d. Department manager
 - e. Consultant
 - f. Other
3. How many people does your company / foundation employ?
 - a. 1-10
 - b. 11-20
 - c. 21-50
 - d. 51-100
 - e. 101+
4. Do you use any software to follow up on the jobs that our software focuses on?
 - a. Yes
 - b. No
 - c. Partly
 - d. I don't know
5. If you answered yes to the software question, then how much do you spend on software connected to these jobs on monthly basis?
 - a. 0 – 10 thousand kroner
 - b. 10 – 50 thousand kroner
 - c. 50 – 100 thousand kroner
 - d. 100 – 200 thousand kroner
 - e. 200+ thousand kroner
 - f. I don't know
 - g. I said no to question 4.
6. How do you manage people working around town today? (here you can choose multiple choices)
 - a. With software
 - b. With phone calls and e-mails
 - c. With personal meetings

- d. By attending the location
 - e. Other
7. Do you think that time registration would improve employees' efficiency?
 - a. Yes
 - b. No
 - c. I think it will have negative effects
 - d. I don't know
 8. Do you think that your company / foundation would have a use for this kind of Software?
 - a. Yes
 - b. No
 - c. Partly
 - d. I don't know
 9. How much would you be willing to spend on software like this on a monthly basis per person? Please bear in mind the time such software could save, and potentially even the work of an employee. You can choose two options if you think the sum you would spend is somewhere between the given values.
 - a. 1000 kroner per person
 - b. 2500 kroner per person
 - c. 5000 kroner per person
 - d. 10.000 kroner per person
 - e. 15.000 kroner per person
 - f. 20.000 kroner per person
 - g. I don't know
 - h. I am not interested in the solution
 10. Do you think your company would be open to interacting with a startup company for software usage?
 - a. Yes
 - b. No
 - c. Not when it comes to important roles
 - d. I don't know

Appendix B – Scrum methodology



Appendix C – API architecture



Appendix D – Financial sheets

Assumptions and Results

		2013						Discounting Rate	10%
Investment:		K.Krona						Planning Horizon	10 years
Buildings		0							
Equipment	100%	0							
Other	100%	28.763							
Total		28.763							
Financing:									
Working Capital		12.500							
Total Financing		41.263							
Equity		0%							
Loan Repayments		10 years							
Loan Interest		8%							
Operations:			2014	2015	2016	2017	2018		
Sales Quantity	100%								
Sales Price	100%								
Variable Cost		0							
Fixed Cost	100%	1.625	26.550	30.392	38.820				
Inventory Build-up		0							
Debtors	0%	of turnover							
Creditors	0%	of variable cost							
Dividend	30%	of profit							
Depreciation Building	4%								
Depreciation Equipm	15%								
Depreciation Other	20%								
Loan Managem. Fees	2%								
Income Tax	20%	of profit							

		Total Cap.	Equity
NPV of Cash Flow	12.261	13.775	
Internal Rate	15%	21%	

Capital/Equity after 10 years	3,0
Minimum cash account	132

Investment

		2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Total
			1	2	3	4	5	6	7	8	9	10	
Investment and Financing													
Investment:													
Buildings		0	0	0	0	0	0	0	0	0	0	0	
Equipment		0	0	0	0	0	0	0	0	0	0	0	
Other		28763	23010	17258	11505	5753	0	0	0	0	0	0	
Booked Value		28763	23010	17258	11505	5753	0	0	0	0	0	0	
Depreciation:													
Depreciation Building	4%		0	0	0	0	0	0	0	0	0	0	0
Depreciation Equipm	15%		0	0	0	0	0	0					0
Depreciation Other	20%		5752,5	5752,5	5752,5	5752,5	5752,5						28762,5
Total Depreciation			5752,5	5752,5	5752,5	5752,5	5752,5	0	0	0	0	0	28762,5
Financing:		41263											
Equity		14763											
Loans		26500											
Repayment	10		2650,0	2650,0	2650,0	2650,0	2650,0	2650,0	2650,0	2650,0	2650,0	2650,0	26499,5
Principal		26499,5	23849,6	21199,6	18549,7	15899,7	13249,8	10599,8	7949,85	5299,9	2649,95	-4E-12	
Interest	8%		2120,0	1908,0	1696,0	1484,0	1272,0	1060,0	848,0	636,0	424,0	212,0	11659,8
Loan Managem. Fee	2%	530,0											

Operations

		2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Total
Operations Statement													
Sales													
Price													
Revenue	100%	0	21.107	40.321	61.232	50.518	54.054	57.838	61.886	66.218	70.854	75.813	559.840
Variable Cost	0	0	0	0	0	0	0	0	0	0	0	0	0
Net Profit Contribution		0	21.107	40.321	61.232	50.518	54.054	57.838	61.886	66.218	70.854	75.813	559.840
Fixed Cost		1.625	26.550	30.392	38.820	41.537	44.445	47.556	50.885	54.447	58.258	62.336	455.226
Diverse Taxes													0
EBITDA (Operating Surplus)		-1.625	-5.444	9.929	22.412	8.980	9.609	10.282	11.001	11.772	12.596	13.477	104.615
Inventory Movement													
Depreciation			5.753	5.753	5.753	5.753	5.753	0	0	0	0	0	28.763
EBIT (Operating Gain/Loss)		-1.625	-11.196	4.177	16.659	3.228	3.857	10.282	11.001	11.772	12.596	13.477	75.852
Financial Costs (Interest+LMF)		530	2.120	1.908	1.696	1.484	1.272	1.060	848	636	424	212	12.190
Profit before Tax		-2.155	-13.316	2.269	14.963	1.744	2.585	9.222	10.153	11.136	12.172	13.265	62.037
Loss Transfer	0	-2.155	-15.471	-13.202	0	0	0	0	0	0	0	0	
Taxable Profit		0	0	0	1.761	1.744	2.585	9.222	10.153	11.136	12.172	13.265	
Income Tax	20%	0	0	0	352	349	517	1.844	2.031	2.227	2.434	2.653	12.407
Profit after Tax		-2.155	-13.316	2.269	14.611	1.395	2.068	7.377	8.123	8.908	9.737	10.612	49.630
Dividend	30%	0	0	681	4.383	419	620	2.213	2.437	2.673	2.921	3.184	19.530
Net Profit/Loss		-2.155	-13.316	1.588	10.228	977	1.447	5.164	5.686	6.236	6.816	7.429	30.100

Cash Flow

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Total
Cash Flow												
EBITDA (Operating Surplus)	-1.625	-5.444	9.929	22.412	8.980	9.609	10.282	11.001	11.772	12.596	13.477	102.990
Debtor Changes		0	0	0	0	0	0	0	0	0	0	0
Creditor Changes		0	0	0	0	0	0	0	0	0	0	0
Inventory Changes		0	0	0	0	0	0	0	0	0	0	0
Cash Flow before Tax	✓ -1.625	-5.444	9.929	22.412	8.980	9.609	10.282	11.001	11.772	12.596	13.477	102.990
Paid Taxes		0	0	0	352	349	517	1.844	2.031	2.227	2.434	9.754
Cash Flow after Tax	✓ -1.625	-5.444	9.929	22.412	8.628	9.260	9.765	9.157	9.741	10.368	11.043	93.235
Financial Costs (Interest+LMF)	530	2.120	1.908	1.696	1.484	1.272	1.060	848	636	424	212	12.190
Repayment of loans	✓ 0	2.650	2.650	2.650	2.650	2.650	2.650	2.650	2.650	2.650	2.650	26.500
Free (Net) Cash Flow	-2.155	-10.213	5.371	18.066	4.494	5.338	6.055	5.659	6.455	7.295	8.181	54.546
Paid Dividend		0	0	681	4.383	419	620	2.213	2.437	2.673	2.921	16.347
Financing - Expenditure (WC)	12.500	✓ 0	✓ 0	✓ 0	✓ 0	0	0	0	0	0	0	12.500
Cash Movement	✓ 10.345	-10.213	5.371	17.385	111	4.920	5.435	3.446	4.018	4.622	5.260	50.699

		2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Balance Sheet												
Assets												
Cash Account	0	10.345	132	5.503	22.888	22.999	27.919	33.353	36.799	40.818	45.439	50.699
Debtors (Accounts Receivable)	0%	0	0	0	0	0	0	0	0	0	0	0
Stock (Inventory)	0	0	0	0	0	0	0	0	0	0	0	0
Current Assets		10.345	132	5.503	22.888	22.999	27.919	33.353	36.799	40.818	45.439	50.699
Fixed Assets (Booked Value)		28.763	23.010	17.258	11.505	5.753	0	0	0	0	0	0
Total Assets		39.108	23.142	22.760	34.393	28.752	27.919	33.353	36.799	40.818	45.439	50.699
Debts												
Dividend Payable		0	0	681	4.383	419	620	2.213	2.437	2.673	2.921	3.184
Taxes Payable		0	0	0	352	349	517	1.844	2.031	2.227	2.434	2.653
Creditors (Accounts Payable)	0%	0	0	0	0	0	0	0	0	0	0	0
Next Year Repayment		2.650	2.650	2.650	2.650	2.650	2.650	2.650	2.650	2.650	2.650	2.650
Current Liabilities		2.650	2.650	3.331	7.385	3.417	3.787	6.708	7.117	7.550	8.005	8.437
Long Term Loans		23.850	21.200	18.550	15.900	13.250	10.600	7.950	5.300	2.650	0	0
Total Debt		26.500	23.850	21.880	23.285	16.667	14.387	14.657	12.417	10.200	8.005	5.837
Equity												
Profit & Loss Balance		14.763	14.763	14.763	14.763	14.763	14.763	14.763	14.763	14.763	14.763	14.763
Total Capital		12.608	-708	880	11.108	12.084	13.532	18.696	24.382	30.618	37.434	44.863
Debts and Capital		39.108	23.142	22.760	34.393	28.752	27.919	33.353	36.799	40.818	45.439	50.699
Error Check		0	0	0	0	0	0	0	0	0	0	0

Profitability

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	<u>Total</u>
<u>Profitability Measurements</u>												
NPV and IRR of Total Cash Flow												
Cash Flow after Taxes	-1.625	-5.444	9.929	22.412	8.628	9.260	9.765	9.157	9.741	10.368	11.043	93.235
Loans	-26.500											-26.500
Equity	-14.763											-14.763
Total Cash Flow & Capital	-42.888	-5.444	9.929	22.412	8.628	9.260	9.765	9.157	9.741	10.368	11.043	51.973
NPV Total Cash Flow 10%	-42.888	-47.836	-39.630	-22.792	-16.899	-11.149	-5.637	-938	3.606	8.004	12.261	
IRR Total Cash Flow						1%	6%	9%	12%	14%	15%	
NPV and IRR of Net Cash Flow												
Free (Net) Cash Flow	-2.155	-10.213	5.371	18.066	4.494	5.338	6.055	5.659	6.455	7.295	8.181	54.546
Equity	-14.763											-14.763
Net Cash Flow & Equity	-16.918	-10.213	5.371	18.066	4.494	5.338	6.055	5.659	6.455	7.295	8.181	39.783
NPV Net Cash Flow 10%	-16.918	-26.203	-21.764	-8.191	-5.121	-1.806	1.611	4.516	7.527	10.620	13.775	
IRR Net Cash Flow						7%	12%	15%	18%	20%	21%	
Financial Ratios												
ROI (Profit+Interest/Debt+Capital)	-29%	18%	73%	9%	13%	37%	33%	32%	31%	30%		
ROE (Profit/Shareh. Capital)	-106%	-320%	1660%	13%	17%	55%	43%	37%	32%	28%		
TR (Revenue/Debt+Capital)	54%	174%	269%	147%	188%	207%	186%	180%	174%	167%		
CR (Capital/Debt+Capital)	-3%	4%	32%	42%	48%	56%	66%	75%	82%	88%		
Net Current Ratio	0,0	1,7	3,1	6,7	7,4	5,0	5,2	5,4	5,7	8,7		
Liquid Current Ratio	0,0	1,7	3,1	6,7	7,4	5,0	5,2	5,4	5,7	8,7		
Total Capital/Equity	0,0	0,1	0,8	0,8	0,9	1,3	1,7	2,1	2,5	3,0		
Debt Service Coverage	-1,1	2,2	5,2	2,1	2,4	2,6	2,6					
Acceptable Minimum		1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5		