Hochschule für Angewandte Wissenschaften Hamburg
*Hamburg University of Applied Sciences*

# Bachelor thesis

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*Application of the Lean UX methodology to a startup
in its seed- and development phase in order to verify
the methodology's feasibility*

*Fakultät Technik und Informatik
Department Informatik*

*Faculty of Engineering and Computer Science
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# Fabian Schimke

*Application of the Lean UX methodology to a startup in its seed- and development phase in order to verify the methodology's feasibility*

Final assignment handed in within studies

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at Department of Computer Science
at Faculty of Engineering and Computer Science
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## Fabian Schimke

### Thema der Bachelorthesis

Der Titel dieser wissenschaftlichen Arbeit *"Application of the Lean UX methodology to a startup in its seed- and development phase in order to verify the methodology's feasibility"* wurde gewählt, um eine konkrete Vorstellung und Erwartung ihres Inhalts zu vermitteln. Die Lean UX-Methodik, wie sie in *Lean UX – Designing Great Products with Agile Teams (O'Reilly, 2016)* von Jeff Gothelf und Josh Seiden beschrieben ist, wird auf ein junges Startup angewendet, um die Praktikabilität der Methodik zu verifizieren.

### Stichworte

Lean UX, Design Thinking, Agile Development, Lean Startup, Lean Product Development, Web-Scraping-Technologie, Chatbot

### Kurzzusammenfassung

Die vorliegende Arbeit gibt einen Überblick darüber, was Lean UX ist und beschreibt seine Prinzipien und den Prozess. Außerdem werden die Unterschiede zwischen Lean UX und Agile UX erläutert. Der Use Case wird mit dem zu lösenden Problem, der beabsichtigten Lösungsstrategie und der Vision des Teams vorgestellt. Die Methoden sind in den vier Schritten der Lean UX-Prozessschleife separat beschrieben, indem sie erklärt, angewandt und deren Ergebnisse ausführlich erläutert werden. Abschließend werden die zu ziehenden Schlussfolgerungen vorgestellt.

## Fabian Schimke

### Title of the paper

The title of this scientific work, *"Application of the Lean UX methodology to a startup in its seed- and development phase in order to verify the methodology's feasibility"*, was chosen to give a concrete idea and expectation of its content. The Lean UX methodology, as described in *Lean UX – Designing Great Products with Agile Teams (O'Reilly, 2016)* by Jeff Gothelf and Josh Seiden, is applied to a young startup to verify the feasibility of the methodology.

### Keywords

Lean UX, Design Thinking, Agile Development, Lean Startup, Lean Product Development, Web Scraping Technology, Chatbot

### Abstract

This paper gives an overview of what Lean UX is and describes its principles and process. It also explains the differences between Lean UX and Agile UX. The use case is presented with the problem to be solved, the intended solution strategy and the vision of the team. The methods are described separately in the four steps of the Lean UX process loop, by explaining them, applying them, and presenting their results in detail. Finally, the conclusions to be drawn are presented.

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# Foreword

As a software developer with agile experience from progressive companies and startups, my goal is to build product right from the start. Lean UX offers a methodology that seems to fit my agile background and my idea of how business and product development can be successful.

However, since theory often differs from the practical application, I have consistently used the Lean UX methods from the beginning of a particular project to check the feasibility of this methodology. In general, my project setups usually looked like this: Self-experienced problems are to be solved, there is no money and all team members can only push the project forward in their spare time.

This thesis will give insights into how Lean UX can be used - or sometimes should be used when use cases come from one and the same project with all its pitfalls and obstacles.

**A brief overview of the content of this work:**

The first chapter will provide an overview of what Lean UX is and describes the principles and process. I will also outline the differences between Lean UX and Agile UX.

The business case will be presented in chapter two with the problem and the intended solution strategy. First assumptions about the market are made and further insights into the team constellation are given.

Chapter three deals with the Lean UX methods and how they were applied in the project. The feasibility of each method is discussed in detail. The methods are grouped and ordered within the four Lean UX process steps that are *3.1 Step one: Outcomes,* Assumptions & Hypotheses, *3.2 Step two*: Design it, *3.3 Step three:* Create an MVP and *3.4 Step four:* Research & Learning.

Finally, chapter 4 summarizes the conclusions that can be drawn.
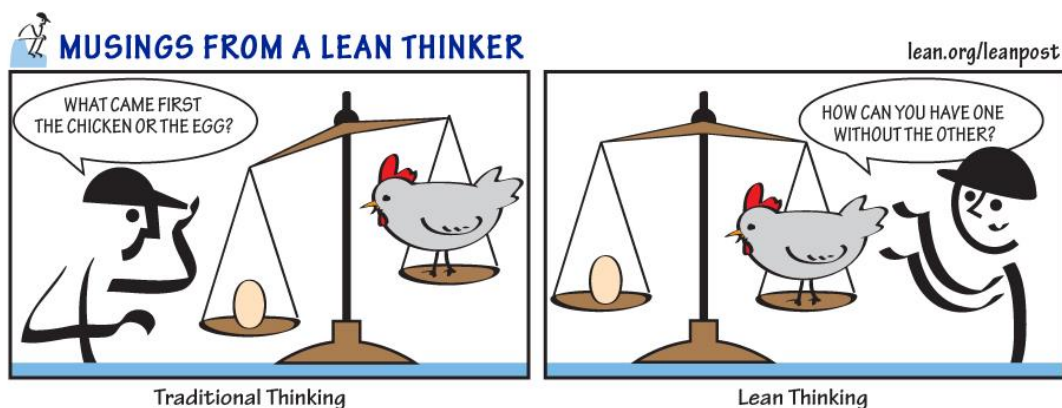
# 1 Introduction

This chapter gives in _1.1 What is Lean UX_ a brief overview of the design-centric framework and names its foundations. Section _1.2 Principles_ describes each principle of the guidelines relevant to _team organization_, _team culture_, and the _design process_. The four steps of the Lean UX process are shown in _1.3 The Lean UX process_ (its methods are explained in more detail later in chapter _3 The Methodology_). A short distinction to another popular framework is made in _1.4 Lean UX vs Agile UX_.

## 1.1    What is Lean UX

Lean UX is a further development of User Experience (UX) design process and has three more foundations: Lean Startup, Design Thinking and Agile development philosophies. A Lean UX process concentrates on the team's learning curve and creates only design artifacts instead of heavily documented hand-offs. Non-designers are involved, so there is a benefit of transparent and cross-functional collaboration. A hero designer that divines the best solution does not exist anymore, but the designer's role evolves toward design facilitation – a new set of responsibilities to enable rapid experimentation and measurement to learn quickly how well (or not) ideas meet their goals. Design Thinking widens the scope of the designer's work beyond interfaces and artifacts and with Agile comes shorter cycles, delivering value regularly, and continuous learning. (1)

The authors of the book "_Lean UX - Designing Great Products with Agile Teams_", Jeff Gothelf and Josh Seiden pointed out:

> "Lean UX uses these foundations to break the stalemate between the speed of Agile and the need for design in the product-development lifecycle. If you've struggled to figure out how UX design can work in agile environments, Lean UX is the answer." (2)

## 1.2 Principles

The Lean UX principles should be taken as its framework and they can be grouped in following core sets: *team organization*, *team culture,* and *design process*. Jeff and Josh list these principles as follows: (3)

The principles to **guide team organization** are:

- Cross-functional teams
- Small, dedicated, colocated
- Self-sufficient and empowered
- Problem-focused team

The principles to **guide team culture** are:

- Moving from doubt to certainty
- Outcomes, not output
- Removing waste
- Shared understanding
- No rock stars, gurus, or ninjas
- Permission to fail

The principles to **guide design process** are:

- Work in small batches to mitigate risk
- Continuous discovery
- GOOB: the new user-centricity
- Externalizing your work
- Making over analysis
- Getting out of the deliverables business

**Guide team organization** principles briefly described: (4)

- cross-functional teams

From day one of the project until the end of the engagement, a Lean UX team is made up of various disciplines such as software engineering, product management, interaction design, visual design, content strategy, marketing, and quality assurance. As diverse teams benefit from many different point of views, they create better products.

- small, dedicated, colocated

The core people in each team should not be more than 10 in total. Everyone is dedicated to one project and located at the same place. This allows good communication, focus, and camaraderie.

- self-sufficient and empowered

No team should have external dependencies or other obstacles to create and release software. This allows to move at a rapid pace and to raise the learning-curve as the feedback of real customers are learnings from the market.

- problem-focused teams

A problem focused team has been organized to solve business problems instead of implementing a set of features. Own solutions are the result and a deeper sense of pride and ownership.

## **Guide team culture** principles briefly described: (5)

- moving from doubt to certainty

Everything in Lean UX is first an assumption until it is proven otherwise. Once all assumptions, including those that are not easily spotted, have been identified, a process begins that validates them as systematically and rigorously as possible to increase certainty.

- outcomes, not output

*Outcomes* in Lean UX are described by meaningful and measurable changes in customer behavior. Explicitly defined outcomes are used to measure progress. *Outputs,* such as features and services, are intended to achieve these outcomes, but do not reflect progress of creating a product. On the way to the desired outcomes, insights about the efficacy of the features are gained. This allows objective decisions to be made when a feature does not perform well, whether it should be kept, changed, or replaced.

- removing waste

To be Lean implies to remove anything that does not lead to the ultimate goal. In Lean UX, anything that does not contribute to improved outcomes is considered waste and is to be removed from the process.

- shared understanding

Shared understanding is the currency of Lean UX and it is collective knowledge that builds up over time. The deeper it is, less debates about the *what* happen. Moreover, second-hand reports and detailed documents will become obsolete.

- no rock stars, gurus, or ninjas

Lean UX seeks team cohesion and collaboration. As rock stars or other personalities with a big ego neither share their ideas nor the spotlight, collaboration breaks down when they are in the team.

- permission to fail

Without a permission to fail, there is no safe environment to experiment and no creativity that yields innovative solutions.

## Guide design process principles briefly described: (6)

- work in small batches to mitigate risk

Design work, divided into small batches, allows validation during the creation process and reduces the risk of wasted work.

- continuous discovery

Quantitative and qualitative methods are used regularly during the design and development process to create shared understanding about *what* the user is doing with your products and *why* they are doing it.

- GOOB: the new user-centricity

Since product success is not a team decision, but the decision of the customer, GOOB stands for "Get out of the building" to find out with potential customers whether the current idea works or not.

- externalizing your work

Externalized work through whiteboards, virtual shared spaces, foam-core boards, artifact walls, printouts, and sticky notes makes the ongoing work available to the entire team. This also gives the quiet team members a voice, as sticky notes or whiteboard sketches are equally loud as the most prominent person in the team.

- making over analysis

To get answers from the customers in the field, it is necessary to make ideas concrete. This helps more than debating the merits of an idea in a conference room without market-based data.

- getting out of the deliverable business

As mentioned above, Lean UX teams achieve well defined outcomes instead of implementing sets of features. This is how stakeholder conversations turn from discussions about artifacts to discussions about which outcome is being achieved.

## 1.3   The Lean UX process

This section briefly describes the four steps of the cyclic Lean UX process. Each step offers hands-on methods that are explained in detail in *3 The Methodology*.
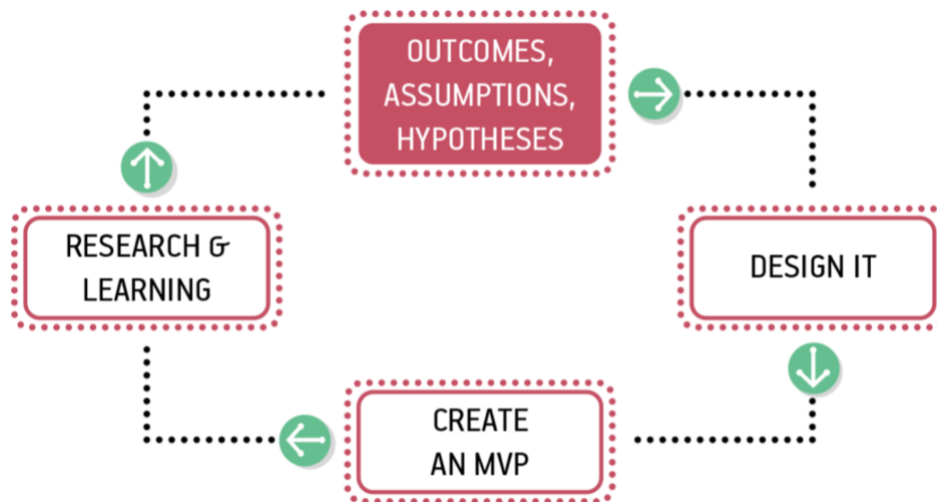


**Figure 1-1** The Lean UX process.
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**Step 1: Outcomes, Assumptions, Hypotheses**
The first step of a Lean UX process cycle begins with defining outcomes (desired changes in the world or in customer behavior) and identifying assumptions rather than starting with features and requirements. Compared to requirements, assumptions explicitly admit the possibility of being wrong. These  assumptions are used to create hypotheses. Similar to tests in Test-Driven Development (TDD), these hypotheses are written *before* the actual implementation. (7)

The methodologies of step one will be discussed in section *3.1 Step one: Outcomes,* Assumptions & Hypotheses.

**Step 2: Design it**
The design step is highly collaborative. The entire cross-functional team – designers and non-designers – co-creates together. This is necessary because user experience is the sum of all interactions a user has with the product, including pricing, the way it is supported or maintained. The process is orchestrated and facilitated by designers so that anyone can express ideas through low-fidelity artifacts. Of course, low-fidelity artifacts that have proven useful in achieving desired outcomes are ultimately implemented by an experienced designer. (8)

The methodologies of step two will be discussed in section *3.2 Step two*: Design it.

**Step 3: Create an MVP**
An MVP (Minimum Viable Product) in Lean UX is used to validate an existing hypothesis and determine whether a product idea is valid or not. If the primary focus of an MVP is to start delivering value to the market as quickly as possible, it should still be designed to learn from it. (9)

The methodologies of step three will be discussed in section *3.3 Step three:* Create an MVP.

**Step 4: Research & Learning**
The final step is the validation of the MVP and thus of all assumptions and the hypothesis on which it is based. For this purpose, light, continuous and collaborative research techniques are used. After this step, a new process cycle begins with a revised hypothesis to be tested. A goal of Lean UX is to iterate as often as possible over this process cycle. (10)

The methodologies of the last step will be discussed in section *3.4 Step four:* Research & Learning.

## 1.4   Lean UX vs Agile UX

Besides Lean UX, Agile UX is the other popular school of thought that fills the vacuum created by the traditional waterfall method. Both methods generally share more than they have differences. The differences are due to their different origins. Since Lean UX is more driven by the business-based Lean Startup method, the focus is on the "why ". In contrast, Agile UX focuses on the "how" as the influence of the project-based Agile development is stronger. Commonalities between the two are that both champion collaboration over documentation and that both emphasize iteration with short sprints/learning loops (Figure 1-2 Difference between Lean UX and Agile UX. (11)
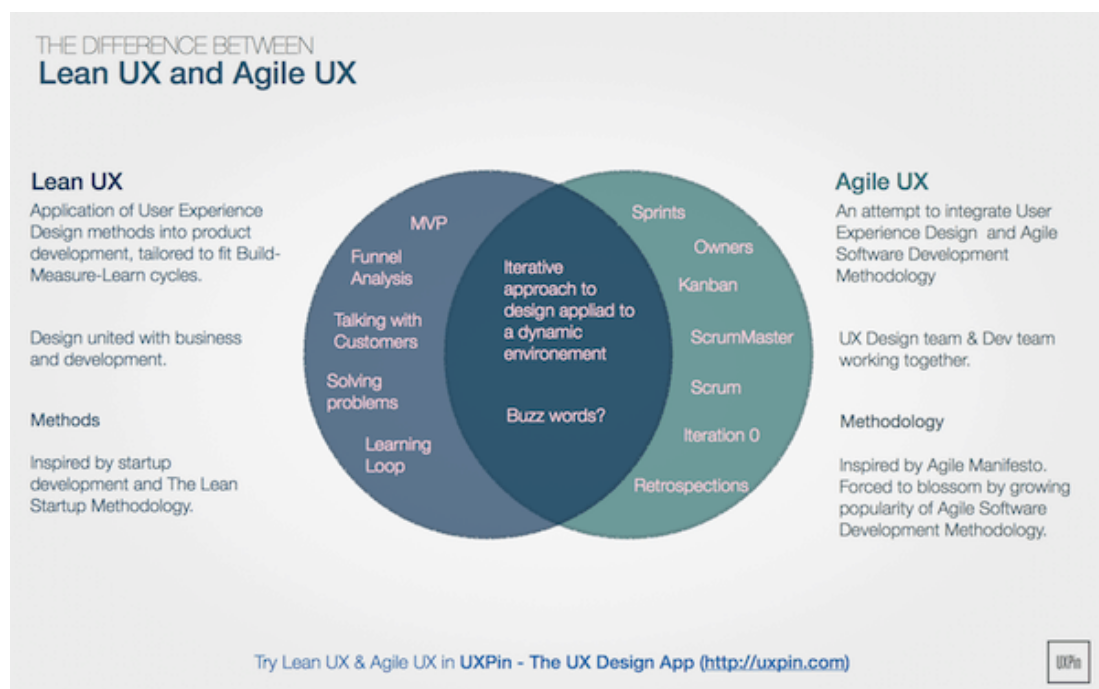


**Figure 1-2** Difference between Lean UX and Agile UX.
Reprinted from "Wireframing & Prototyping: The Past, Present, and Future", by Cao, J. (2015.02.05).
Retrieved from designmodo.com/wireframing-prototyping

# 2  The case: Apartment-Ticker

## 2.1  Problem to solve

In times of an overheated residential market, cooperative housing[1] in large German cities is so much in demand that admission stops or long waiting lists are the norm. In addition to waiting list procedures, cooperatives also offer apartments for non-members! This is hope and frustration at the same time, because once an interesting offer gets published on the cooperative's website, it is taken offline after just few minutes. Since apartment seekers cannot be notified about these offers, the necessity of an active search is the consequence. In order not to miss a housing offer of a cooperative, apartment hunters in one city would have to search through up to 30 web pages in the half-hourly cycle.

## 2.2  Solution and revenue streams

The technical solution to the problem described above is the Apartment-Ticker – a search agent that scans cooperative websites in German cities for apartments every 10 minutes. Subscribers will be notified directly on their smartphones whenever a published offer matches individual search criteria. In this way, subscribers can await being notified and do not need actively search anymore. If an offer is suitable, a viewing appointment can be arranged on the website of the offering cooperative.

At the beginning of the project following <u>revenue streams</u> were considered:

- Income from subscriptions by our users.
- Commissions from contracts concluded by our users with relocation companies, electricity providers or insurance companies.

## 2.3  Innovation

The product innovation consists in the fact that there is so far no service, which informs about housing offers, that were published on the web pages of housing cooperatives.

The technical innovation is based on developing a scalable system that can send large quantities of notifications in a short time, but that also retrieves and categorizes data from up to 2000 different websites with little effort for implementation and maintenance.

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[1] Cooperative housing in Germany is offered by housing cooperatives. These non-profit organizations aim to provide affordable housing to their shareholder members, who thus have the right to occupy a housing unit.

## 2.4 Market

The residential market, especially in the large German cities, is generally tense. The demand for affordable housing in urban areas has grown in recent years due to a significant increase in rents. As a result, there is a growing need to find low-rent apartments with sufficient rental security. Cooperative housing fulfils these conditions and is therefore in great demand.

The approximately 2.2 million cooperative housing apartments in Germany are distributed among approximately 2000 cooperatives. At present, apartments offered beyond waiting lists are allocated on the websites of the respective cooperatives according to the first-come-first-serve principle. The marketing initiative of the housing cooperatives Germany pursues a similar goal, like the Apartment-Ticker. On their web page apartment hunters can specify a search order and receive so once daily a E-Mail with new offers. Since the housing cooperatives must adjust their offers themselves on the web page of the initiative complementarily, it is missing to them at contents and thus also at users.

If cooperatives do not reach sufficient interested persons for a flat by their own Internet appearance, they usually advertise on immobilienscout24.de or immonet.de. This extra work becomes superfluous with the Apartment-Ticker, since this refers the contents automatically.

Our target group are tenants, who look for affordable rents and reliable tenancies in Germany.

## 2.5 Team

Three people formed the main team from the beginning, as they had already worked together on another project before. They build a cross-functional team from the areas of computer science, marketing and design. Each team member studied at university and worked alongside. For this reason it was necessary to use the limited resources as efficient as possible for this project.

## 2.6 Vision

Apartment-Ticker considers the market niche with cooperative apartments as a good market entry in order to expand the service to non-cooperative apartments. With only one search agent its user should be informed about all suitable apartment offers from all offering web pages and platforms. The users of Apartment-Ticker shall be informed also about offers from their Social Media channels in order not to miss any potential dream flat.

# 3 The Methodology

In this chapter, the methods offered by Lean UX will be applied to the project presented earlier. This chapter is divided into four principal sections that correspond each to the steps of the process loop, as described in *1.3 The Lean UX process*. The four sections are:

- *3.1 Step one: Outcomes,* Assumptions & Hypotheses
- *3.2 Step two*: Design it
- *3.3 Step three:* Create an MVP
- *3.4 Step four:* Research & Learning

Each section starts with details about the respective process step and then follows with its methods, whose execution and meaning are first described, then applied and finally summarized.

## 3.1   Step one: Outcomes, Assumptions & Hypotheses

The first step of the Lean UX process loop (*Figure* 3-1) is called *Outcomes, Assumptions & Hypotheses* and is explained in detail in this section. The process is a loop and so the first step is performed each time a new iteration begins. Lean UX aims to run through the loop as often as possible to move forward quickly. TODO(add reference)
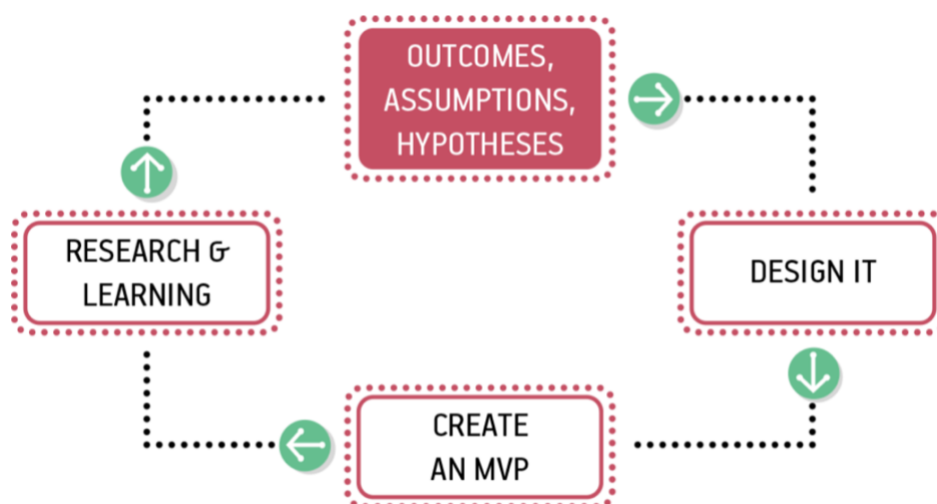


**Figure 3-1** The Lean UX process.
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An *outcome* in the sense of Lean UX is definitely not a design deliverable neither an implemented feature, but everything that wants to change the world or the behavior of customers. All the work within Lean UX is determined by these outcomes since they are the definition of success – not just for the design department, but for the entire team. It is nearly impossible to predict whether a feature will create the strategic and tactical value wanted. Thus, Lean UX keeps creating possible solutions until one has been proven that the desired value – the so-called outcome – has been achieved. This may sound like extra work, but in fact it significantly reduces time that would have been wasted in developing worthless features. (12)

*Assumptions* are the starting point when designing a new project and are associated with risks. They are always the best guess of the current state of knowledge and are updated at the beginning of each new iteration of the Lean UX process to reduce the amount of risk. Any new assumption should consider how it can be substantiated as quickly and cost-effectively as possible so that future decisions are more likely to succeed. A cross-functional team will help to promptly express most concerns to avoid the risk of unforeseen incidents. There are four important types of assumptions, which are: (13)

- *Business outcomes*
- *User*
- *User outcomes*
- *Features*

*Hypothesis statements* are assumptions that are converted into a format so they are easier to test. They should take out much of the subjective and political dialogue of the decision-making process and instead lead the team to market evidence-based work. (14)

### 3.1.1 Business outcomes

In the previous section I introduced and explained outcomes, assumptions and hypotheses. The following section addresses the first of the four types of assumptions: business outcomes. In a first step, I will explain the method of declaring business outcomes and their transformation into testable hypotheses. In a second step, the method will be applied and finally their results will be presented.

#### 3.1.1.1    *The Method: Declaring business assumptions & hypotheses*

**Preparation:**
In order to declare business assumptions, it is crucial to conceptualize and prepare a workshop. Therefore, the following should be considered: (15)

- To increase Product IQ (intelligence quotient), every individual member of the team should be invited and each discipline should be represented.
- To initially draw the team's attention to the problem, a discussion (suitable for small teams) or presentation covering the following points should be prepared:
  - Analytic reports of the current product

- o Usability reports
- o Information about past attempts to solve the problem
- o Connection between the solution of the problem and the performance of the company
- o Competitive analyses
- A strategic context should be prepared to ensure that everyone agrees with the overall objectives of the company.
- A good starting point for the workshop is a problem statement (see below) that should be formulated.

A problem statement for existing products or services (Figure 3-2) shows the current state of the market, the opportunities the company wants to exploit, and a strategic vision for the product or service to address the market gap. It intends to give the team a clear focus by defining all important constraints. (16)
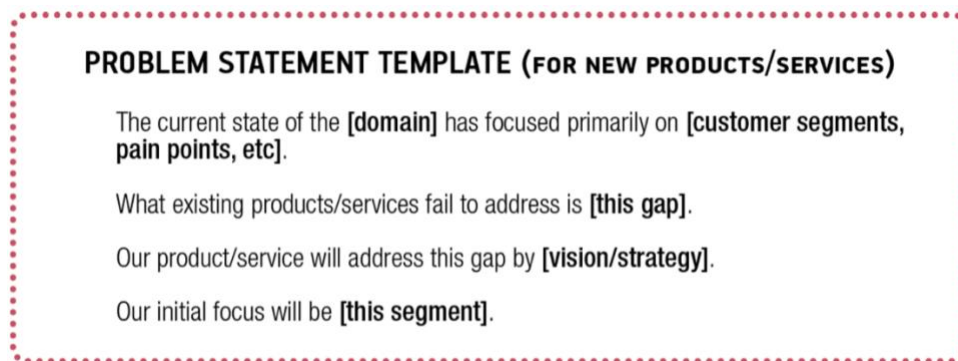
**PROBLEM STATEMENT TEMPLATE (FOR NEW PRODUCTS/SERVICES)**

The current state of the [domain] has focused primarily on [customer segments, pain points, etc].

What existing products/services fail to address is [this gap].

Our product/service will address this gap by [vision/strategy].

Our initial focus will be [this segment].

**Figure 3-2** The problem statement template for existing products and services.
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To help each team find assumptions, a business assumptions worksheet can be created with the following questions: (17)

- My target customer will be?
- The problem my customer wants to solve is?
- My customer's need can be solved with?
- Why can't my customer solve this today?
- The measurable outcome my customer wants to achieve is?
- My primary customer acquisition tactic will be?
- My earliest adopter will be?
- I will make money (revenue) by?
- My primary competition will be?
- I will beat my competitors primarily because of?
- My biggest risk to financial viability is?
- My biggest technical or engineering risk is?
- What assumptions do we have that, if proven wrong, would cause this business to fail?

**Running the workshop:**
The workshop has a clear structure and consists of three steps: (18)

1. Everyone finds assumptions individually (clients should participate)
2. The answers are shared and discussed by the workshop participants.
3. All results are clustered and prioritized (sticky notes are a great way to structure the results of the workshop)

**Follow-up:**
The next step is to transform the most prioritized assumptions into testable hypotheses with the following format: (19)

- We believe [this statement] is true.
- We will know we're [right/wrong] when we see the following feedback from the market:
  - [qualitative feedback]
  - and/or [quantitative feedback]
  - and/or [key performance indicator change]

### 3.1.1.2    Applying the method

The method of declaring business assumptions was utilized when the first MVP was already deployed. It was a programmed prototype with static data as input and live data as output. The static inputs were about 50 users who were manually added to the prototype. All users received the same apartment ads via a chat bot – those with the search preferences of the founders. The output was real data, but only retrieved from one of the largest housing cooperatives in Hamburg (SAGA). The users were found by an announcement (*Figure* 3-3) in a social network and received setup instructions for the chat bot via email.
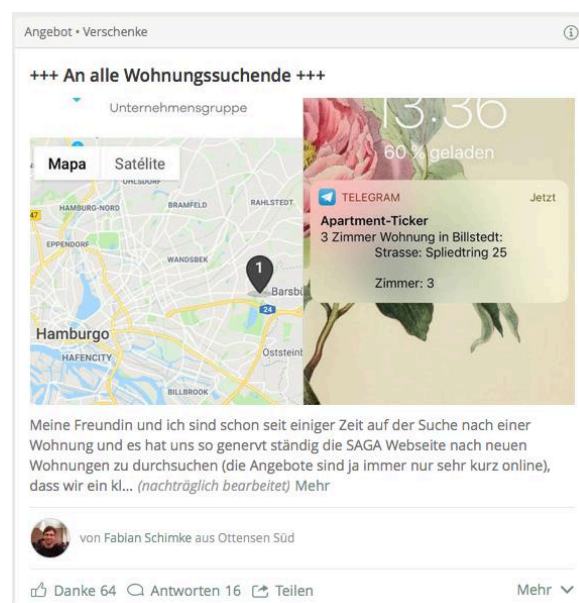


**Figure 3-3:** Screenshot of the social network announcement.
Own depiction.

The participants of the workshop had different backgrounds, i.e. computer science, design and marketing. They were also among the first users of the MVP.

As a starting point for the workshop, the problem statement illustrated earlier in *Figure* 3-2 was presented to the participants as follows:

- The current status of the integration of all online residential services in one service focuses only on non-cooperative housing apartments, which makes up the vast majority, but is irrelevant to many apartment seekers. The main problem is the acute overload when an apartment seeker faces the large variety of apartment platforms. It is necessary to set up many search agents and to maintain them as the search preferences change.
- What existing services do not take into account is the integration of all housing offers, including those of housing cooperatives and those published privately in social media.
- A possible solution could close this gap by promising that no potential dream home can be missed out - neither from platforms with apartment offers, nor from websites of housing cooperatives or private offers in the social media.
- The focus will be thus on the integration of all apartment offers from housing cooperatives into one service. There seems to be a great demand for this, but currently such a service does not exist. Therefore, the focus on housing cooperatives will be a good market entry for the product.

The analytical evaluations of the first MVP were provided to the team. Usability reports was not required as every team member had used the first MVP before. Information about past attempts to solve the problem and links between solving the problem and business performance was not yet available. A competitive analysis of the only competitor was discussed, including a demonstration of the service. It became clear that this competitor addresses the same problem, but with a different approach. The competitor forces pushes co-operatives to use their service instead of retrieving the information themselves.

After the input session, the actual workshop began letting everyone generate assumptions on its own. Every participant received 44 sticky notes which they could use to write down assumptions or questions about the Apartment-Ticker. This session of the workshop was supposed to take 10-15 minutes.

The explicit permission to formulate many questions in a short time – a total of 44 each – goes back to Martin Gaedt, author of the book "Rock your idea" (Gaedt, 2016). Since questions cannot be proven wrong, they are easier to express. This method can lead to further questions, new perspectives and new ideas. But these questions can also generate concrete answers -  including uncomfortable ones. (20)

After 15 minutes, the pre-defined questions, which should support the idea brainstorming, were presented to the other participants. A good way to present the sticky-notes is to collect them on the walls of the workshop room. In so doing, everybody can read the questions. Each participant presented his or her sticky notes. This is where the creative process begins.

For example, in a first step a question was spontaneously transformed into an assumption. In a second step it was assigned to the category business assumptions on the wall. If an assumption could not be easily clustered, it was sorted into a mixed category. Inspired by the assumptions from the others, the participants generated even more ideas in this part of the workshop.

After a short break, the sticky notes were prioritized according to two categories, i.e. high risk and high value. Finally, the participants discussed how the most important assumptions could be tested.

### 3.1.1.3    Result

The most important business assumptions found are listed accordingly:

- BA1: There is a big need for the product
- BA2: Chatbots are a good channel
- BA3: Main product promise is understood (by potential customers)
- BA4: Idea is technically realizable
- BA5: There are enough apartment offers to publish
- BA6: Users would accept business model
- BA7: We get funding
- BA8: Target group is well chosen

The hypotheses transformed from the above assumptions are:

**Hypothesis 1:**
We believe there is a big need for the product.
We will know we're right when we see the following feedback from the market:
- Word of mouth among apartment seekers leads to new MVP users.  The conversion rate should be higher than 75%
- and a locally limited online announcement with a range of up to 4000 neighbors generates more than 100 users within a month.

**Hypothesis 2:**
We believe that chatbots are a good channel to reach our users with the apartment offers.
We will know we're right when we see the following feedback from the market:
- There is a maximum of 1 complaint about the use of the chatbot per 100 users via feedback channels (email, twitter,..)
- and there is a maximum of 1 negative feedback regarding the use of the chatbot per 6 usability testers.

**Hypothesis 3:**
We believe that the main product promise of our service is understood.
We will know we're right when we see the following feedback from the market:
- 6 of 6 usability testers (who have not heard about Apartment-Ticker before) are not confused by the website
- and after usability testers reviewed the website, 5 out of 6 know this: The Apartment-Ticker informs about apartments of housing cooperatives and it is not necessary to have been a member beforehand to be able to rent an apartment.

**Hypothesis 4:**
We believe the idea is technically realizable.
The hypothesis is confirmed if:
- Data from apartment announcements were successfully retrieved from each technically different website of all housing cooperatives.
- Implementing a new website to retrieve its data takes less than 1 hour of work.
- The monthly maintenance of retrieving data from 100 websites is less than 1 hour.

**Hypothesis 5:**
We believe that there are enough apartment offers to publish.
We will know we're right when we see the following feedback from the market:
- In Hamburg, there should be at least 100 apartment offers from housing cooperatives for publishing every month. An extrapolation of one third of all providers is sufficient.

**Hypothesis 6:**
We believe that users would accept the business model.
We will know we're right when we see the following feedback from the market:
- A survey sent to users of the MVP is intended to provide deeper insights into their willingness to pay for the Apartment-Ticker. 2/3 of at least 20 participants should be willing to pay. The average amount should be more than 5 Euro per month.
- The purpose of pitching Apartment-Ticker in front of a feedback-giving crowd of business model experts and entrepreneurs is to give a more concrete idea of pricing.
- The business model must be reflected in the behavior of MVP users. The subject of the investigation must be: Most common usage patterns must be identified in respect of different usage durations, search preferences and the probability of incoming offers.

**Hypothesis 7:**
We believe it is possible to get funding for the product.
The hypothesis is confirmed if:
- Pitching Apartment-Ticker in front of all 30 housing cooperatives provides information on whether funding or other support can be expected from them. Apartment ticker represents a service extension for their (potential) tenants.
- Pitching Apartment-Ticker to investors will show whether this can be a source of funding.
- Applying for a federal scholarship can provide funding for one year.
- The application for a support program of the City of Hamburg can provide funding for one year.

**Hypothesis 8:**
- We believe that the target group is well chosen.
We will know we're right when we see the following feedback from the market:
- 10 out of 15 surveyed participants of visits to cooperative flats are represented by the 3 personas designed by us.

### 3.1.2   User

In Lean UX, users are usually designed as personas and are referred to as proto-personas in the early stages of the project. This emphasizes that they are not the untouchable result of long and expensive one-time research. Instead, the Persona Creation Process is an assumptive and iterative approach. It begins with the creation of proto-personas based on the team's best estimate of who uses (or will use) the product or service and why. Throughout this ongoing process, adjustments are made whenever new insights about the user are gained from research. The presumed proportion in the proto-personas will be reduced until they can be regarded as generally known personas. Compared to traditional product development, where personas may not even be fully accepted by the entire team, a Lean UX team has a common understanding of them. Through continuous learning, each team member repeatedly recognizes that he or she is not the user. (21)

#### 3.1.2.1   *The Method: The proto persona creation*

After the whole team has brainstormed about the target group of the product, each team member completes three to four Persona Templates that differentiate the Personas according to their needs, roles and behaviors (Figure 3-4). When the team has gone through all proposals, it aims to agree on the choice of three to four proto-personas to work with further. At this point, a workshop ends, but since the Persona Creation Process is ongoing, answers such as *"Does the designed representative customers exist?"*, *"Do they have the formulated needs and obstacles?",* and *"Do they value a solution to this problem?"* are clarified subsequently.



**Figure 3-4** The persona template.
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### 3.1.2.2   Applying the method

The proto persona creation method was applied a week after the business assumption workshop covered earlier in *3.1.1.1 The Method: Declaring business assumptions & hypotheses*. The same 3 persons were present and so the disciplines computer science, design and marketing were represented again. All of them already had first contacts to potential users, because they met them on visits of cooperative flats. While the other participants became attentive by chance or actively looking for the flat offer on a web page, the team members of Apartment-Ticker were notified about it by their first MVP.

The meeting happened in a café where the space was limited but the atmosphere was relaxed. After the exchange of our experiences of apartment visits, the Persona Creation Process was explained to the participants. Then the Persona template was introduced and an example from another project was shown to clarify final questions. I handed out three sheets of blank paper that should be used to fill each one with a proto persona. A time limit of 30 minutes was set and every 10 minutes the participants were reminded that the proto persona should be ready.

Similar to the previous workshop, the nine proto personas were presented and discussed. They were then divided into three groups of similar personas to be merged afterwards.

### 3.1.2.3    Result

The results of the proto persona creation process are proto personas Katja (*Figure 3-5*), Doreen (*Figure 3-6*), and Stefan (*Figure 3-7*).



**Figure 3-7** Proto persona Katja.
Own depiction.



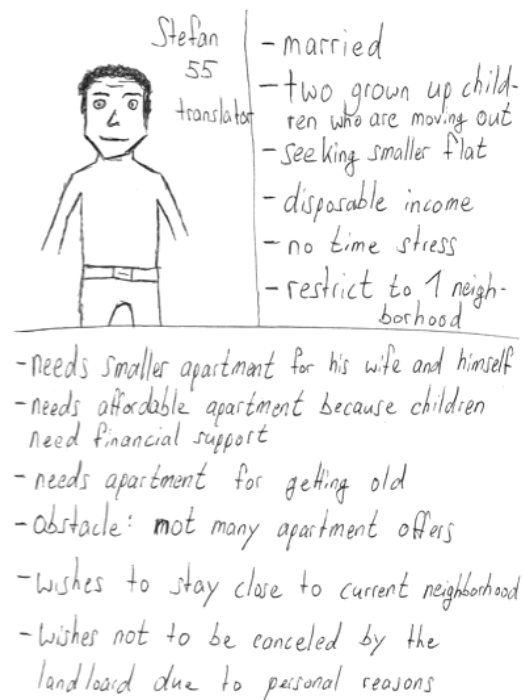**Figure 3-6** Proto persona Doreen.
Own depiction.



**Figure 3-5** Proto persona Stefan.
Own depiction.

### 3.1.3   User outcomes

User outcomes address empathy which is the key to great products and services. Agile techniques such as user stories already target the user and its goals, but since in practice the definition of success is usually equated with "deployed" or "shipped", user stories are often seen just as features that need to be delivered. In Lean UX, the acceptance criteria of any hypothesis is actual behavior change (outcomes) and this assures that the focus on empathy is not lost. A user outcome consists, if possible, of answers to three questions: (22)

1. What is the user trying to accomplish?
2. How does the user want to feel during and after this process?
3. How does the product or service get the user closer to a life goal or dream?

#### 3.1.3.1   *The Method: User outcome brainstorming*

Each team member should quietly generate many ideas and answer the above questions about user outcomes on sticky notes. Then these ideas are structured with an affinity mapping exercise on a whiteboard to bundle the ideas.

#### 3.1.3.2   *Applying the method*

The brainstorming for the user outcomes was performed on the same day as the creation of the proto personas (*3.1.2.1 The Method: The proto persona* creation). Thus again the same 3 persons participated and the disciplines computer science, design and marketing were represented. After the user outcomes, as described above (*3.1.3 User outcomes)*, were explained, the brainstorming started directly, as the sensitivity with the user from the workshop before was still given.

The first question, i.e. *What is the user trying to accomplish?*, was written on a paper and all participants wrote their ideas on little paper sheets referring to the three proto personas. Then we grouped all the ideas according to the respective personas and answered the question for each persona.

To the first question, everyone wrote down ideas for each proto persona on small sheets of paper. Then all ideas were categorized according to its corresponding proto persona and answers were formulated for each Proto-Persona.

The same was done for the other two questions: *How does the user want to feel during and after this process? How does the service get the user closer to a life goal or dream?*

#### 3.1.3.3   *Result*

User outcome 1:

❖ What is the user trying to accomplish?
  ➢ Katja needs an affordable apartment as fast as possible. The neighborhood is less relevant.

- ❖ How does the user want to feel during and after this process?
  - ➢ Katja wants to feel that with Apartment-Ticker she gets more apartment visits than without. So her chances are higher to quickly find an affordable apartment. After using the product she should feel that without Apartment-Ticker she wouldn't have found her new apartment so fast. Even if she would have found an apartement elsewhere she should feel that the Apartment-Ticker helped her staying optimistic in times where there were few offers on the market.
- ❖ How does the product or service get the user closer to a life goal or dream?
  - ➢ Her life goal is to live in an own apartment when her master degree starts so she can focus on her personal and professional development.

User outcome 2:

- ❖ What is the user trying to accomplish?
  - ➢ Doreen wants an affordable apartment close to where she currently lives with enough space for her and her two kids.
- ❖ How does the user want to feel during and after this process?
  - ➢ Doreen wants to know how big her chances are that Apartment-Ticker informs her about a suitable apartment in her preferred neighborhoods. She hopes to catch the notification of an apartment offer just in time to be able to react quickly. If so, she expects to get an invitation to the apartment visit as she pays for Apartment-Ticker but would apologize if it does not work always as expected. After the process she wants to feel that Apartment-Ticker helped her to achieve one life goal.
- ❖ How does the product or service get the user closer to a life goal or dream?
  - ➢ Apartment-Ticker may provide Doreen with the apartment offer that helps her to fulfill one life-goal: living close to where she lives right now in an apartment with a stable and affordable rent without fear of getting kicked out by the landlord due to personal reasons.

User outcome 3:

- ❖ What is the user trying to accomplish?
  - ➢ As both of his children will move out to study in another city, Stefan wants to move into a smaller and more affordable apartment with his wife. He wants to stay in the same neighborhood as he has been living in this part of the town since 15 years.
- ❖ How does the user want to feel during and after this process?
  - ➢ He is prepared for a long apartment hunting and knows that the probability of a notification about an apartment offer through Apartment-Ticker is very small due to the restriction on only one neighborhood. Nevertheless, he values a smaller and cheaper apartment in this neighborhood so much that time does not matter. As he is not seeking apartments very actively, he is very concerned of not catching the notification just in time and would value a stronger form of notification like on different channels at once. He hopes that after the process, Apartment-Ticker helped his wife and him to achieve one of their dreams.
- ❖ How does the product or service get the user closer to a life goal or dream?
  - ➢ Apartment-Ticker may provide them with the apartment offer that help them to fulfill their dream: staying in their lovely neighborhood in an apartment with a stable and affordable rent without the fear of getting kicked out by the landlord due to personal reasons.

### 3.1.4 Features

The first phase of the Lean UX process cycle will be completed by brainstorming features (or tactics, products and services) that reach the user and deliver the previously worked out business and user outcomes. Doing brainstorming on features now (and not before) should ensure that the team has a clear vision of the project during the process and that ultimately the features meet the needs of the customer and the business. (23)

#### 3.1.4.1   The Method: Feature brainstorming

To brainstorm features together as a team, let all team members write their ideas on separate sticky notes. Then ask everyone to hang their notes on the wall. Finally, let the group categorize them. (24)

#### 3.1.4.2   Applying the method

A week after the last two workshops (*3.1.2.1 The Method: The proto persona* creation & *3.1.3.1 The Method: User outcome brainstorming*), the same team got together in a conference room to brainstorm the features, tactics, products and/or services that should achieve the previously worked out business- and user outcomes.

Everyone got a copy of the business outcomes (*3.1.1.3 Result*), proto personas (*0* Result) and user outcomes (***Error! Reference source not found. Error! Reference source not found.***) to help to remember what happened the last 2 weekends. Then the brainstorming started and the participants wrote their feature ideas on sticky notes. After 30 minutes the results were presented and clustered. In the next step, every idea was discussed in detail, notwithstanding if it met one or several predefined business- or user outcomes. Then, all collected features were prioritized by the participants. The result was a list of features with the ideas on, received for each matching outcome one adhesive dot and the matching outcome was noted with a light pen. The ideas with more adhesive dots were more likely to be important than the others which made the prioritization easy at the end.

#### 3.1.4.3   Result

The most important features and tactics found are listed accordingly:

- F1: Users can subscribe themselves to apartment notifications
- F2: Users can choose neighborhoods
- F3: Website that communicates product promise, shows how to get started and answers FAQs
- F4: Implementation of 1/3 of providers
- F5: Survey among users
- F6: Pitch among business model experts
- F7: Pitching to housing cooperatives
- F8: Pitching to investors

How this features and tactics are related to the business outcomes, users and user outcomes will be shown in the next chapter.

### 3.1.5    Everything together: The hypotheses table

A tactical and testable feature hypothesis is a combination of all brainstormed assumptions so far: business outcomes, personas, user outcomes and features. A table as shown in *Figure* 3-8 demonstrates, how feature hypotheses can be constructed using sticky notes. Each row represents a testable feature hypothesis.

| WE BELIEVE THAT: | | | |
|---|---|---|---|
| We will achieve | ...if this user... | ...can achieve... | ...with this feature |
| [business outcome] | [persona] | [user outcome] | [feature] |
| | | | |

**Figure 3-8** A hypothesis table.
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For better readability the feature hypotheses will be shown in its written form:

FH1:
We will achieve a first proof that chatbots are a good channel to inform our users about apartment offers when a user like persona Katja manages to get an affordable apartment within 3 months. This should be achieved through the feature that new users will be able to subscribe independently to all MVP notifications (no filter function).

FH2:
We will continue to prove that chatbots are a good channel to inform our users about apartment offers when also users like Personas Doreen and Stefan manage to get an affordable apartment. This will be made possible by the feature that allows users to filter MVP notifications by neighborhood.

FH3:
We will prove that the main product promise is understood when potential customers such as personas Katja, Doreen or Stefan successfully know after visiting the service's website that Apartment Ticker can bring them closer to their life goals. They should also know how to get started.

FH4:

We will proof that there are enough apartment offers to publish and the idea's technical feasibility when users like any persona successfully receive public apartment notifications from at least one third of Hamburg's housing cooperatives. The necessary data should be retrieved from each type of technologically different websites.

FH5:

We will provide first evidence that users are willing to pay for the service and that the target group is reflected by the personas through a survey with at least 20 users participating. Moreover, the survey should provide insights that help to develop a business model.

FH6:

We will provide initial evidence of an appropriate business model by receiving constructive feedback from business model experts having presented them our business model canvas.

FH7:

We will show that the Apartment-Ticker has the potential to get funding by presenting the idea to the housing cooperatives as well as investors and by applying for public funding.

## 3.2   Step two: Design it

The second step of the Lean UX process covers the conceptual part of the design. It will be done in a collaborative manner by the whole team because user experience design is not only about interactions with the final product. All touchpoints within the customer journey are part of it such as pricing, packaging, selling, maintaining, upgrading, onboarding users and customer support. This cross-functional creation of conceptual design fragments should increase the team-wide *Design IQ*, such as creating hypotheses together increases the *Product IQ* of the team. Moreover, shared understanding within the team should immerse as well as the team's feeling of ownership. (25)
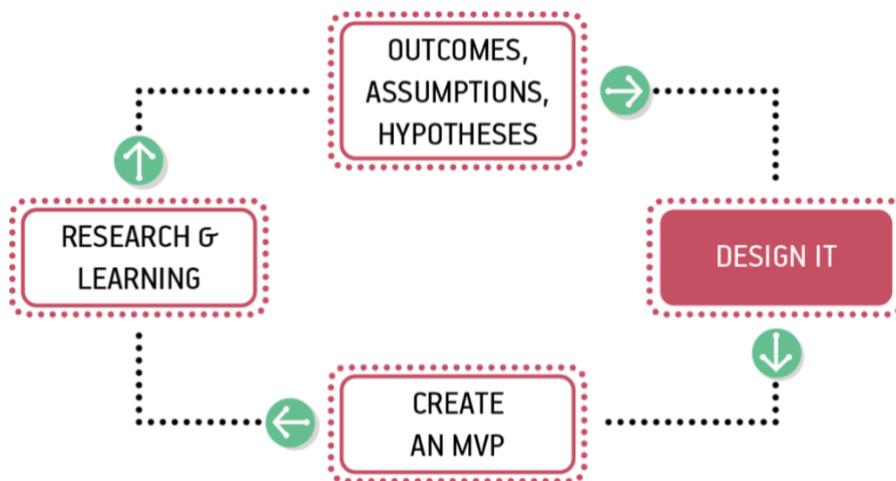


**Figure 3-9** The Lean UX cycle.
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Only statements of the hypothesis table that cannot be validated by research alone are the inputs of design sessions. The outputs, on the other hand, are low-fidelity sketches and wireframes that will later be used to create MVPs. An MVP, in turn, is used to validate the initial hypothesis or hypotheses. The low level of detail in the work is crucial as it allows anyone to participate and it makes it easier to discard failed attempts. (25)

### 3.2.1   Design Studio

A design studio is a workshop format and thus a formal approach to bring cross-functional teams together. Potential solutions to a design problem are visualized and break down organizational silos to create a better outcome. This formal approach can be used to build trust in teams and has the potential that teams continuously and informally improve collaboration. (26)

#### 3.2.1.1    The Method: Design studio

A workshop of at least 3 hours of time should be planned in a room that has enough space with tables to gather around and with enough space on the wall to place the ongoing work. Teams of five to eight participants can work together. If more people are present, it is

possible to divide the team and compare the output in the end. The following supplies are required: (27)

- Pencils
- Pens
- Felt-tip markers or similar (multiple colors/thickness)
- Highlighters (multiple colors)
- Sketching templates (A3) divided into 6 boxes
- Self-stick easel pads (A1)
- drafting dots or any kind of small stickers

The workshop consists of the following six steps: (28)

1. Ensure everyone is aware of the problem (15-45 minutes)
   o This can be done through a formal presentation or an informal group discussion.

2. Individual idea generation (10 minutes)
   o Here the ideas diverge.
   o Everyone gets a blank sheet (A4) with 6 empty boxes to sketch ideas on.

3. Presentation and critique (3 minutes for each person)
   o Everyone should state out (1) which persona was selected, (2) what pain point was addressed and (3) what the respective sketch means.
   o Feedback should be provided by the team, especially using questions to directly clarify the presenter's intention.
   o Finally the team should give feedback.

4. Pair up to iterate and refine (10 minutes)
   o This is where ideas emerge.
   o Each pair should pick up the most promising ideas to develop a more evolved and integrated version.

5. Presentation and critique (3 minutes for each pair)
   o The same procedure as before just presenting in pairs.

6. Team idea generation (45 minutes)
   o This is where ideas converge as the team must agree on one idea that seems to be the most promising. This idea will be used to create an MVP.

### 3.2.1.2   Applying the method

As soon as all four types of assumptions (business outcomes, users, user outcomes, features) were completed, the design studio workshop took place in a room with two tables to gather around. The same team as before was present. A front-end developer who was already familiar with the assumptions and hypotheses through separate onboarding joined the

group. The time window for the workshop was 3 hours, but the plan was to have two design studio sessions in a row, one for the chatbot and one for the website.

To make sure everyone was aware of the problem, we started with a discussion focusing on the first three feature hypotheses related to the chatbot and the website. At the beginning of the first session, we were taking a closer look at the UI (user interface) elements of chatbots in general. At the beginning of the second session we were analyzing UI components provided by Twitter Bootstrap's frontend framework. Both introductions took 15 minutes.

Both individual idea generation sessions lasted 15 minutes. The second session dealt with the website. For its landing page all participants took a piece of paper without dividing it into boxes.

The individual presentations proceeded as described above and lasted about 12 minutes in both sessions. The ideas diverged widely, even though the interface elements were very restrictive. Everyone felt inspired by the ideas of the others and was very grateful for the feedback they received. Asking questions about the idea to start the feedback was helpful as the criticism after that was accurate and did not cause much confusion.

To iterate and redefine, the teams of two were divided into the disciplines Computer Science, Marketing, Computer Science, and Design. In the second session, the two teams exchanged the computer science representatives. Both sessions took 15 minutes each.

The presentations in pairs and criticism proceeded as described in the previous section and lasted about 6 minutes in both sessions. The ideas have evolved and were a little similar, nonetheless both teams inspired themselves in different aspects.

In both cases, the final generation of ideas went very quickly and took only 15 minutes, as it more or less only brought together the good of both ideas presented before.

### 3.2.1.3    Result

The final result of the first Design Studio session (chatbot) is shown in *Figure 3-10 Result of Design Studio session "chatbot"* on page 27. The final result of the second Design Studio session (website) is demonstrated in *Figure 3-11 Landing page result of Design Studio session "website"* on page 28.
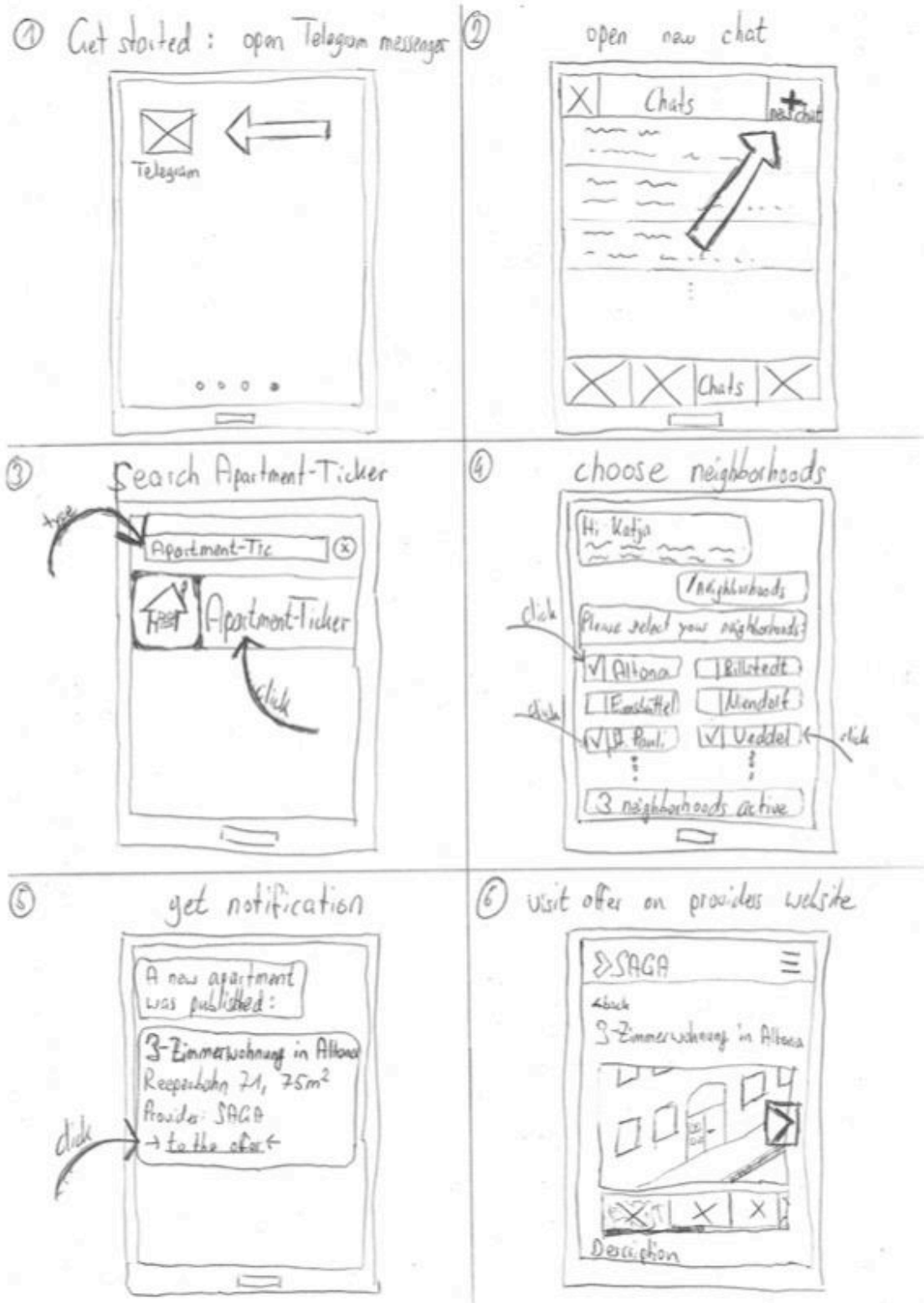
① Get started : open Telegram messenger
② open new chat
③ Search Apartment-Ticker
④ choose neighborhoods
⑤ get notification
⑥ visit offer on providers website

**Figure 3-10** Result of Design Studio session "chatbot".
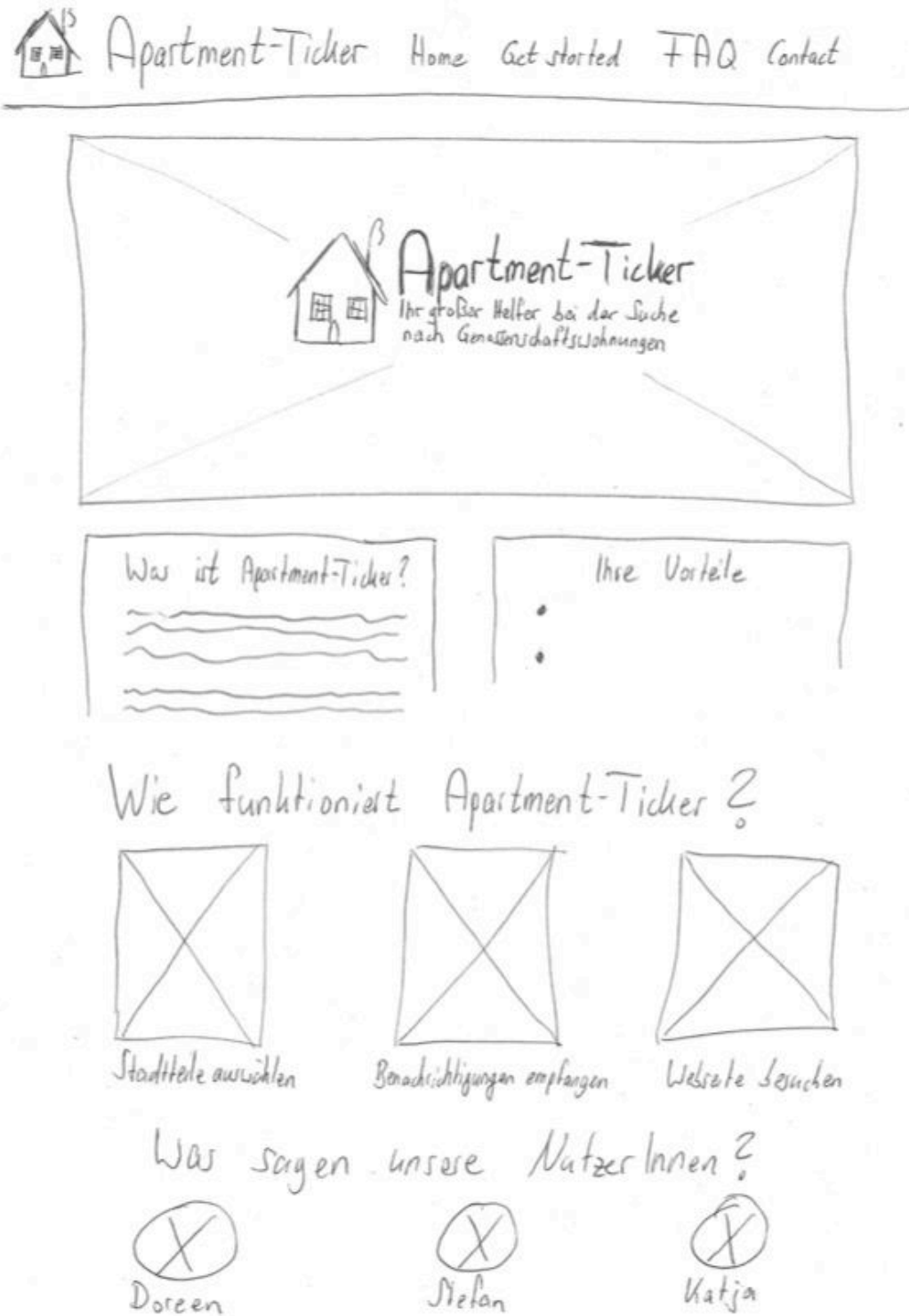Own depiction.

**Figure 3-11** Landing page result of Design Studio session "website".
Own depiction.

## 3.3   Step three: Create an MVP

After the MVP was conceptually designed in the second step of the Lean UX process, the third step (*Figure* 3-12) was to build it.



**Figure 3-12** The Lean UX process.
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Even though an MVP gets prototyped, it is a product that will be taken into production and shipped to the customers to gather real user feedback from the market. Hence, it is more than a prototype but also much less than a fully developed product as demonstrated in *Figure* **3-13**. Only the most important functionalities are implemented so that the core of the idea can be verified. (29)
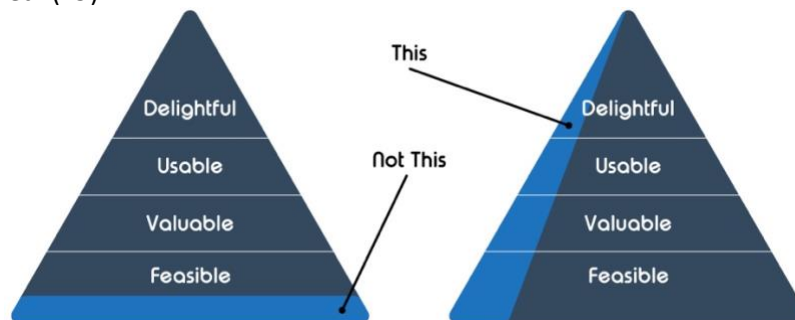


**Figure 3-13** The Minimum Viable Product (MVP)
From "Agile UX & Lean UX – Buzz Words Or Different Strategies?" by Wouters, O. (2017.10.02).
Retrieved from innotain.me/tutorial/agile-ux-lean-ux

MVPs help to test assumptions. The sooner an assumption turns out to be wrong, the less resources are wasted to build on it. On the other hand, resources are used efficiently when the foundation on which further work will be built on is proven to be correct. There are MVPs that are built primarily to learn something and others to deliver value to the market as quickly as possible. In both cases two important questions have to be answered: (30)

- What is most important to learn first (or next) about a hypothesis?
- What is the least amount of work to learn that?

The answer to the second question will be an MVP which, once delivered, should provide sufficient evidence that the current direction of product development should be pursued or abandoned. (31)

### 3.3.1 Guidelines for MVPs

In addition to the questions of what is most important to learn and how this can be achieved with the least effort, there are guidelines that should be considered when creating an MVP. In this section the guidelines are mentioned and in the next two sections implementation is presented and evaluated against the guidelines.

If an **MVP is intended to understand the value** of an idea, following recommendations should be considered: (32)

- Get to the point
  - o Focus on the core value proposition.
  - o Leave irrelevant things regarding the core idea for later (logins, navigation,..).

- Use a clear call to action
  - o A call to action should demonstrate willingness to use or pay for the service.

- Prioritize ruthlessly
  - o Let successfully validated ideas win and the others by side.

- Stay agile
  - o Assure that updates can be easily made.

- Don't reinvent the wheel
  - o Consider to integrate existing tools before reinventing them.

- Measure behavior
  - o Behavior trumps opinion – observe and measure what people do.

- Talk to your users
  - o Measurements tell what users do. Users tell you their reasons why.
  - o Try to capture conversations from converted users, as well as from others.

If an **MVP is intended to understand the implementation** that should be delivered to its users, following should be considered: (33)

- Be functional
  - o Create new workflows in the context of existing functionalities.

- Integrate with existing analytics
  - o Measure within the context of existing product workflows to better understand the resulting numbers.

- Be consistent with the rest of the application
  - o Consistency increases comparability and efficiency.

Some **general guidelines for creating MVPs** are the following: (34)

- It's not easy to be pure
  - o Try to separate MVPs in terms of gaining knowledge from the value of an idea and its implementation.

- Be clear about your learning goals

o Plan which data must be collected in order to achieve the desired results.

- Go small
  o Build the smallest MVP possible. It will be modified iteratively or thrown away.
  o The proportion of effort put into an MVP should correlate with the amount of evidence that the idea is good.

- You don't necessarily need code
  o Before starting to code, think if this is the less expensive way to achieve the desired learnings. Think on existing tools including the ones of UX designers such as sketching, prototyping, copywriting, and visual design.

### 3.3.2   Implementation of MVP

The concept created in the first design studio session (covered in *3.2 Step two: Design it*) was implemented in a chatbot. The feature to filter apartment notifications for preferred neighborhoods and the feature of receiving them are shown in *Figure* 3-14*.*
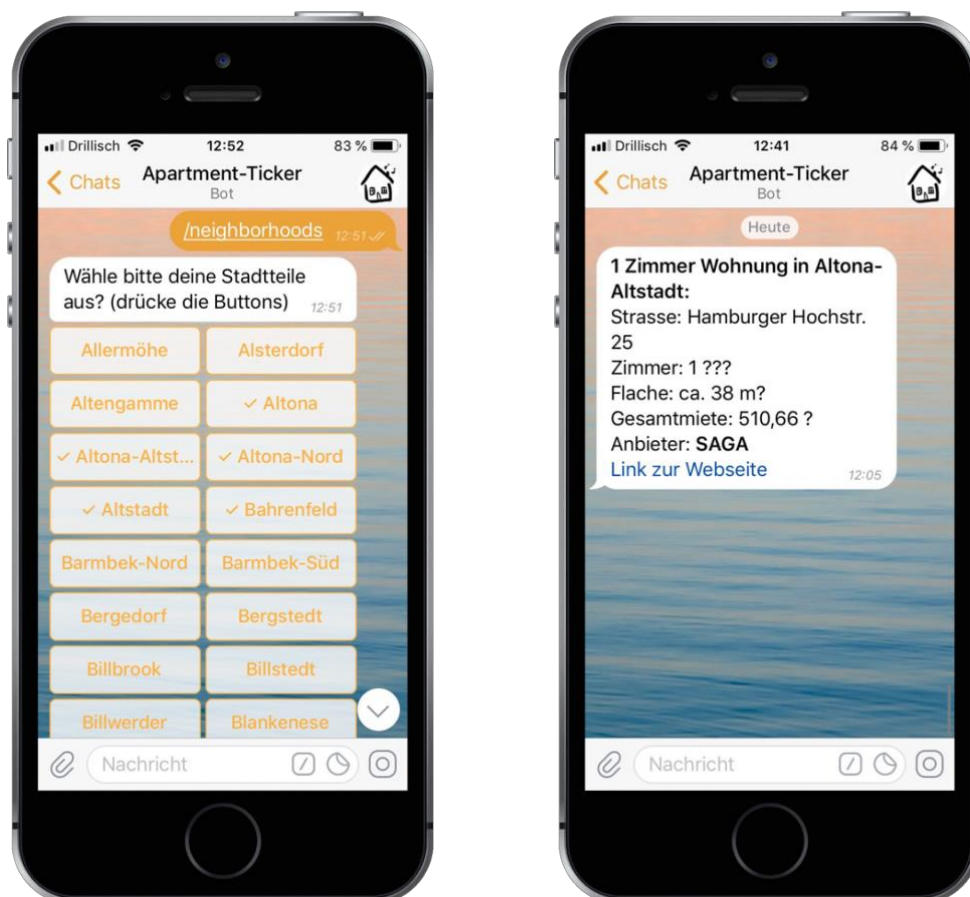


**Figure 3-14** MVP chatbot - choose neighborhoods & receive notifications.
Own depiction.

The conceptual design of the website from the second Design Studio session (dealt with in *3.2 Step two: Design it*) was implemented using a framework for responsive websites. The landing page is demonstrated in *Figure* 3-15.
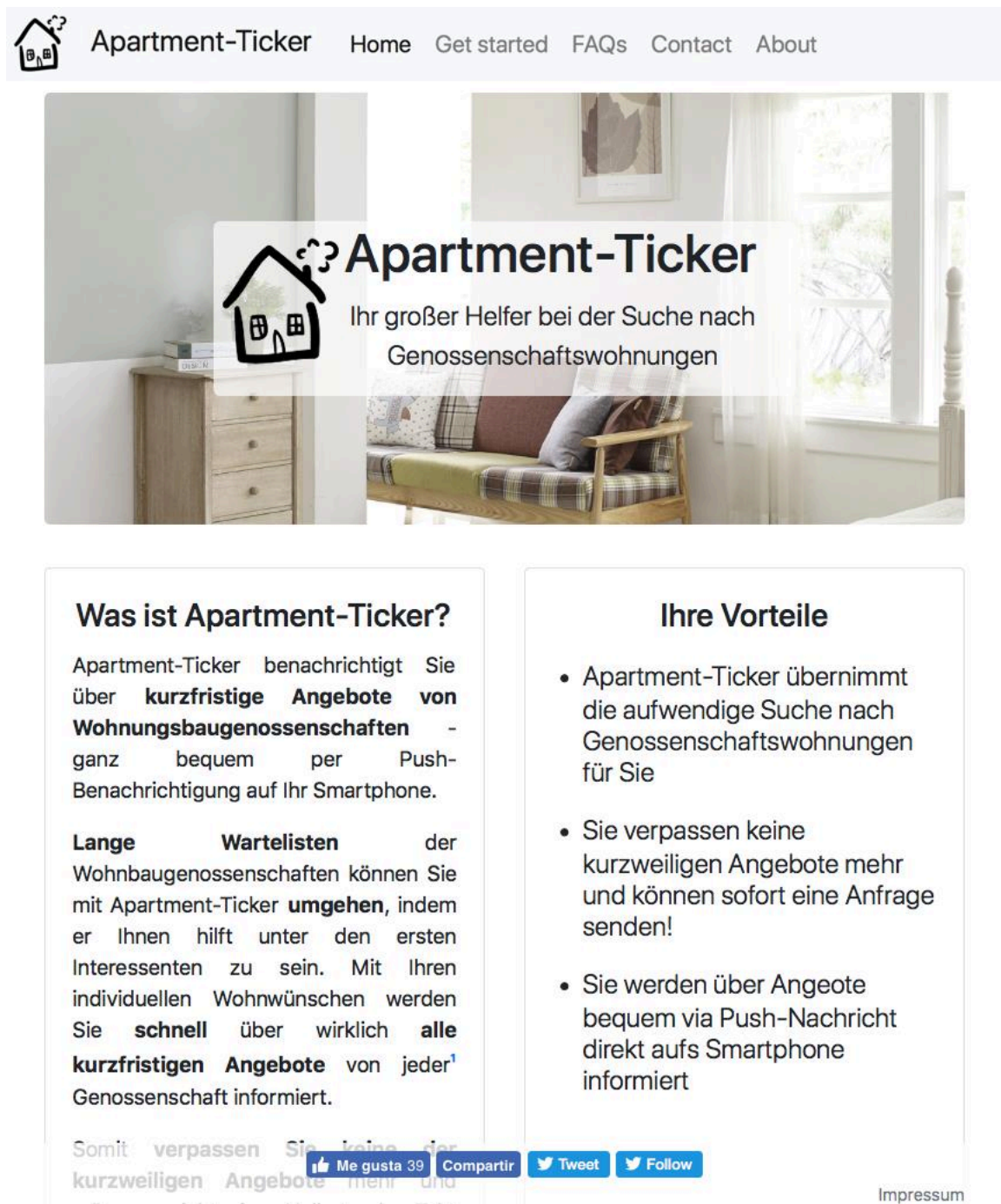


**Figure 3-15** MVP website - Landing page.
Own depiction.

### 3.3.3    Evaluation regarding the guidelines

Guidelines regarding to understand value:

**Get to the point:**
The focus for the demonstrated MVP of the previous section was clearly formulated: Only apartment notifications from the largest provider of housing cooperatives with the option of filtering them by neighborhoods only. A website communicates the product promise and get starting instructions.

**Use a clear call to action:**
A clear call to action was on the website that asked to set up the chatbot on a smartphone to use the service. Users had to install a messaging app, if not already installed. The idea was not yet sufficiently substantiated to receive a request for payment, as the necessary work would not have been justified by the risk involved.

**Prioritize ruthlessly:**
As covered in *3.2 Step two: Design it*, the MVP was developed to evaluate only the three hypotheses with the highest priority. The previous MVP had successfully identified an existing demand by informing users only about apartment offers of certain neighborhoods without being able to filter them. Instead of a website, a post was published on a social network to promote this slim service. Both MVPs are good examples of ruthless prioritization.

**Stay agile:**
All produced low-fidelity design fragments were kept simple so that they remained malleable. They were also created within the scope of UI components of frontend frameworks used, so that their implementation can be easily adapted, too. On the technical side, an agile full-stack web developer provided an environment that could flexibly update changes.

**Don't reinvent the wheel:**
Tools that were used to not develop them ourselves: the chatbot technology to avoid developing an own app, a front- and back-end framework for the web to make agile progress there, stock images to embellish the website without much effort, a state-of-the-art back-end web scraping technology to retrieve the data of the website with the apartment offers.

**Measure behavior:**
The most important parameters measured were the number of monthly visitors to the website, the clicks on the call to action, the conversion rate of users and the total number of housing offers each month.

An analytics tool for the website was installed to measure from the beginning details about visitors such as demographics, geolocation, behavior, technology used (mobile phone, desktop, browser), where they were acquired from and much more.

A database was developed to collect data such as housing offers, filter preferences of users and usage time stamps. These data should provide information about what kind of

apartments the service informs about (size, room, price, location,...), what frequent search preferences users have, how long they search and when they use the service again.

**Talk to your users:**
The MVP website and chatbot included feedback mechanisms so that (potential) users could easily get in touch with the team. Choosing a chatbot also allows not only to send external survey links to the users, but also questions to which they can freely respond (text, voicemail, images,...) and interactive surveys that users can conduct within the chat.

Guidelines for understanding implementation:

**Be functional:**
As the chatbot had a predecessor MVP, the features that users could opt-in and set up a filter by neighborhoods were implemented within the existing functionality.

**Integrate with existing analytics:**
Analysis methods had to be set up from scratch in this MVP, as measurements had previously only been carried out using social media and the number of users in the database. An existing third-party analysis tool was set up for the website.

**Be consistent with the rest of the application:**
The logo that had been used in the chatbot before was also consistently used on the website. The neighborhood command that is used in the chatbot to adjust the filter by neighborhoods, just needed to be added to its existing list of commands.

General guidelines:

**It's not easy to be pure:**
The separation of MVPs in terms of gaining knowledge of the value of an idea and its implementation was done using the first three feature hypotheses only (listed in *3.1.5 Everything together: The hypotheses table*), which all deal exclusively with knowledge expansion. The fourth feature hypothesis was excluded because it intended to examine details of the implementation.

**Be clear about your learning goals:**
The learning objectives were clear as the design of the MVP was based on feature hypotheses. In order to achieve the actual results, short-term measurements were planned and long-term measurements were taken into account in the design of the MVP, previously described in detail in in *Measure behavior*.

**Go small:**
The MVPs were small enough that the effort was proportional to the amount of evidence, that it was worth continuing. This is described in this section above in *Prioritize ruthlessly*.

**You don't necessarily need code:**
The fact that even the prototype of this project was programmed (static input and live data output) is due to my programming skills that made it possible to get the first working prototype within one day of work. This prototype was able to be shared with friends, neighbors and apartment seekers that I met on flat viewings. The feedback motivated two team members of another project and myself to build the first MVP together using the Lean UX methodology. There would have been other possibilities to find out an existent demand, but I could use the prototype for my own apartment search anyway.

## 3.4   Step four: Research & Learning

Each iteration in the Lean UX process cycle ends with conducting research (*Figure* 3-16) to gather learnings. To achieve this, primarily user feedback is used. The following subsections show how Lean UX overlays basic UX research techniques with the key ideas of continuity and collaboration. The techniques are applied to the MVP described above to demonstrate how they contribute to the validation of MVPs. (35)
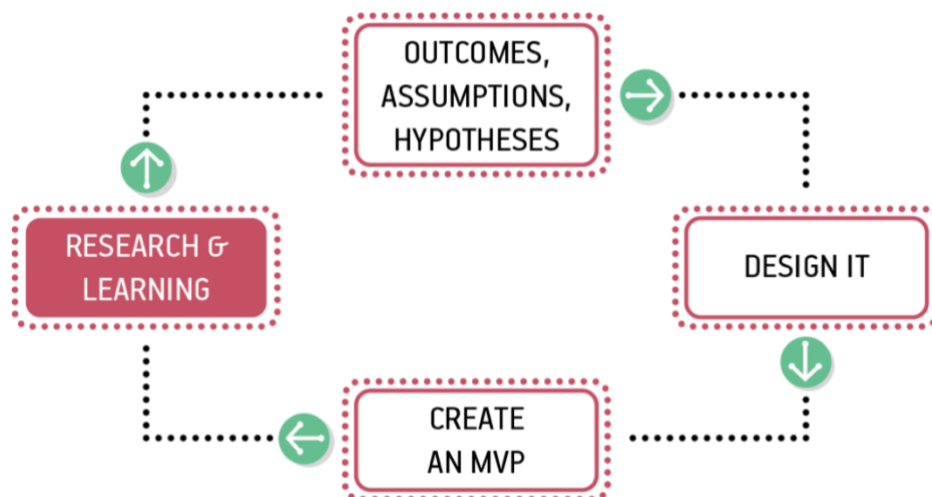


**Figure 3-16.** The Lean UX cycle.
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### 3.4.1   Collaborative Research

Collaborative research techniques will create a shared understanding because the team will discover the learnings it seeks together, rather than relying on handouts of specialized researchers. Having a professional researcher on the team is good in view of his solid knowledge, but research activities should be distributed and shared across the entire team. (36)

### 3.4.1.1    The Method: Collaborative Discovery in the Field

Collaborative discovery intends to go out into the field with the team and the procedure could look like following: (37)

- The team decides what is necessary to learn based on existing questions, assumptions, hypotheses, and MVPs.
- The team figures out who to speak to and who to observe.
- A prepared interview guide will help during the conversations.
- Research teams should be paired up mixed by roles and disciplines.
- Arm each pair with a version of the MVP.
- Send each team out to meet with customers/users
- Split roles of interviewer and note taker and begin with questions, conversations, and observations.
- Let the customer interact with the MVP and collect notes.
- Switch roles and let the note take ask follow up questions.
- At the end ask for referrals to other people who might also provide feedback.

### 3.4.1.2    Applying the method

Once the new MVP was complete, the entire team wanted to validate the new website to see if the desired product promise was understood. The usability of the enhanced version of the chatbot and the underlying assumption that a chatbot is a good channel for the Apartment-Ticker also needed to be further verified.

Fortunately, a short-term usability testing event named Usability Testessen was on the agenda. Its format was suitable for testing both the website and the chatbot. There, all participating teams, who arrived with different projects from different companies or startups, got six test volunteers for 12 minutes each. The format of the usability event (usability-testessen.org), which is already known beyond Germany and which goes back to Philipp Hormel, ensures that all testers were familiarized with the Think-Aloud test method before starting the testing.

At the beginning, each of our test subjects was told to imagine being in Hamburg looking for an apartment and having heard from a friend that there is a service called Apartment-Ticker that informs about affordable apartment offers. Moreover, they were told that they should be curious enough to find out whether the service is attractive to them or not. A desktop computer and smartphones with common operating systems were available to observe the tester's first approaches towards the Apartment-Ticker. To prevent a device from attracting excessive attention, they were not placed too prominently on the desk and the laptop's browser was only opened with a blank browser tab. Testers were also allowed to use their own devices.

Two team members took notes and the third encouraged the tester to say his thoughts out aloud while exploring the Apartment-Ticker and, in the best case, configuring the chatbot on its own or a provided smartphone.

In the last two minutes, the testers were asked what they thought of Apartment-Ticker in general and whether they understood that Apartment-Ticker is also relevant for non-members of housing cooperatives.

At the end of the event, all participating teams exchanged their testing techniques and key findings. With regard to Lean UX, this can be interpreted as a cross-team development of shared understanding on testing techniques.

### 3.4.1.3    Result

- The shared understanding grew. Above all, each member of the team was reminded that he or she did not represent the user. The best example of this was that few testers used a search engine directly to search for the apartment ticker website we created. Instead, other approaches were pursued through app stores and social media.
- Various search engine entries provided us with crucial information for upcoming search engine optimizations. For instance, the term "Apartment tkr" was used instead of "Apartment-Ticker" in 2 cases out of 6.
- Necessary improvements for the usability of the website and the chatbot could be identified. The number of testers struggling with a component and the amount of confusion created were good indicators for later prioritization of the resulting tasks.

## 3.4.2    Continuous Learning

It is best to integrate continuous learning in a Lean UX team as a regular part of every sprint. This shortens the time between hypothesis creation, experiment design, and user feedback on the duration of each sprint. A major advantage of regular and frequent market feedback is the great help it provides in sometimes difficult decision-making processes. A further advantage is the strong effect on a team, which arises when the day of the presentation of the current work to the customer is approaching. Therefore, it is important that a "Test What You've Got" mentality is internalized by the team in order to avoid rushing to deadlines. Finally, continuous learning makes it possible to identify recurring patterns that can be used to set long-term goals. The monitoring of long-term goals can easily be integrated within the continuous learning process. (38)

### 3.4.2.1    The Method: Implement continuous learning

To make collective learning continuous as a regular part of each sprint, following guidelines should be considered: (39)

- Usability labs are not necessary, a workstation with a webcam is sufficient.
- Assure that a "Test What You've Got" mentality is internalized by the team.

- Consider for tests: sketches, static wireframes, high-fidelity visual mockups (not clickable), clickable mockups and coded prototypes.
- The entire team should be involved.
- Outsource recruitment of participants.
- Hold review sessions after testing (share and categorize findings).
- Look for patterns over time.
- Verify with other sources.
- Make outliners aware but do not hang on them.
- Determine next steps for the MVP.

Another way of retrieving feedback are implemented mechanisms which users can use to send their thoughts regularly. Feedback mechanisms that should be considered are: (40)

- Simple email forms
- Customer support forums
- Third-party community sites
- Making use of search logs (what are users looking for?)
- Site usage analytics
- A/B testing

### 3.4.2.2    Applying the method

In order to practice continuous learning, a participation at the usability testing event mentioned earlier in *3.4.1.2* has been carried out on a regular and monthly basis. This corresponded to the sprint rhythm of the team and if urgent questions arose in advance, informal tests with friends could provide the necessary feedback in the meantime. The internal team review sessions took place informally after each testing event. Notes were shared with each other and agreements on the most important findings was reached. In follow-up meetings, the new findings were discussed in detail against the previous results and the next steps for the MVP were planned.

To retrieve regularly feedback from users an email feedback mechanism was implemented at both the website and the chatbot. Users also could reach Apartment-Ticker through social media via direct messages or commenting posts that promoted the MVP. Additionally, a survey was sent via the chat bot to the users to get insights about their satisfaction and willingness to pay for the service. An analytics tool for the website was set up to answer initial questions such as: *How many users visit the website and when?, How is the website used?,* and *Where are the users?*

### 3.4.2.3    Result

The curiosity as to how the chatbot and the website would be received by (potential) users had to give way to a slight disillusionment when the team received feedback for the very first time realizing that not everything worked as expected. However, this changed later on, since the disillusionment was replaced by successful experiences – feedback that demonstrated improvements and that let the team know they were working on the right things. Beyond that, the sense of ownership grew throughout the team because moments of discovering

that the product had improved were shared and everyone was aware of their direct impact on the result.

Over time, patterns could be identified, such as the trustworthiness of the brand, which needs to be improved and monitored. First, the missing professionalism of the website was identified as the reason for the lack of trust in the brand. Since improvements to the site could not change this behavior, a closer investigation revealed that potential users could not believe that there is a way to bypass the well-known waiting lists of housing cooperatives. Through continuous learning, this fact could be recognized early on and until the business model will be implemented, solutions can be found.

# 4 Conclusions

The aim of this work was to apply the Lean UX methodology to a startup in the seed and development phase in order to determine whether the method is suitable for a small team that initially pursues an idea as a side project.

Thus, the three high-level business hypotheses explained at the beginning of this work, which were given the highest priority, are first reviewed and then conclusions are drawn.

**Hypothesis 1:**
There is a big need for the product.

**Hypothesis 2:**
Chatbots are a good channel to reach our users with the apartment offers.

**Hypothesis 3:**
The main product promise of our service is understood.

The three hypotheses, all aimed at gaining insight into the value of the idea, were validated in an MVP. This is in line with the methodology that requires the separation of MVPs to either gain knowledge about the value of an idea or the details of its implementation. The first two hypotheses were verified in the first Lean UX cycle. The third hypothesis could be validated in a second cycle after some improvements were made to the MVP.

It can therefore be concluded that the Lean UX methodology was feasible for this project. In order to extend the conclusion to young startups with similar project set-ups (small teams, no funding, side project basis), further investigation is needed to apply the methodology to several projects over a longer period of time.

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# 6 Figure overview

# Versicherung über Selbstständigkeit

*Hiermit versichere ich, dass ich die vorliegende Arbeit ohne fremde Hilfe selbstständig verfasst und nur die angegebenen Hilfsmittel benutzt habe.*

*Hamburg, den* _____26.08.2019_____          _____F. Schimke_____