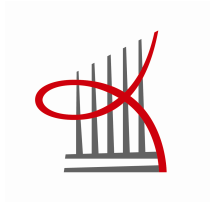

LEAN USER EXPERIENCE DESIGN IN PRACTICE

A Case Study: Implementing Lean User Experience Design in Software Development

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ABSTRACT

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Lean user experience aims to integrate user experience design as part of lean software development. The methods vary from using traditional user research practices during the development process to improving teamwork to better support collaboration between different competences. Lean is a management principle, but also a methodology to create new products more efficiently.

The purpose of the study was to find out how to efficiently combine user experience design with lean development. A secondary goal was to consider the most feasible ways to use lean practices when working with clients. The case study was based on a product development experiment to test the lean ideology in practice. Expert interviews were also used to learn about the adoption of lean practices.

In the beginning of the study, a lean framework was formed to select suitable lean user experience design principles. A team of software development professionals then tested the selected methods while developing a new product. During the study, the product was developed from an idea to a functional prototype.

While conducting the experiment, the team discovered new insights on lean workflows. The lean framework was found to be a practical guide to creating more efficient development teams. The lean principles also offered a methodology to create software products in a design-oriented way using real data from the users as a reference. Based on the experiment and the expert interviews, some challenges were also identified, for example when working in subcontracted projects or multiple teams at the same time.

Key words: lean, lean startup, design, user experience, user research, software development

CONTENTS

ABBREVIATIONS AND TERMS

UX	User experience
MVP	Minimum viable product
QA	Quality assurance
SaaS	Software as a Service

Agile

A selection of software development methods, which value people over processes, working software instead of documentation, collaboration between team members and the ability to respond to change.

A/B testing

A method of testing different versions of a product simultaneously to measure which version performs better.

Beta testing

Beta testing is used in software development to test an unfinished product with a limited batch of real users.

Bounce rate

A term used in Internet marketing, the percentage of visitors who enter the site and leave (“bounce”) without interacting with the site.

Click rate

Used in Internet marketing, a percentage of visitors who interact with a certain clickable object, such as a button or a link.

Conversion rate

A term used in Internet marketing referring to the percentage of users who perform a desired action, for example sign up to a mailing list or purchase a product.

Customer development

A methodology for creating a new product and building the customer base at the same time.

Design thinking

A methodology for solving complex problems with a design-based approach.

Front-end development

Building the styles and markup for a user interface, including the code run on the browser.

Hypothesis

A proposed explanation for a phenomenon; a scientific hypothesis is an assumption that can be tested.

Landing page

A page introducing or selling a product or a service.

Lean

As in lean manufacturing or lean startup, lean is a collection of management principles and workflow methodologies that can be applied to different types of organizations.

Minimum viable product

A product with the minimum set of features to make it viable for a user.

1 INTRODUCTION

The competition in software business has grown massively in recent years, and only a small percentage of new companies can thrive in the competitive field. With all the options available, the opinion of the customer has more importance in the product business than ever before. Yet a lot of companies are failing to meet customer expectations and thus are not able to find a scalable business model. Even larger companies are looking for a way to respond to the changing market more efficiently.

Because of the harsh competition in the software development field, a more scientific method of building successful products was in demand. Lean ideology was originally developed in the car manufacturing business and the groundwork for the current methodology was built in the early 20th century Japan. Since then, the lean ideology has been adopted in a range of different domains.

After the publication of the lean startup method by Eric Ries, lean suddenly became a buzzword in software development. Since then, lean has been gaining increasing leverage in software business, often as an alternative or addition to agile principles. Globally thousands of software companies have adopted the lean approach in product and service development.

Compared to other development principles such as agile, lean software development takes a more business-centric approach to building new products. Not solely aiming to succeed in developing a product in a reasonable time, the lean development methodology also seeks to find a scalable business model for the new product at the same time.

As the basis for the recent lean movement, the lean startup has taken concepts from both lean manufacturing and customer development uniting them into a set of tools and principles. Building on that, lean user experience design combines known usability and user experience methods with the lean startup process.

Thoughtful user experience has almost become a requirement for a new product to succeed in the competitive market. The lean user experience design methodology was built to integrate the work of designers to the lean development workflow.

Lean user experience designers utilize user research, prototyping and data analysis to measure the impact of different actions. In the core of the lean ideology is also the cross-functional team in which professionals from different fields are brought together. The team works in close collaboration, doing research, design and development together.

1.1 Terminology

In the context of this thesis, the term customer refers to a potential buyer for the product, while the term user is used in a more general sense, referring to any person that could potentially use the product. While user research and user experience in general include all kinds of users, the lean approach attempts to find the users that are most likely to become customers for the product.

The term project is used to refer to a range of software development projects, either an internal product development project in a software company or a project done for a client, aiming to produce a software product following a legal contract. The clients are other organizations building internal or external products for different types of users.

Team is a commonly used term throughout the thesis and it refers to a team of software development professionals working in a project together to reach a common goal, usually a new product or part of a product, for example a concept or a prototype. A team consists of designers and developers as well as administrators such as project managers or product owners.

The outcome of a project made by the team in this context is most often a web application or a web site running in a web browser. The product built during the study is a Software as a Service or SaaS product, where the data is stored in an external server and used via Internet. Since the product is delivered as a service, the terms are used interchangeably through the thesis.

A range of online services was used during the study, including the advertising platform AdWords, which offers targeted advertising and is developed by Google. Other online

platforms offer similar solutions, such as a service called Reddit, which collects online news and conversations, displaying paid advertisements in addition to the curated content.

Some technical language is used especially in the data analysis chapters. Internet marketing has a set of terms that are used to describe the different actions of the users visiting a web site. The users in this context are often referred as visitors. Click or bounce rate for example refers to a percentage of visitors who perform an action on the page.

The term metrics refers to the measured rates and numbers. The used metrics are for example the number of visitors who visit a site and the percentage of those visitors who interact with the site by clicking different objects such as buttons or links.

1.2 The goal of the study

The main goal of the thesis was to develop lean workflows and practices for a product team working independently on a software project. The case study was conducted in a startup company developing its first product and the outcomes of the study were implemented in the culture of the startup when feasible.

Since the writer of the thesis was working in two different companies at the same time, the goal of the study was expanded to cover both work environments. The other position for the writer was a consultant in an established organization developing new products for other companies, referred to as clients. The actors in the environments were the same, since the same team worked together in both organizations.

Since the team was frequently working in client projects, the other goal for the study was to develop methods and principles for those projects as well. The idea was to test the lean user experience methods in a flexible environment to decide if it would be worthwhile to include some or all of the methods in the future client projects.

The reason the methodology was tested in the startup environment was the time and flexibility available in in-house product development. Client projects are quite tightly budgeted and the deadline is usually set before starting a project. This leaves little time

for experimentation or room for trying different methods. Also the challenges in adopting lean practices could be evaluated without negative effects to client projects.

The main reason for choosing lean as the thesis subject was the sudden popularity of the lean startup movement and the possibility to develop more efficient and motivating work experience using lean ideology.

1.3 Case description

The lean user experience ideology was tested in a new product development project. The lean workflow methods were expected to result in more effective teamwork and to guide the development to become more iterative and market-driven. The lean user experience methodology was also predicted to provide a feasible way of combining the design process with product development.

To begin the product development, a concept was created for a project management tool for online collaboration. The product was designed to help software development teams to track, measure and plan their work together. The product would cover task management, product documentation and tracking the completeness of a project. The tool was envisioned to be simple but powerful, offering flexible options for different workflows.

During the development of the new product, the team conducted experiments with the selected lean methods such as continuous user interviews and landing page testing. The experiments were based on hypotheses, then measured and validated one at a time.

User interviews were used to study the problem and to validate the problem hypothesis. The hypothesis stated that collaborative teams lack sufficient tools to manage their projects when working together with different competences. For example designers and developers often use separate tools to manage their workflows.

The interest towards the product was measured using a landing page. In the beginning, the efforts were focused on getting enough visitors to the page. During the landing page test the visitors were offered an option to subscribe to the beta test by registering their

email address. These subscriptions were used to measure the rate of interest towards the product.

A prototype was created to test the solution. Concept generation, visual direction and interaction design for the product were made simultaneously with the development work in small iterations. The prototype served as a specification for the product as well as clarified the needs for the minimum viable product.

The minimum viable product was built on top of the prototype. The features were implemented one by one and the entire team worked on one use case at a time. As a result, the team always had a functional product with an increasing set of features. That way the product produced value from the first version and it could be used in user testing at any time.

Lean user experience methods were used as primary sources for planning the project activities. Based on the lean principles, different types of user studies and market testing theories were used during the project. The methods were examined to report the feasibility and usefulness of the lean development frameworks in this type of product development.

1.4 The adoption of lean principles

Three expert interviews were conducted to find out how widely the lean principles have been adopted in Finland, what kind of problems can be identified and what kind of future they expect for the lean and agile workflows. The interviewed persons were seasoned professionals working in the field of user experience, employed in different companies offering consulting or user experience design services in Finland and also globally in different countries such as the United States.

During the interviews a range of topics was discussed. The questions covered the history and current status of lean in Finland, limited to the software business and covering mostly the user experience part of the lean process. The future of lean was also briefly discussed. The interviewed persons were selected based on their experience and work history in different consulting positions.

According to Fjord's Senior Interaction Designer Taina Arjanmaa, the term lean has become more common after 2010, but it is probably still more prominent in the discussions than in practice. Agile for example seems to be used a lot, but is quite rarely implemented in its purest form. The same way lean is probably modified to use the most suitable parts rather than the entire methodology. (Arjanmaa, 2014.)

According to the interviews, succeeding in the adoption of lean seems to depend on the team member's ability and urge to improve and develop the workflows and practices in the team and the organization. If the team or the whole organization has a culture of testing new practices, they have probably experimented with at least some of the lean methods. The teams are however likely to adopt only the parts of the lean methodology that practically fit into their unique needs rather than follow the lean practice to the letter.

Timo Rostedt, Senior UX Designer at Nordkapp, states that the lean methodology is a natural progression to agile offering more flexibility especially to the design process. While the agile processes help the programmers split the implementation to smaller tasks, it is not well suited for the design work. The agile workflow expects the layouts to be finished before the implementation can be planned. Using the lean methods, the team works together with the design and development at the same time, so that the design is really integrated into the implementation. (Rostedt, 2014.)

Based on the discussions, agile as it is usually implemented is seen more suited in improving the efficiency of the development team to deliver a predefined outcome, instead of trying to find the best outcome. As such, agile is not seen very compatible with user experience design and it has been difficult to combine the design process with the agile workflows in a useful way.

The experts assume that many companies are experimenting with the lean ideology in Finland, especially startups, which are usually keen to try out new ideas. Some would even predict that the most forward-minded startups quite quickly move to the next hype when such appears, leaving lean or parts of it behind. Large and established companies could be more likely to adopt strictly defined processes in the long term, but will do the transition more slowly.

Jori Larres, currently working as Senior Designer at Idean, says that user experience is especially hot in the startup scene in Silicon Valley at the moment and they are building the lean user experience competence in-house in many companies. In Finland, the adoption of user-centered methods is often still too far from the daily practice. To take advantage of the lean ideology, large companies still need to make a shift in their thinking to understand the benefits of testing in small batches and including the users in the design process. (Larres, 2014.)

User experience consultants seem to be interested in applying the lean methods in practice, and it is found possible with the right team and environment. The most successful experiments described are the ones where the designer has the opportunity to work full-time with a team of developers, even if the developers are not working in-house. If a client has already adopted agile workflows, they may wish to use agile in external work as well to integrate with the internal teams. Also especially development companies without in-house designers may prefer agile processes.

The problems with the adoption of lean have been resistance from the team members or external teams or working with teams with less experience in software development, in which people are likely to follow the process by the book while learning. Since lean is more an ideology than a defined process, it may be difficult to adopt without solid experience from software development.

When working with clients, inflexible contract conventions with fixed budget, outcome or deadline are not seen as compatible with the lean methodology. It is also found difficult to apply lean teamwork if the team members work with multiple projects at the same time, since the team members do not have enough time to participate in a single project. With less time to build shared knowledge, the project will become increasingly waterfall-like, generating hand-overs from one team member to the other.

Based on the predictions made in the interviews, it is probable that lean will become a commonly used development workflow in addition to agile, but most likely the end result will be a selection of different approaches and methods mixed together. Processes and workflows most certainly are and will be modified to find the right balance for a unique situation, team or organization.

Globally some large companies report to have adopted lean principles in their product development. As described in the article by Forbes, a large financial software company Intuit has successfully adopted the lean startup ideology in developing products to new markets (Forbes 2013).

Another successful company to experiment with lean methods is Zappos, an online shoe and clothing retailer known for its culture. As Michelli writes, the building blocks behind the success of the company are valuing the quality of the employees, building a learning organization and listening to the customers. The spirit of a collaborative and diverse corporate culture offers Zappos a strong competitive advantage. (Michelli 2011.)

2 CONCEPTS

Lean ideology should be interpreted as a guide to management and company culture. Lean affects the way people work in an organization, so implementing the methodology also requires an effort to share the ideology between the employees. By building on the lean principles, lean user experience design attempts to combine the ideas of collaborative culture and learning organization with traditional user experience design.

The first part of this section aims to explain the difference in traditional and lean management approaches and to describe the environment that led to disruptive changes in manufacturing and later in software development. Since the lean ideology consists of many different concepts, the scope of this section is limited to the ideas that have influenced the lean user experience methodology.

In the second part the history of software development is briefly reviewed, and the development of different workflows from waterfall to agile is described. It also discusses the differences and similarities between agile and lean approaches.

The third part of the section discusses the concept of user experience design and uncovers the theories that have further influenced the lean user experience methods, such as design thinking, user-centered design, lean startup and customer development.

2.1 Lean manufacturing

Mass production set the baseline for the industrial organization model, which is still largely used in modern companies. By focusing on efficiency, large amounts of goods could be manufactured using replaceable and uneducated workforce. As the market became more fragmented, the lean ideology was developed to adapt to the rapidly changing business environment and growing competition.

The effect of lean was not only the improved flexibility and quality in the production chain, but in the entire ideology of how the organization was managed and how the employees were treated. The new approach to management moved responsibility down the

organizational ladder, concentrated on improving the quality of the employees and placed the customer in the center.

2.1.1 Mass production is efficient but inflexible

The early starting point for the development of lean was in the beginning of the 20th century when Ford and the famous Model T pioneered the growing automotive market in United States. Ford had just implemented a highly effective mass production system, and the newly born middle class was a large market to sell to. His superior production system disrupted the production of cars by reallocating formerly craft-based work to machines and made manufacturing cheap and fast. (Poppendieck 2007, 2.)

Because of the efficiency of the new production system, the price of the Model T plummeted and suddenly masses could afford to buy a car. Soon competitors would follow and increase the level of competition that was largely based on the price of the car. (Womack, Jones & Roos 2007, 27-29, 35.) In this model, efficiency was placed above customer experience and satisfaction (Pinheiro 2014, loc 343).

As Womack et al. explain, the hierarchical management system is a characteristic of mass production where the basic workforce requires no special skill or education to perform easy and repetitive tasks on a production line (Womack et al 2007, 21, 24-25). Poppendieck describes the work boring, repetitive and tightly controlled (Poppendieck 2007, 2).

While the nature of the work in the creative and information technology fields is very different from the assembly line, the organizational hierarchy and position still largely defines the responsibilities of individuals. Usually the manager positions form a decision-making layer and the employees report to them periodically.

Another trait of a hierarchical company is the high level of specialization in the workforce. Having a specialized workforce makes it easier to manage from the upper levels, and as in mass manufacturing, makes employees easy to replace. The model is not designed to support collaboration between different roles and departments. According to Pinheiro, specialization is the heritage of the industrial mindset. As in the mass produc-

tion era, companies still tend to have separate roles and departments for different specialties. (Pinheiro 2014, loc 294-300, 373.)

A mass-producing organization is very slow to respond in case of a sudden shift in the market since it is quite costly to change the production line. The fixed production line and highly specialized workforce makes mass production very efficient in producing large amounts of predefined types of products, but not very efficient in reacting to changes. (Womack et al 2007, 24-25.)

2.1.2 Lean manufacturing and the focus on value

While mass production was gaining traction in the American market, a Japanese company led by Eiji Toyoda was looking for a way to shift into the car manufacturing business. At the time, the market in Japan was small and fragmented and the workforce was too unionized to be treated as interchangeable resource. (Womack et al 2007, 48-49.)

The workforce situation in Japan forced Toyota to find other means to producing a range of quality cars in a price regular people could afford (Womack et al 2007, 48-49). As Liker writes, Toyota Production System was designed to continuously improve every step of the process and create a learning organization in which every employee is motivated to work towards greater quality (Liker 2004, 36).

According to Liker, Taiichi Ohno from Toyota described the idea of lean as: “All we are doing is looking at the timeline from the moment the customer gives us an order to the point when we collect the cash. And we are reducing that timeline by removing the non-value-added wastes” (Liker 2004, 7, 37). As Ries explains, the lean organization was built on the principle that everything should be geared towards removing excess waste from the process by concentrating on the steps that add value to the customer (Ries 2011, 185-187).

Building value and learning into the process required skilled workforce to accomplish and at Toyota the quality of the people was placed above everything (Liker 2004, 186). People were hired for life, so a lot of effort was placed on improving the skill of the workforce (Liker and Hoseus 2008, 77, 106). The unique point of view valued the quali-

ty of individuals over processes, and only the highly trained workers met the requirements for building an effective learning organization (Womack et al 2007, 102).

Producing what the customer wants, at the right time and in the right amount was the key to the lean production (Liker 2004, 8). New things were created on demand, which streamlined the delivery system since things were not produced unnecessarily (Ries 2011, 185-187). The idea is not novel, but still many software products fail to meet the customer needs. Thus the lean approach could be one way to remove excess waste from the software development as well.

A concrete concept to removing waste is to streamline the production to support smaller batch sizes (Liker 2004, 88-89). Ries agrees that it is possible to efficiently produce limited batches of different products by concentrating on building in smaller units (Ries 2011, 185-187). The small batch approach should be valid also in software business, where each product is usually quite unique.

The implementation of lean has been tried before in different fields, yet companies still struggle to find the right methods and tools (Poppendieck 2007, 11). As Liker writes, the effectiveness of the lean approach in the Toyota factories is well known, and organizations in different fields are studying and trying to implement the winning combination of lean production methods (Liker 2004, 4-5).

2.2 Lean software development

Agile movement had a similar effect in the software business as lean had in manufacturing. The reason for the agile disruption was also the need to adapt to changing environment more efficiently. Agile ideology changed the way the software is built, and how the team members work and collaborate.

Agile has become more or less de facto way of working in software development in recent years. Since lean and agile methods share a similar ideology, they are not alternatives to each other. They can even be merged together to create the most convenient workflows for the teams.

2.2.1 Agile changes the way software is developed

Before the wide adoption of the Internet and the modern development tools, software development was slow and expensive. Software was delivered in physical form, such as CD-ROMs, which could not be updated after delivery. The situation led to a process where everything had to be thoroughly specified before the implementation could start. After implementation everything was tested and then released. If the specification had a flaw, the heavy process had to be started over.

As described by Royce as early as in 1970, the waterfall model represents this process. It is based on heavy documentation and large handovers from one specialty to the other. (Royce 1970.) Over time, the waterfall method was challenged because it did not serve the modern software development where things constantly change and evolve.

Since the waterfall approach created problems in responding to changing requirements and software development was getting easier and faster, new methods started to emerge. Agile movement changed the development process by placing people over processes and working software over documentation (Pichler 2010).

The change from waterfall to agile was similar to the movement from mass production to lean manufacturing, as teams started working collaboratively rather than through large deliveries and developing in smaller iterations. This enabled making iterations to the specifications during the project and responding to changes more efficiently.

Agile shares many characteristics with lean, and at best they compliment each other. It is also possible to use lean strategies with agile methods to get the best of both worlds, as they share many principles and both are designed to respond to change.

Agile and lean both place individuals and collaboration between different professions to the center of development. In the ground level, agile is structured to help adapting to the changes during development while lean attempts to bring value to the customer more efficiently.

2.2.2 Customer development validates the market assumptions

Customer development is a strategy that led the way to the birth of the lean startup. As defined by Blank, the idea of customer development is to validate the business assumptions by involving the real customers in the development process as early as possible (Blank 2007, 15).

Customer development approach ditches the traditional approach of conducting market research on a new market to ask people if they would like to buy the product or service if it was available. Peter Drucker challenged this as early as in the 70s when writing about management and entrepreneurship. He states that one cannot do market research for something genuinely new. Building a new service or product requires listening to the users and experimenting with trial and error. (Drucker 1974, 367.)

As lean principles in general, customer development is about challenging the hypotheses about the market. As Maurya states, the business plan of a new company is just a series of assumptions that can be tested empirically (Maurya 2012, loc 154-162).

Customer development is focused on validating the business plan and minimizing the market risk for a new product by conducting experiments (Blank 2007, 33). The approach aims to acquire paying customers even before the product is ready (Blank 2007, 103). According to Alvarez, you should be building your customer base at the same time as you're building your product or service (Alvarez 2014, loc 322-330).

Customer development is a good match with lean since it is a way of reducing the batch size by validating assumptions as early as possible. If a hypothesis can be proved false before building anything, the spared amount of work can be focused on more value-added activities.

2.2.3 Lean startup builds on agile and lean ideologies

Brought mainstream by Eric Ries, lean startup movement has been taking over the software development community for a few years. As Ries describes, the core of the lean startup was formed when he tried a lean way of building new products. He writes

that success was not about luck, but methodologically improving all aspects of the product while simultaneously testing every step with the real users. (Ries 2011, 3-4, 6, 10.)

A traditional way of measuring the progress of a company is by settings business goals. The management sets outcomes to pursue, such as a certain amount of gross sales. The problem with the approach is the shortsightedness of the goals. In a modern company, every decision might not create instantly measurable revenue. The culture of measuring only success might also hinder experimentation and innovation.

In a lean startup, the progress of the team is measured in learning milestones instead of completed features or business goals (Ries 2011, 77). As Gothelf and Seiden argue, keeping the focus on the learning rather than trying to succeed in every attempt shifts the culture of the company. When teams are allowed to experiment and occasionally fail, the generation and implementation of new ideas is accelerated. (Gothelf and Seiden 2013, loc 403.) According to Ries, the idea is to create a culture of entrepreneurship, which enables rapid development and a continuous learning process (Ries 2011, 19, 34-36).

The idea of the learning milestones is to make measurable assumptions about the initiatives of the team and the experiments are focused on learning from the results (Ries 2011, 77). As Gothelf and Seiden describe, new assumptions about the market or users are created in the form of hypotheses. An experiment based on the hypothesis is conducted and measured and the hypothesis is validated or discarded based on the results. (Gothelf and Seiden 2013, 22-23, 56.)

The experiments should be kept small to minimize the batch size so only a part of the product or service is built and validated before moving to the next experiment (Gothelf and Seiden 2013, loc 345-353). As Ries writes, the foundation of the lean startup ideology is the build-measure-learn loop, which is implemented by building the smallest thing possible to measure an outcome. The goal is to consistently learn from the results of the experiments. (Ries 2011, 9, 76.)

A building block of the lean startup process is the minimum viable product, which is the smallest possible implementation that is still viable for the customer (Gothelf and Sei-

den 2013, loc 301). The term is often used to indicate the smallest possible product that can be shipped to the market, but as Gothelf and Seiden write, the smallest thing you can build to test a hypothesis is your minimum viable product (Gothelf and Seiden 2013, 7).

2.3 Lean user experience

User experience design is an important part of the development of any service, including software products. There have been many attempts to improve the efficiency of user experience design and to integrate it with the implementation after moving on from the waterfall model.

The core basics of lean user experience design draw from the Toyota culture embracing teamwork, nurturing quality and learning, producing in small batches to remove waste and creating value to the customer in every step. The lean user experience ideology offers yet another way of implementing user experience in the development process, which is further discussed in the case study.

2.3.1 The principles from design thinking

Design thinking shares principles with lean as it builds on user-centered methods and quick iterations. Design thinking evolved in parallel with user-centered design, developed as a set of methods to solve complex problems in a people-centric way. The idea of design thinking is to provide an overall principle of solving problems, using different methods from different fields related to design such as user research to come up with the best solution.

According to Curedale, the principles of design thinking lie in collaborative, team-based process and it is based on solving problems by observing and studying users and using the gained knowledge to find a solution to the identified problem. Design thinking methods can be applied to any problem or domain to find novel and innovative solutions. (Curedale 2013, loc 470-474.)

Liedtka, King and Bennett further describe that the key to solving the problem with design thinking is discovery using user-driven research methods to better understand the current reality. Another step is to involve partners to expand the boundaries of the solution by co-creation. Finally, the design thinking process involves real-world experimentation to get feedback, iterate and validate the solution. (Liedtka, King and Bennett 2013, loc 137-149, 174-184, 209.)

The last phase of the design thinking process is to iteratively test and improve the solution as in lean design in general. The prototyping phase could involve anything from paper prototypes to human actors to make the solution testable and tangible. Combined with the small batch principle, design thinking comes quite close to the lean startup methodology.

Design thinking is often linked to the globally known design company IDEO, which publicly praises the approach. Their introduction about design thinking says: “Thinking like a designer can transform the way organizations develop products, services, processes, and strategy.” (IDEO 2014.)

By bringing the experimental and iterative design to the center, design thinking shapes the core of the lean user experience. Combined with the small batch size and continuous learning and validation, it forms the basis of the lean design process. Thinking like a designer and bringing the user to the center forms a solid foundation for the lean teams to build on.

2.3.2 User experience design

Since lean development is based on learning about the market and the customers, user research is the most important concept in utilizing lean methods. The lean user experience methodology builds on top of traditional user experience design principles.

By definition, user experience design covers all the interactions a user has with a product, service or organization (Moule 2012, loc 239). User experience design includes all the interaction between a service and the user and is not limited to tangible products. It

often consists of user research, service design and interaction design, also covering the artistic and usability-related aspects of the user interface.

User experience designers are often mainly working in the first phase of the project, collecting information about the needs and preferences of the users by conducting research. The research results are then used to design a new product or service. In case there are no design skills in-house, design agencies are often hired to create a design to be implemented elsewhere.

As Sy describes, in the waterfall model user research is conducted before starting the design work, and the complete design is finished, documented and handed over to the development before the implementation begins (Sy 2007). The problem with the waterfall approach has been the large batch size of creating the entire design up front. Having everything designed before starting the implementation can lead to large amounts of wasted work if there are any changes during the following phases.

The agile revolution forced the user experience design to adapt to the new workflow. Different approaches were tried to fit the design process into the agile workflow. A popular method was the staggered sprints approach, where design was created one sprint ahead of the development.

While the cycle time for the design was significantly shorter using agile methods, user experience was still seen as a separate part from the development. According to Gothelf and Seiden, the staggered sprints approach created a sort of a mini-waterfall process where designers and developers still continued to communicate through hand-offs (Gothelf and Seiden 2013, 98).

Cooper, Reimann and Cronin also once believed that all design work should be completed before coding begins (Cooper, Reimann and Cronin 2007, 567). Their widely used methodology in designing user interfaces is largely built around this idea. They however argue, that the process is not practical in reality and suggest collaboration as the key to more effective design process (Cooper, Reimann and Cronin 2007, 567).

Encouraging developers and designers to work together, lean design methodologies provide a practical framework to accomplishing a more iterative and collaborative

workflow between design and implementation. Even though user experience design is often done iteratively, the traditional way of designing the user experience was separated from the development, leaving little possibility for cross collaborating with the different professions. Design may also be seen as an art form that should not be influenced by business, which is completely reversed in the lean ideology.

2.3.3 Merging lean with user experience

Lean user experience or lean UX in short is a term used to refer to a set of methods and philosophies aimed to apply lean principles to user experience design. The methods of researching and validating with real users are drawn from the user-centered design philosophy, but using the methods to test early and validate before building is the heritage of lean.

In contrary to the traditional user experience design that is based on reports and deliveries, lean user experience design is based on quick implementation and testing in rapid iterations. As in lean methodology in general, common research methods such as user interviews and contextual inquiry are used to validate ideas and continuous testing is done both qualitatively and quantitatively during all phases of the process.

Similarly to the lean startup, the design process is based on testing early and often. A way of keeping the inventory low is applying small batch size principle from the lean manufacturing system. Gothelf and Seiden state that by delivering design in small iterations ensures there is no large batch of unimplemented and untested design waiting for implementation (Gothelf and Seiden 2013, 9).

The early testing method has been criticized for delivering a bad user experience since everything in the product is not finished or functional. Ries is a great advocate of early delivery, stating that additional features or polish beyond what early adopters demand is a form of wasted resources and time (Ries 2011, 95).

The trade-off between delivering a polished experience and testing an assumption as early as possible should of course be considered. In high-risk assumptions and when the effort to create a functional product is large, testing with the minimum product is rea-

sonable. Some users would however be outraged if a company such as Apple was to publish something unpolished and nonfunctional, which could have an undesired effect on the reputation of the company.

According to Gothelf and Seiden, the goal of lean user experience is to gain shared knowledge of the current subject within the team. By working collaboratively teams can move forward from the deliverables and concentrate on the learning. The base of the conversation is shifted from opinions to measurable outcomes. (Gothelf and Seiden 2013, 10-12.)

The value of teams with different competences has been acknowledged before. According to Kotler and Keller, the winning companies are those that excel at managing core business processes through cross-functional teams (Kotler and Keller 2006, 39).

The difference between traditional user experience research and the lean approach is that the discovery process is continuous and collaborative. The team does not rely on the handoffs from the external user researchers, but the research activities are shared across the entire team. In the waterfall process the whole design is created before the implementation begins. The lean team works towards the next goals together, led by the chosen metrics or goals, such as the minimum viable product.

According to Kuniavsky, in traditional software development, beta testing is seen as the final bug test before the product release and it is seen as a QA tool rather than design method. Usually the product is considered to be “ready” in this stage, and fundamental changes to the functionality are unlikely to be possible. (Kuniavsky 2003, 391-392.)

The lean development ideology takes a rather different approach in publishing the minimum viable product as soon as possible to start collecting user feedback and measuring user interaction metrics. In case a major flaw in the assumptions is discovered during the beta phase, the idea of the entire product could be reformed.

While the lean design process has been much discussed in public recently, there are still questions about how to deliver a good enough user experience while continuously delivering new parts of the product. The thesis explores some of the suggested lean design methods to discover new insights about the lean design process.

3 CASE STUDY

The case study describes the steps in building a new product from an idea to a minimum viable product using lean methodologies. The product was designed and implemented from scratch during the study.

The idea and the following design were validated and measured with potential customers during the development process as the lean ideology states. Following the lean principles, the team built experiments to test the problem and value hypotheses before the product was launched.

The next section describes the background of the project and uncovers the reasons why the project was started. The framework section further discusses the methods used to test and validate the ideas and how the lean user experience framework was built.

3.1 Background

The basis of the project was a decision to start a demo project to test the lean development principles and also to learn the realities of in-house product development. The goal was to explore the methodology of lean user experience design and analyze the pros and cons of the process to find and learn new tools to use in product development.

The team was self-directed and working without external stakeholders. The reason for the decision to start an independent development track was the possibility to spend enough time studying and validating the methods and workflows. The environment was created to resemble a new startup and the lean startup principles were followed during the process.

The product team's skills consisted of a range of specialties including programming, product management and user experience design. The members of the team were used to working in fast-paced client projects, each having more than ten years of software design and development experience.

Three people worked in the team during the development phase. The writer of the thesis was in charge of the product development, planning the customer discovery and research activities and leading the product design. The writer was also responsible for the front-end development of the landing page and the product, including styles, interactions and the layout of the user interface. However, based on the lean principles, everything was done in close collaboration with the team members.

The product was built in the spare time of the team members and on top of a full-day job, which resulted to time being the most critical asset. The project scope was planned accordingly so that the prototype was finished on time. The other scarce resource was money. There was no separate budget during the first development phase so the marketing money used to promote the product had to be kept minimum.

In addition, the entire team was not able to work co-located at all times since one team member lived in China for a while. Having regular, short team meetings and collaborating by virtual presence and in a shared chat channel assisted co-working and ideation.

3.2 The framework

This section explains the core principles and methods to which the case study was based. The framework builds on the work of lean authors and the publications were used as a guiding framework while building the product.

The authors often mentioned are Eric Ries, author of The Lean Startup, which revolutionized the way startups grow their business. Ries was greatly influenced by Steven Blank who is the author of The Four Steps to Epiphany, first published in 2005. Blank's book was a cornerstone to a process called customer development, which became the leading strategy for the lean startup.

Many authors were inspired by Ries' work, including Laura Klein who wrote UX for Lean Startups and Jeff Gothelf, author of Lean UX. They took the ideas from Ries' work and developed the process further to have more tangible methods to practice lean user experience design. In addition to the lean user experience books, Cindy Alvarez is

the author of Lean customer development, which is an excellent guide to lean customer development tactics, especially user interviews.

3.2.1 Idea for the product

Fried and Heinemeyer suggest that it is a good thing to create something you could use yourself, because building for yourself makes it much easier to solve all the little problems that come your way (Fried and Heinemeyer. 2010, 34-35).

Following that idea, the product idea was selected based on the team's own needs. The product would be a project management tool for software projects, suitable for in-house development as well as client projects. The preliminary domain expertise of the team made it easy to build early hypotheses about the problem.

According to Klein, selecting a small and well-defined user segment helps to create a tight scope for the first version, and it is possible to broaden the product scope later on (Klein 2013, 146). The target user base of the product was narrowed to teams that are building a software product in a lean way and need a flexible tool to track their plans and process.

The concept of the product was based on teamwork, where the design and implementation phases happen simultaneously in short iterations. The product would have a flexible task assignment system and a means to easily document design decisions. It would also allow the users to easily share documents and tasks with external stakeholders.

As the project management field already has different solutions for different kinds of teams, the product would attempt to re-segment the software project management market. According to Blank, niche products are launched to a saturated market attempting to address specific needs not currently served by the existing products (Blank 2007, 25).

The interesting part of the market re-segmentation was that the features needed to support the minimum use cases were quite extensive, since there already were a lot of products solving similar problems. To have a desirable minimum viable product, the

core set of features covered by other products would have to be implemented before the new product could provide more value than the competition.

3.2.2 Hypotheses

As Alvarez writes, hypothesis forming is a basic tool in lean methodology. Hypotheses are formed based on current knowledge and assumptions and then systematically validated using different research methods. The formed hypotheses must be challenged to gain the most accurate results from the research. (Alvarez 2014, loc 271-279, 292-298.)

Following the lean process, every experiment was based on a hypothesis and brought through the build-measure-learn loop. The selected activities included user interviews and landing page testing as a part of the customer development and discovery.

The experiments were designed together with the team members. Sharing the work with the team was assumed to minimize the need for deliveries and handovers between the team members and allow reaching the learning milestones of the team. As Alvares suggests, all assumptions were written down together and shared with the team to clarify the objectives (Alvarez 2014, loc 554).

3.2.3 User interviews

Early interviews were used to provide a clear problem validation. As Alvarez writes, the goal of the interview is to get as personal and subjective responses about the given subject as possible. The customers are not able to tell exactly what they want, but the challenge for the interviewee is to uncover what the customer needs. (Alvarez 2014, loc 1345, 1406.)

The problem hypothesis was studied by interviewing potential customers. The interviews would reveal if the problem was recognized and if the users were actively looking for a solution. The success metric for the interviews was to find at least one person within five interviewees with a recognized need for the solution. As described, all the

team members took part in the user research activities to maximize the shared understanding.

3.2.4 Landing page testing

Landing page is a marketing website that demonstrates the main features of a product. In this study, landing page testing was used as an early validation method before the product development was started. As Klein writes, a landing page test is a good way to reveal if someone is actually interested in your product or idea. (Klein 2013, 11-13.)

According to Ries, the value hypothesis can be tested by measuring if customers will sign up for a free trial (Ries 2011, 96). When using a landing page, the most important metric to test is how many users can be attracted to try the product. If there are no users willing to try the product, even for free, building it is probably a waste of time.

To measure the interest towards the product, a waiting list for the upcoming product was set up on the landing page. Users were able to submit their email address to become beta testers. The success metric for the test declared that if 15% of the site visitors would sign up on the waiting list, it would be enough to validate the value of the product. Additionally, the reliability of landing page testing was studied with a survey.

3.2.5 User acquisition

In this case new users were acquired to the landing page through paid advertising and free startup listings. The goal was to get enough users to visit the landing page to reliably measure the conversion rate for the registration form.

Even though using AdWords to drive traffic to your website was the original customer development tactic, Alvarez points out that because more companies have started to use the service, the price of the click has gone up so much it might not be the best channel to acquire clicks anymore (Alvarez 2014, loc 1043). To test the difference between advertising channels, another advertising platform called Reddit was also tested.

3.2.6 Prototype

In this case, a prototype was a minimum viable product in terms of testing the user interactions in a native environment and also in proving the validity of the technical choices. The prototype was built in a short time, tested internally and used as a base for the functional product.

As Gothelf writes, coded prototypes are the highest fidelity prototypes since they look and feel like the final product. The interactions in the prototype often behave like they would in the real version, and users are able to click through the predefined flows like they would in the finished product. (Gothelf 2013, 65.)

The prototype was built for the browser to mimic the final interactions as closely as possible. Since the product was meant to be simple and easy to use, a lot of effort was put to the interaction patterns to make it as quick as possible to add, edit and remove information.

3.2.7 Minimum viable product

According to Ries, a minimum viable product is a version of the product that has the minimum set of features to begin the learning process within the team. The goal of the minimum viable product can be to validate a design or technical questions as well as the fundamental business hypothesis. (Ries 2011, 93.)

Yoskowitz et al. also write that while the landing page and marketing buzz is about finding out if the message is good enough to attract customers, the minimum viable product is about validating that the solution is good enough to solve the identified problem (Yoskowitz et al 2013, loc 4062).

The final stage of the minimum viable product in this case was a real product with the minimum set of features to fill the basic needs of a production team. Selling the product with just the minimum set of features would finally validate the market hypothesis, even though that part has been left out of the scope of this thesis.

The minimum viable product for project management would have to fill the basic use cases to add, edit and delete tasks as well as to add and edit documentation. Some searching functions and the possibility to assign tasks to project members were also required.

There have been diverging opinions on the idea of the minimum viable product. Another point of view is to generate a minimum product based on the unique need or situation. In addition to viability, there are also other aspects that may be as important, such as desirability and feasibility. Chen argues that the minimum desirable product should provide a great user experience and value to the customer from day one (Chen 2009).

The design goals for this minimum viable product were to prove the simplicity and ease of use, paying less attention to aesthetics. The visual appearance was kept good enough to feel reliable and modern, but the design decisions were based on usability and clarity rather than polished graphic design.

3.3 Setting up the team

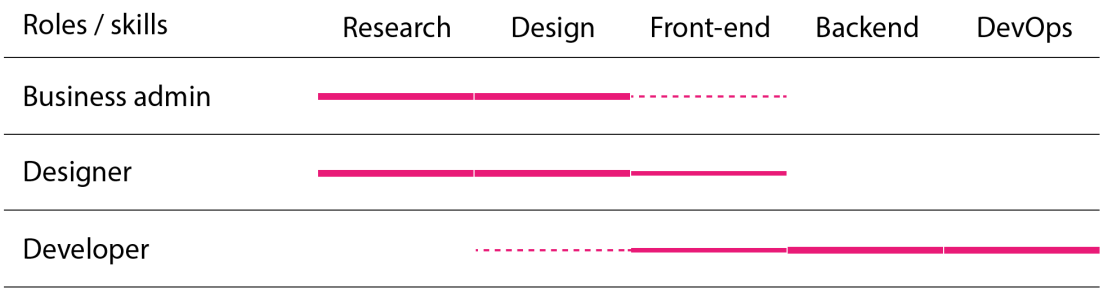
The team-forming phase was the most important stage of starting the lean development, since the lean ideology is based on the quality of the people. The lean approach requires deep collaboration between different competences and the skills of each team member should be considered carefully. The idea is to find professionals with enough overlap in their skills to communicate and collaborate effectively.

A gap between skillsets of the team members may lead to missed opportunities and prevent the team from working in full capacity. For example, having a graphic designer to only draw pictures instead of creating the layouts in a native platform means that someone other has to replicate the designs with a programming language later on. Duplicate work slows down the team's cycle time from idea to production.

Most importantly, sharing the same skillsets minimizes the amount of documentation needed between the team members. For example, building a prototype for the browser is more efficient than drawing the same design on paper, since the browser version can

also communicate the nuances that are dependent on the platform. Unlike paper, a browser window can be resized indefinitely within the screen. A design on paper is never capable of displaying the different possibilities. Also, when the team members can talk with the same terms, there is less risk of misunderstanding.

The product team was built to support lean workflows with different skillsets. Picture 1 shows the separate skills that have some overlap in the middle (Picture 1). In the context of the thesis, the business administration role was less utilized.



PICTURE 1. Team skills visualized as a graph where the high-performance skills are shown as a thicker line and basic skills as a dashed line

3.4 Validating the problem hypothesis with user research

The first task for the team was to generate an idea and a starting point for the product in the form of a problem hypothesis. The team members produced the hypothesis in a workshop. The agenda was to create a shared vision of what the team was about to start building and what were the first assumptions about the problem and the customers.

Out of the first discussions, a single problem was most clearly identified. While working in software projects, the team had tried a lot of products to allow sharing quick notes and keeping tasks up to date while doing iterative work. None of the products currently on the market had been able to solve the core problem. The ideal product would be simple enough to keep the workflow as quick as possible yet support managing very large and complex projects.

Based on the idea, the problem hypothesis was formed: “We believe that cross-functional teams experience inability to efficiently iterate with design documents and development tasks when working on a software project”. As people working in teams in the field of software development were the target users, the project team closely matched the target customer segment.

The market hypothesis for the product concept stated that the members of cross-functional teams and certain individuals such as front-end developers and designers who work with design and programming are an underserved user segment and should express interest towards a new solution.

3.4.1 Conducting the user interviews

Based on the early validation ideology, arranging the interviews was started as soon as the first hypotheses were stated and continued as often as possible during the design and development, the first interviews being geared towards validating the problem hypothesis.

In the beginning of the validation process the team did five interviews based on the target customer segment. As Alvarez points out, out of the five first interviewees, the team should be able to find a single enthusiastic person or the hypothesis would be proved incorrect (Alvarez 2014, loc 2403). Based on that, the problem hypothesis would be considered correct if at least one of the five interviewees would get excited about the idea.

Social media and personal contacts were used to find matching people to interview. Since the selected user segment was a close match to the professional careers of the team members, recruiting people from personal networks was quite easy. The selected persons were designers, project managers and developers working in a team-based environment to get a view into their daily work.

No more than two persons were conducting the interview at a time to keep the interview session light and pleasant for the interviewee. The other participant took notes while the

other kept the conversation flowing and roughly on track. Having the notes ready right after the session saved time and effort from having to go through tapes afterwards.

As Alvarez advises, most of the conversation was based on open-ended questions, which were triggered by the conversation (Alvarez 2014, loc 1308). That way the team learned a lot of detailed information about the processes and workflows of the users. Every member of the team participated on the interviews in turns to personally learn about the subject.

As the lean approach is focused on learning about the users and not the academic relevance, the interview questions were updated between the sessions to keep the team learning new things after reaching a saturation point or refining the assumptions.

As the team succeeded in finding an enthusiastic person that had a clear need for solving the problem, the hypothesis was declared validated. The interviews also helped to form a clear picture of the problems the users were facing. By keeping each interview relatively short, under an hour, the need to process too much data at once was avoided. Gaining more knowledge and perspective helped the team see the domain from a much wider angle.

As Alvarez suggests, a short retrospective was kept after each interview to go through the main points (Alvarez 2014, loc 1767). The idea was to summarize the most important findings as long as they are still memorized. Discussing the interviews briefly after the session helped to build a consensus within the team. In some cases, the interpretation of the data was different, and building a shared opinion was important for the team to move forward.

3.5 Validating the solution hypothesis by landing page testing

To find out more about the usefulness of landing page testing, a survey was conducted to study the attitudes and behavior of users encountering landing pages (Appendix 2). The survey had a total of 21 randomly selected users to answer the questions about their landing page behavior and attitudes. The amount of users to answer the questions was

eventually smaller than intended due to time constraints and the difficulty to get answers to an online survey.

3.5.1 Setting up a survey

The main goal of the survey was to find out if the registration is a good prediction of future behavior and if the interest rate on a landing page could be a leading indicator to the future success of a product.

The second target was to find out if the users not willing to register would be possible to convert into customers later on. The third goal was to find the most important aspects of a landing page to make the customers register. It was especially interesting to study if an unfinished landing page would create persistent damage to the reputation of the company.

By definition, early adopters should be the main user group to register on a landing page (Ries 2011, 62). Early adopters are a user group that is especially keen on trying new products and does not mind if the product is unfinished or lacks features. In the survey, early and late adopters were categorized by asking about their usual attitude towards unfinished or novel products.

3.5.2 Survey results

Out of the 21 participants, a little more than half considered themselves early adopters. There was no clear distinction of different behavior towards landing pages within this material, so early and late adopters were as probable to sign up to different services. 67% of the participants had registered on a landing page without seeing the real product.

The main reason not to register was the lack of screenshots or a demo in the landing page or the product not being finished yet. The main reason to register was because the product seemed cool with 57% share. Only one third of the participants had signed up because they actually needed the product features.

The share of the customers that needed the product correlated loosely with the share of the customers that converted into paying customers. 29% of the registered users had bought the product, and 36% had used it for free. Of the participants that did not sign up, almost 60% went back to use the product after it was published. The main reason for changing their mind was a recommendation from someone.

All of the users sometimes registered their email address to new services, 33% monthly and 15% more than once a week. Out of the emails they got, only a few most interesting sources were read. 20% of the users directed the emails straight into their spam box or spam account. Only under 5% of the users ever read the emails they get, and yet hardly go back to see the pages.

3.5.3 Survey conclusions

The survey results suggest that getting a landing page registration is a reasonably good way of predicting the minimum size of the market. Of the registered users, about a third should be possible to convert into paying users.

The landing page should have screenshots or a demo of the product to get most of the potential users to register. For future conversions to happen, the landing page has to be interesting enough to make the users to follow up. While users give their email address quite easily they are very selective of the emails they read.

If the landing page is not interesting enough, or the product is not complete enough, a lot of potential customers will drop out. Anyway, leaving without registering is not an accurate prediction of the future behavior. A recommendation seems to be the most effective way to get users to use a product.

Based on the results, it would be recommended to create the landing page only after the product has been planned far enough to give information about the real content of the product. Screenshots and demos are a good way of getting the users to register, and leaving them out may lower the conversion rate. Having some users to recommend the product may have a really good impact on the overall conversion rate, because recom-

mendations can make a lot of drop-outs to return to use the product, even if they did not show interest the first time.

3.5.4 Setting up the landing page

To measure the interest, a landing page was set up for the intended product. The first version of the landing page had a registration button to subscribe to the waiting list for the closed beta, which would become available later. By tracking the clicks and the conversions from the registration, it should be possible to tell if the product idea has any potential.

We assumed to get the first version conversion rate to about 1% or even less since there was no images or screenshots about a real product at this point. A considerably high conversion rate of over 15% would be considered a success, leading to the validation of the solution hypothesis.

The first version of the page was created in less than a week. The page had only a short explanation of the most important benefits. The tagline, which describes the product idea in a few words, was thought up quickly since it would be changed and tested again during the process.

3.5.5 Quick testing

Many online services for early validation have been introduced following the popularity of the lean startup. The services vary from offering tools for landing page testing to idea validation and user testing (Appendix 1). This section describes quick user testing with an online tool called UsabilityHub, which was used to test the versions of the landing page.

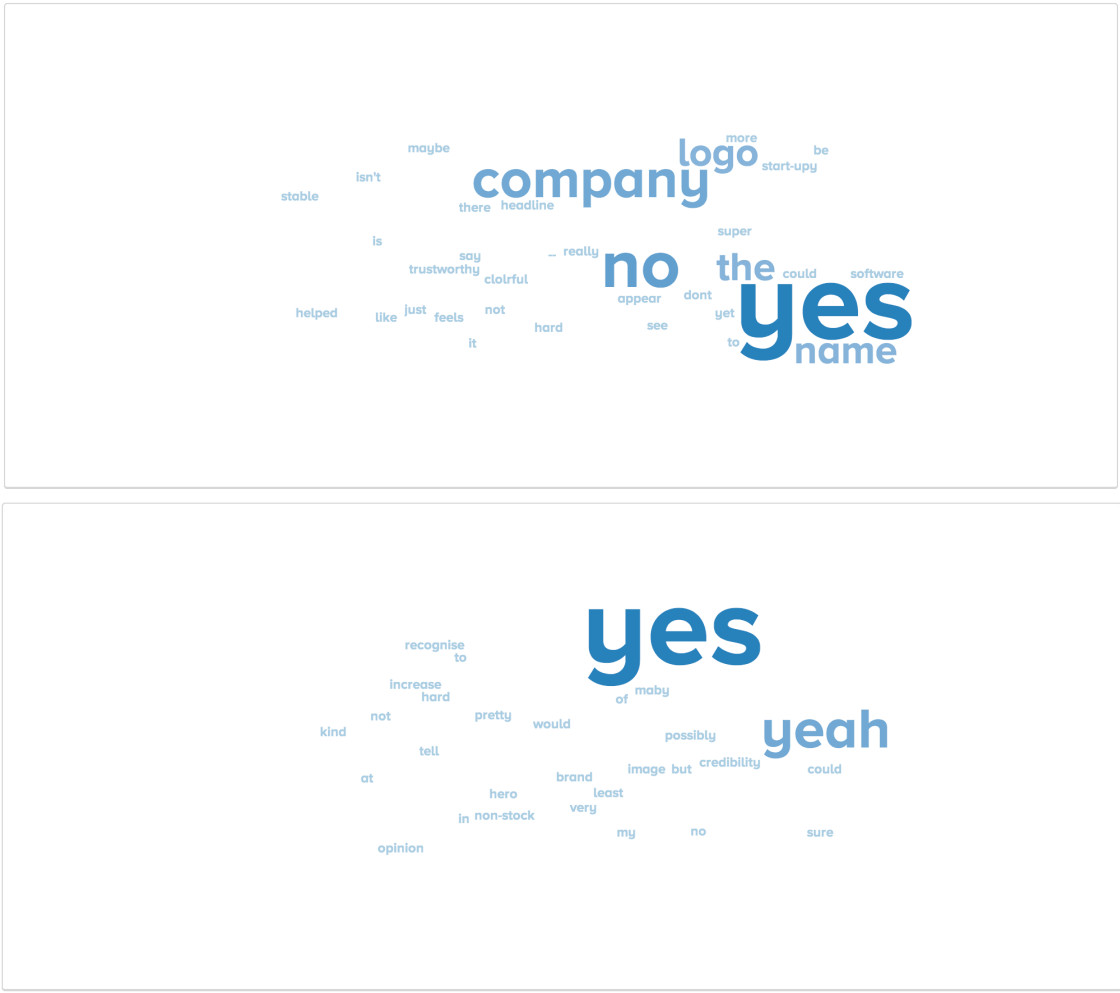
UsabilityHub is an online service where you can upload a design and have other users look at it and answer the questions you have defined. In the five-second-test a user is allowed to look at the page for exactly five seconds and is then prompted to answer a few questions.

The early versions of the landing page were tested before publishing to get instant feedback about the direction of the design. In this case, two consecutive designs were tested asking the same questions from the users. By comparing the answers, it was possible to assume which of the designs would perform better when published.

Most users who viewed the first version of the site found the overall look trustworthy and interesting. The critique stated that the lack of having a company name on the page was suspicious. Someone thought it felt “start-upy”, like the product was not stable yet. The users also wrote that the most interesting part of the page was the features section, which had some colorful graphics in it.

The second iteration of the landing page was uploaded to UsabilityHub to see if the redesign would have an effect to the results. Based on the earlier tests, a company name was added and the logo area was refined. Custom photography was added to replace the stock photos and the most important texts were rephrased to improve the overall look-and-feel. The same question, “Did the brand appear trustworthy?” was asked in both five-second-tests and each had a total of 20 answers.

The second version was seen as more trustworthy as less negative feedback and improvement suggestions came in altogether. As seen in Picture 2, UsabilityHub provides the results as a weighted tag cloud, which is a visual way of comparing the results from different tests (Picture 2). The larger the text is, the more answers came in that included the displayed word. Interpreting the image, the latter test had less negative words and more overall positive feedback.



PICTURE 2. Landing page test results from versions 1 and 2, showing more positive results from the second test (UsabilityHub)

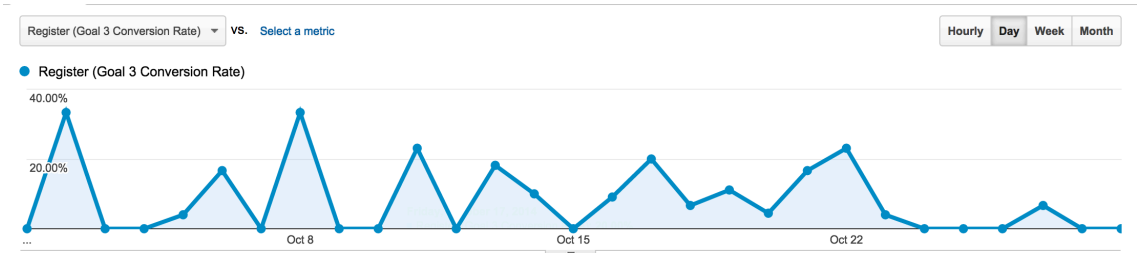
UsabilityHub is a useful tool for gathering both qualitative and quantitative data about different designs. The results were delivered quickly even with the free version, in a few days for each of the tests. The possible downside with the service is that since the free tests are paid with points earned by answering other designers' questions, it is possible that the active user segment is biased towards designers.

3.5.6 Selecting metrics

Metrics are the numbers and conversion rates that are tracked to measure the performance and impact of different experiments. In the beginning of the landing page test, the most important metric was the number of users to visit the page. As suggested by Yoskovitz et al., there should be just enough optimization to get the business to a place

where the risk can be quantified and understood (Yoskovitz et al. 2013, loc 1857). In this case the visitor rate should be improved enough to measure the conversion rate. That means that the number of visitors should be high enough to be able to make predictions of how many of them are interested in the product.

A free service for measuring the clicks and conversions is Google Analytics. As a free tool it is a widely used service to measure user activity on web pages. Events and goals can be tracked individually so that different interactions can be separately measured. The service also calculates conversion rates and allows comparing values visually on a timeline.



PICTURE 3. Registration conversion rate on the landing page (Google Analytics)

As seen in Picture 3, the registration was continuously measured in the web analytics service. The days with little or no conversions are seen as low points in the graph and the days with a better conversion rate are seen as spikes (Picture 3). Since the amount of users was quite low in the beginning, the days with zero conversions were usually also days with zero visitors. The average registration rate was calculated from a longer time frame than shown in the graph since the daily number of customers was too low to make valid assumptions about the trends in conversion rates.

While Google Analytics is a versatile tool that has tons of features for free, it is also quite complicated. Learning to use the advanced measuring tactics takes some time and effort. It also takes practice to find the meaningful numbers from all the possible graphs and tables. However, after setting up the service to automatically show a set of selected metrics, it is easy to track the most important numbers.

3.5.7 Acquiring visitors to the landing page

As the landing page is useless without visitors, different tactics were used to get potential customers to visit the site. Ries suggests setting up an AdWords campaign to get users to visit the product page (Ries 2011, 121). AdWords is a service provided by Google to easily advertise online. It shows advertisements based on different search terms that can be selected when setting up the campaigns.

At the same time with the AdWords campaigns other type of paid advertisements were tested in Reddit, which is an online news and networking service. Reddit has a reputation of being popular with early adopters, so it could provide more interested users for an early version of the product. A cheap campaign was bought to test if it would bring any users to the site.

A total of four campaigns were run during the case study, including two AdWords and two Reddit campaigns. The results were compared to find out which of the channels performed better and if the second campaign performed better than the first one in each channel. Based on the results, the best performing channels could be selected for further testing. Also the data from the advertisements resulting in most clicks could be used to improve the campaign conversion rates in the future.

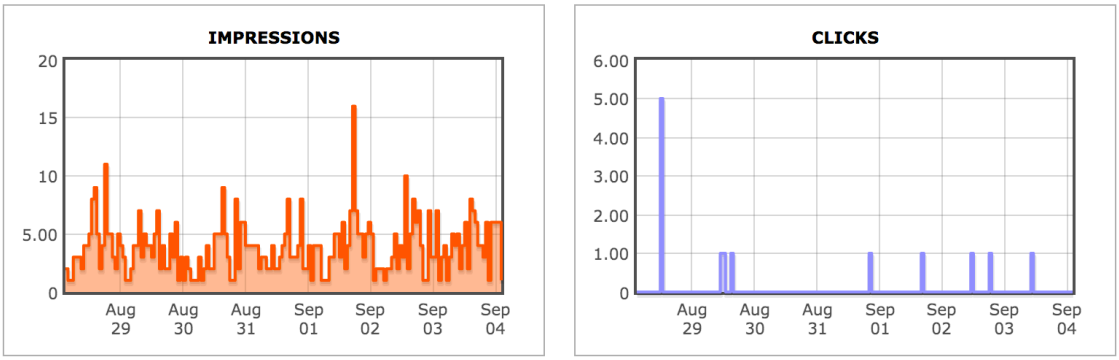
In three weeks the first Reddit campaign had generated a total of five clicks out of about 1800 views, one click costing about 0,20 euros. Out of the five clicks the landing page recorded two registrations, leading to a conversion rate of 40%.

TABLE 1. Reddit campaign 1 results in different stages of the first campaign

Views	Clicks	CTR	Conversions	Conversion rate
300	1	0,3%	0	0%
1800	5	0,28%	2	40%
3536	14	0,4%	4	28,57%

The second campaign tried a different tactic targeting especially early adopters using keywords such as “closed beta” in the advertisement text. The click-through rate was significantly higher than in the previous campaign, measuring at 1,13% after 3000 views.

As seen in Picture 5, the view counts were quite consistent during the campaign generating a relatively steady amount of clicks, one day performing exceptionally well (Picture 5). The amount of clicks from a single campaign was not very high because of the low budget. As seen in the first graph, the daily number of views, or impressions as phrased in Reddit, was generally between 2 and 10 with some rare irregularities (Picture 5).



PICTURE 5. Reddit campaign 2 statistics showing impressions and clicks in separate graphs (Reddit)

As seen in Table 2, the efficiency of the campaigns was improved by trying different messages, which lead to more clicks with fewer views (Table 2). The team learned about the user preferences by studying the most and least effective wording in the advertisements and could use the knowledge to create more efficient messaging for the target user segment.

TABLE 2. Cost per click in tested services

Service	Views	Clicks	Cost per click ($)
AdWords	117 263	32	1,02
AdWords 2	98 529	250	0,11
Reddit campaign 1	3 536	14	0,18
Reddit campaign 2	3 167	36	0,07

While the paid campaigns failed to create meaningful traffic with the very low budget, trying other methods proved worthwhile. There are a lot of startup acceleration platforms online and creating a profile in different services greatly increased early adopter visitor rates.

There are quite a few free services to have your startup featured. ErliBird is a startup accelerating service that has a free waiting list and some marketing options. It also offers paid acceleration services such as visibility in mailing lists and focus groups to collect feedback from the users. BetaList offers free and paid visibility in their web and social media channels.

The free version of ErliBird generated a total of 100 conversions on the service waiting list and on the landing page. The results from BetaList were similar, adding another 100 users to the landing page waiting list.

After finding the right channels to get the users, there was an increase in all of the measured events, such as navigation and sharing as well as registration. The users were more interested in the content and engaged with the site more than previously.

Even though the services generated a good amount of traffic, the measured metrics from the landing page were hard to interpret since the visitors arrived in spikes rather than separated evenly across different versions and channels. The overall performance was improved, but the reason for the improvement could not be clearly pointed out. Either the new version of the landing page was performing better, or the new acquisition channel generated more interested users.

TABLE 3. Register conversion rate by source

Source	Register conversion rate
Betalist	33%
Reddit (paid campaign)	28.57%
ErliBird	23.08%
AdWords (paid campaign)	6.42%
Other (organic search, LinkedIn, Twitter, Facebook...)	3.12%

While browsing the possible advertising methods and services, it became clear that there are a lot of companies and startups competing in the SaaS market. The range and offering of the products differs radically, but being noticed in the crowded space is hard.

A lot of startups are using the landing page testing tactic to early test the market, which means there is a lot of advertisements and social media buzz around the different products, which are not finished or even started yet. Having so much competition creates saturation on search keywords and social media, which makes it more difficult to get attention.

The situation of the online services is probably similar to the mobile app market, where the users are offered so many choices that only a few can reach the momentum to make it to the top. As Nielsen Company found out, the users only use a limited amount of applications despite having access to millions, and the number is ceasing to grow above a certain limit (Nielsen Company 2014).

3.6 Validating the market with a minimum viable product

While the landing page is sort of a minimum viable product by itself, the term is used to refer to the functional prototype in this context. The minimum viable product for the product was the prototype that featured the most important aspects of the solution. Since the simple and efficient user interaction was a key benefit in this case, the prototype was built to resemble the actual product as closely as possible.

While the prototype could be a bare bones version of the product in a situation where a completely new idea is featured, the high amount of competition in the selected market was enough to convince the team that a wireframe would not be enough to assure the users about the superiority of the new solution. Thus the desirability aspect was also taken into account in this project.

3.6.1 Building a prototype

Prototypes are used to communicate design decisions, test ideas with users and publish minimum viable products or features into the market. Prototypes vary from simple paper drawings to realistic functional prototypes.

In this case the product idea was based on dynamic views and user-generated data, so paper prototyping was not going to be a valid option. Only a few features were selected to the functional prototype, including the base navigation and information hierarchy. The prototype was designed to effectively communicate the basic interaction patterns such as adding and removing items.

The way of approaching the design by starting with a small feature set instead of a complete concept caused some discussions in the product team. The argument was that we could not design a small part of the system without knowing the finished concept. The other argument was that in designing only small parts of the system at a time, the concept would eventually become a patchwork of different things instead of a coherent user interface.

As Gothelf explains, in lean design, the job of the designer is to keep the concept coherent and maintain the grand vision. Delivering smaller pieces of the product at a time keeps the focus on the smaller goals, but ultimately they must all lead to a holistic user experience. (Gothelf 2011.)

While building the prototype, the workflow was very dynamic and design and prioritization decisions were made hourly. Since the team was responsible for the full workflow, the ongoing communication was enough to create consensus on the next steps. A time was set for a daily meeting to reflect the work done the day before and to set goals for the current day. The goals were based on the theme the team should be tackling each day, such as working to build the tasks flow or improving the main layout in general.

The prototype was finished in a few weeks displaying the most important benefits for the users. The user interface worked closely as the final product should, featuring the ease and simplicity of the interactions. The prototype was also the design specification for the implementation with preliminary visuals, layouts and design patterns.

3.6.2 Iterating the first version of the product

The first version of the product was built on top of the prototype. The user interface and the basic interactions were already documented in the prototype, so the upgrade from the prototype to a functional minimum viable product was accomplished quickly.

The problem with the implementation was the code used in prototype, which had to be written again a few times before the development team was content with the technical solutions. Thus the prototype was not a final proof for the technical implementation, but revealed the flaws in the first framework selections. Testing the prototype with the real codebase was in that sense also an exercise for the actual implementation, minimizing the risk for making the same mistakes later with the real product.

The product was built one feature at a time, which were tested with the real use cases as soon as they were planned and implemented. The development team worked with one feature or use case at a time to have a functional product for testing at all times. That way the product was usable almost from week one, and it was also used to track the tasks for the implementation project right from the beginning.

The benefit of building the product one finished feature at a time was that each of the iterations was itself a minimum viable product with an increasing amount of features. The end result was testable each day and provided value for the team from day one, even though the feature set was too limited for public usage during the first months. Testing the product in real use also made it easier to make the judgment call for releasing the product to the private beta when the features were extensive enough for real users.

3.7 Final thoughts

During the first phase the team members had very limited time allocated for the project, usually less than one day in one week. The time limitation resulted into a much longer time from idea to the functional product than previously anticipated. The work continued with the alpha version right after the first prototype had been validated and the first functional version of the product went to internal use shortly after. The product has been in private beta for some time and is close to being released to public beta.

The budgetary limitations in testing the landing page were not that major, because of the long development time. With more allocated money, the advertisement efforts could have been increased resulting into more traffic in less time. In this case, because the landing page was developing very slowly, it would have been a waste to use a lot of effort in advertising before having the base idea clearly stated and described on the landing page.

The overall results from the landing page testing phase were over 300 email addresses on the waiting list, 2 interview suggestions from startup publications and 2 meeting proposals from investor representatives. A total of 80 dollars was used on the marketing experimentations. The team published 2 blog posts and tweeted 50 times. The product was also demonstrated in a tech conference as a part of a startup event.

The service was featured on three startup listings, which generated a majority of visits on the landing page. The overall view count could not be measured since the statistics are not accessible in each of the services. The early measurements were also inconclusive for the future of the product due to the inconsistent visitor rate and the varying results from the different channels.

Since the case study was conducted in the beginning of the product development process, using iterative methods during the lifetime of the project were left out of the scope of the thesis. Using lean methodology to add value to an existing product would also have been an interesting subject to study.

4 RESULTS

Lean user experience changes the way we see user research by making it a tool for different kinds of professionals such as engineers and company management rather than limiting it to the designers and researchers. Measuring the user experience is no longer only for the selected few with qualifications. Depending on the execution, the approach could lead to a new era of user-centricity or to many adequately done or misinterpreted user studies.

By having the focus on the needs and desires of customer could backfire if followed too literally. Some disruptive ideas take time to mature, and could be easily discarded too soon if the market signals are the only tool of measurement. It is also possible that listening to the users too closely could lead to a homogeneous service environment and take the edge out of new innovations.

With the massive amount of competition, there is probably a limit of how many products the users are willing to use and more so develop with the creators. Gathering quality feedback takes serious effort, and the users are increasingly busy and bombarded from different directions with the plea to give feedback. They also get tons of email from every other service and only follow a small percentage of the messaging.

The amount of services trying to get user insight may lead to the feedback being more and more painful to gather in the future. Also only a few services can differentiate themselves from the crowd. The increasing offering of online services leads to too many options for the users, so more products will eventually fail to get enough customers to create a sustainable business model.

4.1 Cross-functional team minimized the handovers

Working as a team to build the prototype shifted the effort from creating deliveries for other team members to working together towards common goals. The entire team automatically stayed up to date about what and why should be built next. The generated buy-in and empathy towards the users from the research was a great way of including everyone in the design process.

The collaborative approach minimized the amount of documentation. Having the entire team participate in the user interviews and the following retrospectives created shared understanding on the subject, and there was little need to go back to the documentation. The decisions were trailed with short documentation to collect the history in a permanent form. The summaries from the interviews and the written hypotheses were helpful when occasionally going back to the earlier decisions.

Building a high-fidelity prototype in a short time demanded close collaboration between designers and developers. In the best scenario, the team was working intensively on the same prototype in the same location. Overlap in the skills such as a graphic designer with programming skills added speed to the process because all redundant deliverables could be eliminated. A functional team with good communication skills was needed to achieve this kind of workflow.

4.2 Early interviews formed a clear problem validation

Early interviews before starting the product design proved to be a great way of defining and understanding the problem behind the designed solution. It takes no more than a few days to arrange the first five to ten interviews, assuming the target segment can be contacted easily enough.

In the best scenario the interviews can be done free of charge if the users can be found from the teams' social circles. Having a budget to pay a small compensation to the users would however be helpful in the recruiting process. Reserving enough calendar time to arrange the interviews was needed, because getting a slot for the interview from a busy user took some time.

By really understanding the pain points of the users should result into better and more focused solutions. Asking about the products they might be using to solve the problem today helped to identify the biggest problems with the current products so that they could be avoided.

The entire team was present in the interviews or at least fully briefed to the results to build empathy towards the users problems. By introducing constant learning freed the team from creating heavy deliveries and improved teamwork by building consensus from the beginning. Getting everyone interested in the users' problems also helped in running the design workshops. Choosing a problem to which every team member can relate to made decision-making easier and required less output from outside the team.

There should be no reason to avoid talking with the real users, since the results are invaluable while building the solution. By finding out that the problem does not persist across the target user segment can save a large amount of time from building the wrong solution, or even reveal more profitable routes for the development.

4.3 Landing page validated the market before the product was released

For a market re-segmentation or a niche product, the amount of competition is huge, and it is hard to get attention without anything tangible to show. The differentiation strategy has to be clear enough to be able to show valuable benefits with only text content and vision description.

Getting visitors to a new page was slow in the beginning. The search keywords are saturated and advertising is quite expensive. If online marketing is used, there has to be a budget to use on the early marketing that will not directly convert into cash flow.

Calculating the market size and acquisition cost of the registered customers should be possible based on the landing page test. The survey suggests that a third of the registered users will convert into paying customers in the best scenario. A landing page might not however give the full picture of the market. If the solution differs from the message, or the message has been unclear, it is possible that the interested users will abandon the product once it has been published.

The process of creating the landing page was a good way of clarifying the vision within the implementation team, because had to be spelled out and explained with a few sentences. It also added momentum to the marketing by gaining attention and followers from early on. While the site might change and evolve a lot after the initial release,

based on the survey results the reputation impact from an unfinished page should not be permanent.

While testing different marketing messages and landing page options the team gained valuable information about the solution and was able to clarify the message and benefits to a best match with the target market.

4.4 Advertising was an expensive way of adding traffic to the landing page

Advertising in this case turned out to be an expensive way to gain traffic to a landing page. Searching for alternatives for paid advertising proved worthwhile. Using startup-featuring services proved to be a cheaper and easier way of getting traffic to a landing page. For a new startup there is a lot of services to gain free publicity and these are a good way to get early adopters to come to the site.

In the beginning, the early adopters are the ones that should be aimed for, so using time and money on channels that drive mainstream adoption could be saved for later. For this type of product, services that are meant for connecting early adopters with startups seem to be effective. These are also often free for basic use. Early adopter news feeds or discussions could also be a place to get attention if used correctly.

The problem with the channels was the irregularity of the number of visitors, and the varying acquisition channel. That made measuring the changes in message and content difficult or impossible. Without the visitor rate revealed on the service the click-through rate was also missed.

If paid advertising is used, the acquisition and conversion rates of a single channel can be tested with a small budget. The type of the users that can be reached varies a lot between channels resulting into large divergence in conversion rates. Some channels drive more mainstream users to the site, which may result to higher bounce rates.

Finding the best tagline and marketing copy separately for each channel was a measurable experimentation. If the user base is different from the other channels, a slightly modified message could resonate better. If the conversion rate is low, the channel

should probably be considered again. If the channel is promising, tweaking the message to better match the promised value in the landing page could lead to better conversion rates.

5 CONCLUSIONS

5.1 A lean design toolbox

The goal of this thesis was to find out how to implement lean user experience design in software development. Different methods were tested and the lean ideology was studied to find out practical ways of building software products in a lean way while maintaining the best user experience possible.

This section aims to build a framework of the best practices when using lean methodology in software development. The problem has been approached from two different viewpoints. The study itself was conducted in a flexible environment of an independent startup company. The goal of the study was to test the usage of the lean practices in a small team developing a new product.

As the second point of view, the results of the study are merged with the consultant agency world. The goal is to apply the learned lessons to a more complex context based on the writer's experience in selling and implementing client projects.

5.1.1 Validate the problem

The first task should be to identify a problem worth solving. User interviews and landing page testing are a quick way of finding out if the problem really exist and could be worth solving. User interviews broaden the view on the topic, possibly helping to come up with different kinds of solutions. While interviewing the potential customers gives qualitative results, landing page testing should reveal the actual market potential for the new idea. The entire team should participate in the research phase for everyone to have a good understanding of the situation.

After the problem has been validated, a high level concept should be created to frame the most important aspects of the solution. The concept should specify the high level architecture for the minimum viable product with just the most important features assumed to solve the problem. Hand-drawn wireframes and possibly some user stories are

enough to communicate the first version of the solution, which is created together with the team.

The customer discovery phase should take as little time as possible before building something tangible for testing. If the first results seem to be positive, the building phase should begin immediately. By shortening the cycle time, the team does not use too much time on the preliminary research without gaining new information each round.

A functional approach on selling lean projects as subcontracting projects could be to split the project to different phases, for example research and concept creation, prototyping, iterating based on user research, building a minimum viable product and finally improving the product. Different stages could even be separated into smaller portions.

By separating the project into smaller portions, the next phase could be planned based on the information gained during the previous phase. This would be another way of applying the small batch approach. Lean methods could also be beneficial in improving an existing product by setting metrics and experimenting to improve the user experience rather than doing a complete redesign from scratch.

5.1.2 Build a prototype

A functional prototype is important in testing the actual reaction to the solution. As people rarely know what they really need or could pay for, a real product to show them is the ultimate test. In the best scenario they could be charged up front for the product, which would validate the business case in the early stages. If no one is willing to pay anything for the product, the problem evaluation should be reconsidered.

For the prototype to be as useful as possible, the goal for the early test should be considered. Even a bare bones execution might be enough to prove a business case if it solves a real problem. The design drivers should be possible to find out during the research phase to make judgment calls on the most important aspects of the prototype.

The prototype should be focused on building the most important thing from the customer's point of view. It should also validate the most uncertain assumptions, moving

quickly through iterations and building features one by one. Prototyping should not be seen as a phase, but as a continuous cycle of build-measure-learn loop, which can be implemented while building the actual product as well.

Working with a prototype is fast and only a small amount of work is required to iterate between versions. In a lean team the designer works directly with the prototype, so there is no need to maintain separate design documents. There should be no heavy backend logic, so a rapid change of direction is possible if an assumption proves to be wrong. The visuals should be built and iterated on top of the layout using native tools. That way the colors and other graphic elements are easy to update at any time.

Building a product prototype for the browser should not take more than a few days depending on the complexity of the core flows. Since creating and testing animations and transitions in the browser environment is easy, it is also possible to test the motion design to accompany the graphic and interaction design.

The prototyping approach can be continued during the entire development, even after the product is published. Prototypes can represent single features and function as minimum viable products to test new features. They can even be validated before the actual implementation to see if the users would use the feature in the first place.

When starting a prototype without the finished layouts, the work is inherently driven by design. There has to be a solid direction to keep the prototype scope as focused as possible. Depending on the team skills, the designer should take responsibility of building the front-end and interactions, or with less programming skills, work closely with the development drawing and explaining the design decisions as much as the development requires.

5.1.3 Prioritize constantly

The workflow should be guided by constant prioritization. New data from the research or measuring activities should always have an effect on the task backlog. Without making continuous steering through measuring, the workflow will not automatically adjust. Sprints could probably be used to set milestones for the development, but settings goals

by single objectives for the entire team makes more sense. A backlog of items should always be ready to be tested, moved to the implementation and through the build-measure-learn loop.

The lean approach makes the development largely design-driven, based on the gathered data. The plan should be changed every time the information changes to have continuous redefinition of the goals. The features should be tested even before actually building them if possible to avoid excess implementation work.

Using lean prioritization in client projects could prove very problematic. Subcontracted projects are usually strictly specified before implementation, so redirection based on user input could be hard to negotiate. Even more problematic is the fact that client projects are charged based on reaching implementation goals. In the lean model, success is measured by learning milestones, not by finished features so the client would pay for something very abstract. It is also difficult to estimate how long it will take in hours to validate an assumption.

5.1.4 Have an autonomous and dedicated team

In the lean approach, the team has to have full autonomy to make design decisions based on the learning they have acquired. The team members should also be able to work full-time in one project. Working in multiple projects or even teams at the same time decreases the time that can be spent on working together and increases the need for documentation and hand-overs.

External politics are also a form of waste that is halting the team from moving forward, and thus should be minimized as much as possible. Since the team has to make quick judgment calls based on the gathered data, strict contracts or specifications are not compatible with lean.

The information about the project's requirements is gathered during the implementation and iterated. To be able to sell a lean project, the end result should be tied to the problem solved with the product, not on the features that will be built. The solution may not even be visible in the beginning, or it might profoundly change during the exploration.

One approach on lean client projects could be building cross-organizational teams. Communication and trust is needed between the client and the subcontractor for the team to be able to make quick decisions and even move to a completely different direction. At least there should be ongoing communication between the team and the client to ensure the project is going to the right direction from the client's point of view. Business needs stated from inside the client organization could be interpreted as user requirements and combined with the user data used to steer the project.

The problem with the approach that broadens the responsibilities of the team members is that everybody does not fit in this kind of process. The quality, or rather qualities, of the people play an important role. Not every developer can be persuaded to learn research skills. Some designers want to create the finalized, beautiful layouts by themselves, and not include "non-design" people in the process. Some people enjoy excelling in just one competence and staying in the defined department.

Including the soloists and single-skilled people in a lean team is not advisable, since the dynamics of the team are based on the deep collaboration between the team members. Working in just one phase of the development at a time means there will be idle times when the particular skill is not needed. Also, waiting for a phase, such as interaction design to finish before starting the development creates gaps for the developers too.

Developing lean methods in this kind of environment would have to be started from changes in the attitudes of the employees, and building team skills and camaraderie among the participants. Also, working together to broaden the understanding and skills between different roles should be organized.

5.1.5 Set measurable metrics

The hypotheses should be based on measurable assumptions and include a clear success indicator. It is easy to interpret results in a positive way for them to look more convincing than they really are. By selecting the metric for success before measuring, it gets harder to twist the results on your favor.

The actions taken to improve the product should be based on measurable hypotheses. As it is commonly said, you get what you measure. As all the functions of the company are based on metrics, constantly improving them should in time make the company more profitable. The key to improvement is to recognize the details that worked and repeat those to gain better results each time.

Measuring and testing may be difficult to implement in a client project since planning and implementing the metrics also takes time. The salesperson should have a good pitch about the benefits of measuring. If the team is only building the product as a project without the follow-up development, setting up the metrics might not be very beneficial if the client lacks the resources to keep iterating on the product.

5.1.6 Keep the research activities iterative and informal

The lean approach on user research makes it informal, quick and iterative. The sessions are short and happen in rapid cycles. There is little need for preparation, since anything the team has at the time will be tested. The focus is on learning, not in having an academic report to present after the study. The studies should also evolve during the project, so that the team keeps learning new things. Iterating the user interviews or the surveys should not be avoided if there seems to be more relevant subjects to learn about.

As the entire team participates in the research activities to learn about the users and the market, no heavy reports should be generated to document the results. Quick and informal notes should be enough to document the findings. It is beneficial to go through the findings right after the interview session to document the most important or new findings. Usually simply talking to different people is enough to find out about the issues the team is trying to solve, so having a formal test setup is not often necessary.

If the team is working for a client, it is probable that the client wants a more detailed report on the results to document the work. In the best scenario the team would have the authority to use the learning and make informed decisions based on that, but usually the client would want to have more control over the direction of the project. By presenting the findings to the client could be beneficial in building consensus. Also having the client's representative take part on the research could help in sharing the learning process.

5.1.7 Have a designer on board

Using lean user experience design methods makes the product development process design-oriented. The user research and design activities continuously drive the planning and implementation of the product. The backlog should be prioritized based on the design decisions that are driven by the research findings and the business goals.

Even though lean user research is informal in nature, there should be a member in the team that is familiar with the most basic research methods to get the team going efficiently and to avoid the known pitfalls in conducting user research. User interviews can be tricky to pull off without leading the conversation to a desired direction. The interpretation of the results may also be difficult for a person that has less experience on the subject.

The data-driven approach does not remove the need for a skilled designer with a solid skillset in usability and accessibility. A seasoned professional should fill the designer role to create a usable and appealing user interface for the product. In addition, the position of the designer should be the facilitator of the user research activities and usually the product owner in some degree. The designer is also working as an expert to teach and guide the team to the right direction in design-based decisions.

LIST OF REFERENCES

Alvarez, C. 2014. Lean Customer Development: Building Products Your Customers Will Buy. Kindle Edition. Sebastopol: O'Reilly Media.

Arjanmaa, Taina. Senior Interaction Designer at Fjord. 2014. Interview 29.12.2014. Interviewer Jouhtimäki.

Blank, S. 2007. The Four Steps to the Epiphany. Sussex: Quad/Graphics.

Chen, A. 2009. Minimum Desirable Product. Referenced 28.8.2014. http://andrewchen.co/2009/12/07/minimum-desirable-product/

Cooper, A, Reimann, R, Cronin, D. 2007. About Face 3. The Essentials of Interaction Design. New York: Wiley Publishing, Inc.

Curedale, R. 2013. Design Thinking: process and methods manual. Kindle Edition. Topanga: Design Community College Inc.

Drucker, P. 1973. Management. New York: Harper & Row.

Forbes. 2013. Lean Startup Strategy Not Just for Startups. Referenced 24.10.2014. http://www.forbes.com/sites/hbsworkingknowledge/2013/02/25/lean-startup-strategy-not-just-for-startups/

Fried, J, Hansson, D. 2010. Rework. Kindle Edition. New York: Crown Business.

Gothelf, J. 2011. Lean UX: Getting Out Of The Deliverables Business. Smashing Magazine. Referenced 10.7.2014. http://www.smashingmagazine.com/2011/03/07/lean-ux-getting-out-of-the-deliverables-business/

Gothelf, J, Seiden, J. 2013. Lean UX: Applying Lean Principles to Improve User Experience. Kindle Edition. Sebastopol: O'Reilly Media.

IDEO. Referenced 21.9.2014. http://www.ideo.com/about/

Klein, L. 2013. UX for Lean Startups: Faster, Smarter User Experience Research and Design. Kindle Edition. Sebastopol: O'Reilly Media.

Kotler, P, Keller, K. 2006. Marketing Management. 12th edition. London: Prentice Hall.

Kuniavsky, M. 2003. Observing the User Experience. San Francisco: Morgan Kaufmann.

Larres, Jori. Senior Designer at Idean. 2014. Interview 19.12.2014. Interviewer Jouhtimäki.

Liedtka, J, King, A, Bennett, K. 2013. Solving Problems with Design Thinking: Ten Stories of What Works. Kindle Edition. New York: Columbia University Press.

Liker, J. 2004. The Toyota Way. New York: McGraw-Hill.

Liker, J., Hoseus, M. 2008. Toyota Culture. The Heart and Soul of the Toyota Way. New York: McGraw-Hill.

Maurya, A. 2012. Running Lean: Iterate from Plan A to a Plan That Works. Kindle Edition. Sebastopol: O'Reilly Media.

Michelli, J. 2011. The Zappos Experience: 5 Principles to Inspire, Engage, and WOW. Kindle Edition. New York: McGraw-Hill.

Moule, J. 2012. Killer UX Design. Kindle Edition. Collingwood: SitePoint.

Pichler, R. 2010. Agile Product Management with Scrum. Boston: Addison-Wesley.

Nielsen Company. 2014. Smartphones: So Many Apps, So Little Time. Referenced 14.9.2014.
http://www.nielsen.com/us/en/insights/news/2014/smartphones-so-many-apps--so-much-time.html

Pinheiro, T. 2014. The Service Startup: Design gets lean. Kindle Edition. Eise.

Poppendieck, M, Poppendieck, T. 2007. Implementing Lean Software Development. Boston: Pearson Education.

Ries, E. 2011. The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses. Kindle Edition. New York: Crown Business.

Rostedt, Timo. Senior UX Designer at Nordkapp. 2014. Interview 6.12.2014. Interviewer Jouhtimäki.

Royce, W. 1970. Managing the development of large software systems.
http://www.cs.umd.edu/class/spring2003/cmsc838p/Process/waterfall.pdf

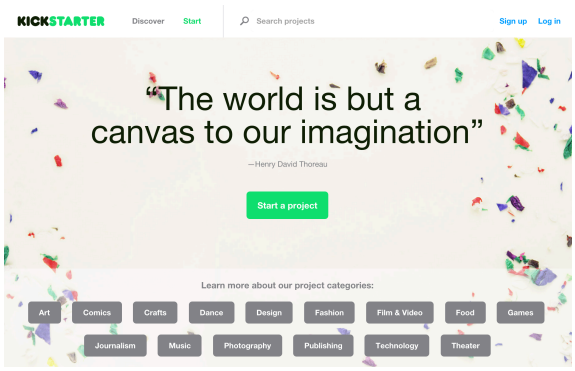
Sy, D. 2007. Adapting Usability Investigations for Agile User-centered Design.
http://www.upassoc.org/upa_publications/jus/2007may/agile-ucd.pdf

Womack, J., Jones, D., Roos, D. 2007. The Machine That Changed the World. How Lean Production Revolutionized the Global Car Wars. London: Simon & Schuster.

Yoskovitz, B, Croll, A. 2013. Lean Analytics: Use Data to Build a Better Startup Faster. Kindle Edition. Sebastopol: O'Reilly Media.

APPENDICES

Appendix 1. Services for early testing and validation



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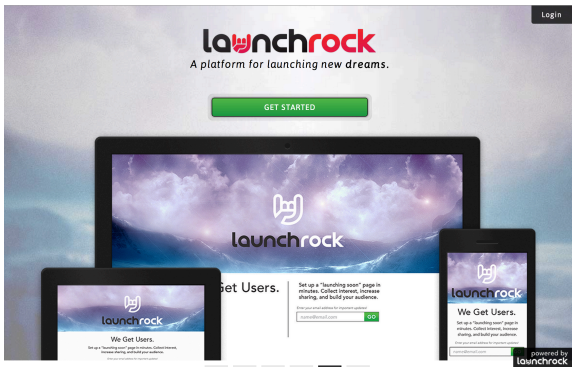
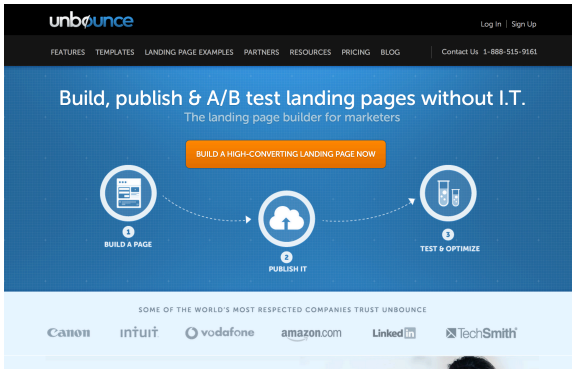
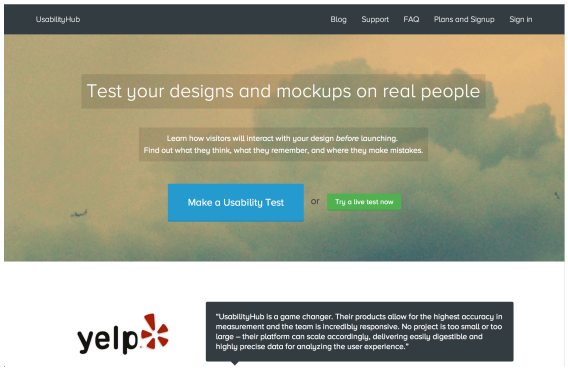


Launchrock http://launchrock.co/



Unbounce http://unbounce.com/



UsabilityHub https://usabilityhub.com/

Appendix 2. Landing page survey

1 Have you ever registered or subscribed on a product introduction page without seeing the live product? (The product was unfinished, did not have a trial or demo, was at beta stage etc.)

Yes

No (jump to question 4)

2 If so, what caused you to make a decision to register or subscribe?

The features were something I needed

The product seemed cool

The page itself was interesting

Other

3 After you got to try the product, what happened?

I bought it

I used it for free

I didn't need it after all

I did not like it

It was not interesting enough

Other

4 When you didn't register, what was the main reason?

I didn't trust the page

I didn't need the product

I didn't like the features

I didn't like the page

The page looked too unfinished

The product was not finished yet

There was no demo or screenshots

Other

5 When you didn't register, have you ever gone back to try the product after it was published?

Yes, I changed my mind when I saw the finished product

Yes, because someone recommended it

No, I never went back

Other

6 Early adopters tend to be the first to try a new product, late adopters use the product after it has been on a market for a while, which type are you?

Early adopter, I like to try new products as soon as possible

Late adopter, I like my products stable, ready and tested

7 Do you often register your email address to different services?

Yes, more than once a week

Yes, monthly

Sometimes

Never

Other

8 Do you read the newsletters or other emails you get from the services?

I read them and often go back to see the product

I read them, but not usually go back

I read only those from a few most interesting services

No, they go to my spam box or spam account

Other