ISCTE Business School
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PRODUCT DEVELOPMENT IN APP BUSINESS
A corporate project of the moovel Group GmbH (Ltd)

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Executive Summary

The aim of this master thesis is to describe the development of an in-app survey feature with the goal to widen the service range of the mobility app provider moovel Group GmbH. The theory of product development, according to Harry Igor Ansoff, is combined with the modern and structured process of Design Thinking. This leads to new ways to design and develop products or services. The thesis is structured in the Design Thinking steps itself to guarantee a precise workflow. First, the topics app business, digital marketing, growth strategies and Design Thinking are explained in detail. Secondly, by means of interviews the requirements on the survey feature are defined. In the analysis part, different suppliers of the technical base of the feature are examined. In the next phase the content of the survey is evaluated and a clickable prototype is designed. In the last phase the prototype is tested by real users. According to their feedback the survey feature was finalised.

In order to not exceed the framework of this thesis, the technical side of the project, regarding development and engineering processes, is not considered.

Sumário

O objetivo desta tese de mestrado é descrever o desenvolvimento de um recurso de pesquisa In-app, que tem como foco ampliar a gama de serviços do provedor de aplicações para mobilidade Moovel Group GmbH. A teoria do desenvolvimento de produtos, de acordo com Harry Igor Ansoff, é combinada com o processo moderno e estruturado de Design Thinking, o que leva a novas formas de projetar e desenvolver produtos ou serviços. A tese, por si mesma, também está estruturada nas etapas do Design Thinking, de forma a garantir um fluxo de trabalho preciso. Na primeira fase, os tópicos app business, Marketing digital, Estratégias de crescimento e Design Thinking são explicados em detalhe. Em seguida, são definidos os requisitos relativos à característica do inquérito, através de entrevistas. Uma análise é então realizada para os diferentes fornecedores da base técnica da característica. Na fase seguinte, o conteúdo da pesquisa é avaliado e um protótipo clicável é projetado. Na última fase, o protótipo é testado por usuários reais. De acordo com o seu feedback, a funcionalidade do inquérito é então finalizada.

A fim de não exceder o âmbito desta tese, o lado técnico do projeto, em relação aos processos de desenvolvimento e engenharia, não é considerado.

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List of Abbreviations

ACEA	Association des Constructeurs Européens d'Automobile (European Automobile Manufacturers Association)
ACT	Association for Commuter Transportation
API	Application Programming Interface
App	Application
AUS	Australia
B2B	Business to Business
CSO	Chief Sales Officer
EG	Egypt
EU	European Union
GDPR	General Data Protection Regulation
GER	Germany
GmbH	Gesellschaft mit beschränkter Haftung (German limited Company)
GPS	Global Positioning System
HPI	Hasso-Plattner-Institut
km	kilometer
KPI	Key Performance Indicator
Ltd.	Private company limited by shares
MaaS	Mobility-as-a-Service
NL	Netherlands
NOR	Norway
PTO	Public Transport Operator
SGPR	Singapore
SWE	Sweden
UK	United Kingdom
USA	United States of America

1 Introduction

In 2017, studies counted 465 million unique mobile subscribers in Europe, which equalled a penetration rate of 85% of the European population. Out of the total connections 70% were smartphone users. Forecasts say that the distribution of smartphone users will increase to 85% by 2025 (GSMA Intelligence. 2018. p. 6). Until 2022, smartphone traffic in Western Europe is expected to increase by seven times and 90% of mobile data traffic will come from smartphones (Telefonaktiebolaget LM Ericsson. 2016). These figures show that the smartphone is a permanent companion of end users and it is possible to reach prospects and customers almost anytime and anywhere. This offers new business models and can be seen as a benefit for internet and mobile data companies.

The urban mobility company moovel Group GmbH (Ltd.), which is a partner of this master thesis, uses the smartphone technology to sell and promote their mobile applications (apps). Its mission "A world without traffic jams" is supposed to be achieved by combining all available transport possibilities within a city. Therefore, the company builds apps which integrate route descriptions, public transport ticketing, vehicle sharing or ride hailing booking. The definition of specific terms will follow in chapter 3.1: *Literature Review* and more details of the moovel Group GmbH (Ltd.) in chapter 3.1.4: *Company Profile.* In the thesis the company is often mentioned just as "moovel".

The focus of this master thesis is a four-month company project with the goal to widen moovel's product and service portfolio and to improve moovel's products and apps. The author has a leading role in the project.

1.1. Project description & problem statement

To improve its products moovel plans to implement a feedback and survey tool which appears after every ticket or ride booking. The reason behind this feature is to widen moovel's product range and thus, to offer more services for their clients, which are Public Transport Operators (PTOs), such as deep user insights or product improvements. There are two departments interested in this feature – the marketing and the product department. Since the author is working in the marketing department, the thesis approaches the topic mainly from the marketing side and its respective advantages. A valuable article from Vasudha Mamtani underlined the importance of user feedback. Developers spend much time and effort in user research to

understand customer wishes and needs in order to build products that fulfill these requirements. Before a product is released on the market, multiple rounds of user testing with potential customers are performed. However, key insights can only be received from the real customer. That is why gathering user feedback is essential. Some issues can only be identified once the app is used frequently. By providing the possibility of giving quick feedback, the product can be modified and optimized for the everyday use. Another advantage is that a feedback interface increases the users' satisfaction because they can contribute recommendations and be part of the improvement process. As a result, a certain level of trust between customer and company gets established (Mamtani. 2018).

The idea of a survey feature was developed by the Chief Sales Officer (CSO) of moovel and executed by the marketing department. The focus of the thesis thus lies more on the executive part than on the brainstorming part.

From the scientific business perspective the process describes the method of product development according to Harry Igor Ansoff - meaning, an additional product is developed and sold in an existing market. This is a vital strategy to diversify the product range and to increase market share and sales. Hence extensive testing and piloting is recommended (Koks. Kilika. 2016. p. 95).

Testing is also an essential part of Design Thinking, a modern method for solving problems such as the development of a new product or service. Until the start of the thesis preparation, there was no exact product development process at moovel. For this reason, the author wants to proof if and how Design Thinking can be a valid method for developing an in-app feature for the company. This thesis is guiding through the different steps of Design Thinking and applying several measures and tools.

1.2. Objectives & approach

From the company perspective two main departments are interested in this project – marketing and product. The marketing department wants to introduce a new feature, which may be sold to transport agencies and widen their product range. In addition, it is possible to gain deep user insights which allow to advertise the market more specifically. The product department wants to use the feedback of the survey to improve the product and as an alert when issues occur in the apps. The overall objective of the company is to attract and retain more users and thereby increasing the revenue.

The objective of the university and the supervisor is to collect modern knowledge of app- and digital businesses. In addition, the project allows to find new product management methods by using Ansoff's popular matrix and the modern method of Design Thinking.

Regarding the aspired approach, the master thesis evaluates the project from a scientific view. To have a clear project process the steps of Design Thinking are applied:

1. Understanding and observation: Research

   On the research side it is crucial to understand the topic and fields of the app business, digital marketing, growth strategies and Design Thinking.

2. Ideation: Analysis

   In the analysis part, the requirements on the survey feature and their decision criteria will be defined and examined. In addition, the task is to find an ideal supplier who has the knowledge and expertise to develop the technical base of the survey tool and helps to integrate it into the existing apps. Therefore, the defined requirements and their decision criteria will be compared with several suppliers.

   In addition, the survey interfaces of Uber, Lyft and Grab are analyzed to achieve a base of necessary features for building the prototype.

3. Prototyping: Content and survey journey

   In the prototyping part, the content of the surveys is evaluated. Related to this, different survey questions and routes have to be developed, to collect different user insights. This is shown with screenshots from the actual surveys in the app.

4. Testing: Finalization of the product

   The prototype is tested by user groups inside and outside the company, feedback is collected, and the product is improved.

1.3. Company profile

The vision of moovel is a planet without traffic jams (moovel Group GmbH. 2018). This goal is supposed to be achieved by combining relevant and sustainable mobility solutions such as public transport, bike sharing, car sharing, ride sharing or ride hailing. moovel is building apps and providing concepts to achieve this goal.

To fulfill the goals and aims of moovel, the corporate start up, which is a 100 % subsidiary of the Daimler AG, employs 260 people globally. The offices are in Berlin (GER), Stuttgart (GER), Hamburg (GER) and Portland (USA). In August 2018, moovel counted five million users globally with bookings at every 1.2 seconds for a ticket or a ride (Daimler. 2018).

moovel combines mobility solutions with their products, which are mainly apps for smartphones or tablets. Overall, the corporate start up offers three kind of apps. A white label solution for PTO's to display their transport connections and tickets (1). On-demand shuttles, which are picking up the users from a set location, pooling them at best with other users and drive them to their desired destination. This service is available in Stuttgart (GER), Los Angeles (USA) and Singapore (SGPR) (2). The third product solution is also the pilot project of moovel: an app which is combining all relevant mobility solutions in a city, the moovel own-branded app (3) (moovel Group GmbH. 2018a; moovel Group GmbH. 2018b.). The mentioned survey feature will be implemented in the apps of the first category.

Next to the mentioned products, moovel is offering also a wide range of services for B2B clients. After the successful roll out of the apps in a city or region, moovel continues to promote the apps with a range of performance marketing solutions. These are app store optimization, online advertising and campaign optimization, user engagement, ad set production, reporting on a regular basis and in future user surveys.

App store optimization means the monitoring and optimization of the app store ranking. By means of descriptions, specific keyword selection and image varieties, it is possible to influence the ranking of an app in the respective app stores. Online advertising and the connected campaign optimization are key elements in online marketing. Activities here are the setting up of campaigns at Facebook, Instagram, Google, YouTube, Twitter or Apple Search Ads. Here it is important to select appropriate keywords, to target the right audience and to distribute the budget. To keep the user engaged, it is possible to send them push notifications on their phone with an incentive to use the app more often. The ad set production includes the creation, editing and adjusting of advertising assets, which can be images, videos or sounds. With regular reports, the client receives insights into running advertising campaigns on the basis of relevant KPIs such as install rate, cost per install, impressions, clicks, transactions or registrations.

2 Literature Review

This chapter serves as a theoretical framework to comprehend the topic and to analyse it. To conduct a relevant and qualitative analysis it is important to understand the theory, method and functionality behind the subject. Therefore, an extensive literature review of the fields of mobile app business, digital marketing, growth strategies and Design Thinking is essential to proceed with the analysis. In the literature review the terms used are defined, backgrounds are discussed and additional information is provided.

2.1 Mobile app business

First of all, it is important to define the characteristics and factors of an app. Later on, the terms *mobile device* and *smartphone* are explained, before the app business market is introduced.

Dr. Md. Rashedul Islam defines a mobile app as a software or set of programs that runs on a mobile device and performs certain tasks for the user. He explains that mobile applications are running on a small hand hold mobile device which is easy to use, moveable and accessible anytime and anywhere. In addition, Islam mentions that an app takes advantages of the features of a smart device such as calling, messaging, browsing, chatting, social network communication, audio, video, game etc. (Islam. 2010. p. 72).

In 2005, Ivo Salmre defined in his software engineering guide five important characteristics of successful mobile applications. First of all, quick start up time (1) is essential, because users tend to use mobile devices frequently but for short sessions of time. The ability to quickly launch an app is indispensable. He recommends that the session time should be much longer than any launch time the user endures. Responsiveness (2) is the second important characteristic. Users expect a physical or visual response when interacting with the device. Otherwise users will become impatient and frustrated. The best acknowledgement users can receive is the completion of the requested action or a notice that the request is being worked on. Another characteristic of successful mobile application is focused purpose (3). The app should have a clearly defined set of tasks. The objective of the user should be achieved with a minimum number of clicks, taps or other gestures. The goal is to have the smoothest customer journey as possible. Further it is important that off-device information is included and published seamlessly in the interface of the app. This kind of information could be for example a map or address integration from the internet. The challenge is to overcome weak network availability

when the user is not in a stable internet connection. Salmre recommends limiting the size of relevant content being downloaded. The last important application characteristic is the consistency of experience (5). That means that the app should be perfectly integrated into the user experience of his or her device. Therefore, tailored and specific app versions for each device and operating system are required (Salmre. 2005. p. 31-34).

In addition, Ulrike Sturm defined some recommendations for app development from the perspective of urban and citizen science in a workshop with her colleagues in 2017. According to these, the aspects can be distinguished into three overarching sections. First sharing of outcomes and interoperability (1). Under this aspect some key factors are listed: The app should have an API (Application Programming Interface) to share as much data as possible. Further there should be transparency about which data is collected and where the data is stored. Another factor is to provide the app in several languages, related to the city where it operates.

The second aspect for app development in urban and citizen science is communication and design (2). This represents an app design and performance that appreciates the users time and lowers the barriers for market entry. In addition, it makes sense to communicate constantly with the participants and react to feedback and ideas. Also, communication should be direct as possible and both sides should profit.

The last aspect is ethics (3). This means a responsible handling of the users' data and respect of privacy as well as a protected app environment, which is safe from third party accesses (Sturm et al. 2017. p. 8-10).

After making clear what the app needs to consider, it is now necessary to determine often-mentioned terms *mobile device* and *smartphone*. Priya Viswanathan defined the terms in a tech article. According to her, "mobile device" is a general term for any handheld device. Tablets, e-readers, smartphones and portable music players are all mobile devices. The characteristics of mobile devices are having an access to the internet, a battery, a keyboard for entering information, a portable size and weight and wireless operation (Viswanathan. 2018).

S. M. Jacob and B. Issac characterised a smartphone as a mobile device that integrates telephone features along with a camera, music player, access to the internet, and the possibility to edit, create and store data (Jacob. Issac. 2008. p. 2). According to that a smartphone is a mobile device with all its functions plus the telephone feature.

To determine the size of the business segment of apps, the download and usage figures of app stores is helpful. In 2017, 197 billion apps were downloaded via the app stores. According to a

forecast, by 2021, the total app downloads number will almost double to 352 billion (Statista. 2019). A comparison of the two main operating systems – Android (Google) and iOS (Apple) shows that Google is gaining significantly more installs than Apple (App Annie. 2017. p. 9). This could be explained with the different strategy of the two companies. While the Android operating system can be installed also on external, non-Google, devices, the iOS operating system is exclusively for Apple products. However, a glance at revenue discloses that Apple's App Store is twice as successful as Google's Play Store (App Annie. 2018. p. 10). The discrepancy is not linked to different monetization models but rather to different user behaviour. iOS users are more likely to invest in Apps. 46% of iOS users indicated to make an in-app purchase to avoid ads. This compares to only 38% of the Android users (Milanesi. 2018).

The lucrativeness of the app market can be seen at the revenues of app publishers such as moovel. In 2016, publishers were paid over \$35 billion across the App Store and Google Play. Including third-party Android stores and advertising revenues the total amount increases to almost \$89 billion. Thereby in-app purchases as tickets or bookings are not counted (App Annie. 2018. p. 10).

2.2   Urban mobility

moovel's goal is to shape the future of urban mobility. The term *urban mobility* attracted more and more attention over the past five years (Google Trends. 2019). But what does this actual mean? This subsection serves to clarify and define common and modern trend words of *urban mobility* such as vehicle sharing.

In 1998 Patricia L. Mokhtarian and Ilan Salomon defined mobility as a demand for activities or travel, where the costs are an integral part of the demand (Salomon. Moktarian. 1998. p. 131).

Dr Jean-Paul Rodrigue distinguishes between three categories of *urban mobility*: collective transportation (public transit), individual transportation and freight transportation. According to Rodrigue the purpose of collective transportation is (1) to provide publicly accessible mobility in a city. Its efficiency is based on transporting a large amount of people and achieving economies of scale. Examples are trams, buses, trains, subways and ferries. Individual transportation (2) are modes of personal choice such as the automobile, motorbike, cycling and walking. The last category freight transportation (3) is characterized by delivery trucks moving between industries, distribution centres, or warehouses and ports, rail yards or airports (Rodrigue. 2013. p. 206).

For the business model of moovel, mainly the first two categories are relevant. Essential parts of individual transportation in a shared economy are Mobility-as-a-Service (MaaS), on-demand mobility, vehicle sharing, ride sharing, and ride hailing.

moovel sees itself as a pioneer in the field of MaaS. Jittrapirom and his colleagues formed a task force in the Netherlands to compare several definitions of this term. They concluded that MaaS can be seen as a mobility concept, phenomenon or transport solution. The core is to have access to multiple transport service provider by using only one platform or app. To differentiate clearly from other concepts, the authors set up the following nine characteristics (Jittrapirom et al. 2017, p. 14-16).

1. The integration of transport modes. Meaning that different public transport services are combined and available for the user. Following transport modes can be included: public transport, ride hailing, car sharing, ride sharing or bike sharing.
2. The tariff options. Normally, there are two options available: A monthly package of a certain amount of kilometres or time, or the exact account of the used service.
3. The user can access all services, such as trip planning, booking, ticketing, payment, and real-time information, via one platform only.
4. Interactions between the multiple actors involved, which are users, suppliers of the transport service, platform owners or local authorities.
5. Different technologies are combined, such as mobile devices, internet network, GPS, e-ticketing and e-payment systems.
6. The service is user-centred and demand oriented.
7. Registration and validation of the account is required.
8. Personalisation: Based on the user's profile, preferences and behaviours the platform provides specific recommendations.
9. Customisation: Trips and routes and mobility packages can be freely composed.

On-demand mobility, which is part of moovel's business model, means the use of shared vehicles that are accessible on demand. Typically, a passenger reserves a ride via the smartphone before the trip. On-demand mobility is part of the sharing economy within a city (Greenblatt. Shaheen. 2015. p. 77).

Within vehicle sharing, car sharing is the most important part. A car sharing report from 2014 by the European Automobile Manufacturers Association provided some information about the terminology. According to the organisation there is no uniform definition, but the following characteristics could be determined. The user must validate himself or herself with a driving

license and is then able to access the car without interacting with the company providing the vehicles. The price for the services often depends on minutes or the distance travelled. Some operators allow multi-day packages to better conditions. Typically, the vehicles are available from distributed locations across a service area. Servicing as cleaning or refuelling is conducted by the operator. In some cases, users are incentivised to undertake the service (ACEA. 2014. p. 3-4). Similar to this concept is bike sharing. According to Shaheen, Guzman and Zhang, the shared use of a bicycle fleet, is a mobility strategy that could help address sustainable transportation (Shaheen. Guzman. Zhang. 2014. p. 159). moovel is operating in both segments by collaborations with the sister company car2go (car sharing) and the partner company nextbike (bike sharing).

The Association for Commuter Transportation in 2014 defined the term ride sharing as a non-commercial service. Ride sharing means people are pooling from a common origin, like their residence, to a common destination, like their employer. In some cases, arrangements exist where costs are shared between passengers and driver, but not for commercial profit (ACT. 2014).

Ride hailing is a more modern term. Because of the technological advancements in the transportation industry and mobile devices, it has become possible to connect driver and passengers in a fast and easy way. Hunaiti et al mentioned recently that due to the dissemination of smartphones and fast communication, ride sharing transformed to ride hailing (Hunaiti et al. 2018. p. 244). The company Uber was the first operator to turn ride hailing into an app-based business model by using the new technology in 2009 (Uber Technologies Inc. 2019). moovel is using ride hailing by including the services of its sister company mytaxi and shuttles in Los Angeles (USA), Singapore (SGPR) and Stuttgart (GER).

2.3   Growth strategies

On the one hand this company project is an example for a modern operatonal case in the digital business world, but on the other hand it follows the well-known theory of traditional product development. Already in 1957, Harry Igor Ansoff, a pioneer of product market strategies, pointed out that business firms must go through continuous growth and change to retain or improve its position. He mentions four basic growth alternatives for a business: market penetration, market development, product development or diversification (Ansoff. 1957. p. 113). In this section the four strategies are briefly explained and it is demonstrated how moovel's project can be described as product development.

The strategies are explained by means of the original literature provided by Ansoff from 1957 and of a more contemporary source of Dr Al-Bostanji from 2015. The reason is that Al-Bostanji expanded Ansoff's theories valuably by including risks estimations and strategic approaches.

Ansoff's strategies contain two dimensions: product and market. With the first strategy "market penetration", a company uses their current product in the existing market (Ansoff. 1957. p. 114). The goal is to achieve greater sales for the current products for the same consumers. This should be accomplished without a change or modification of the product or its image. The best way to penetrate a market is a combination of competitive pricing strategies, advertising, sales promotion and personal selling. With this strategy, companies focus on markets and products it knows well. Thus, there is not a lot of investment in market research required and ultimately the risk is relatively low (Al-Bostanji. 2015. p. 73).

"Market development" describes a strategy of introducing a current product into a new market (Ansoff. 1957. p. 114). This could be a new targeted group of consumers or a new geographical market. Other approaches can be new distribution channels (e.g. e-commerce) or adjusting prices to attract new customers. Market development may be linked to some risks: Non-acceptance of a product from new market and expensive market researches (Al-Bostanji. 2015. p. 73-74).

A "product development" strategy describes the introduction of a product with new and different characteristics (Ansoff. 1957. p. 114). The goal is to develop new competencies and to meet needs, desires and preferences of existing customers. Important, however, is the awareness that these factors are changing continuously. Product development requires a detailed market and customer analysis, which may be cost intensive. Therefore, product development can be considered as relatively risky (Al-Bostanji. 2015. p. 74). The company project, to build a survey feature inside existing apps, can be described as product development, because it's aiming to meet the needs of the moovel's customers which are Public Transport Operators. By using insights from commuters and passengers, PTOs are able to improve their vehicles and services. moovel sells this additional service of collecting insights to its customers, which may lead to growing revenue. In addition, moovel itself can collect user opinions about the satisfaction level of interface, handling or customer journey within an app. Based on of this information, apps and services can be improved.

"Diversification" is the final growth strategy. It describes the step to enter a new market with a new developed product (Ansoff. 1957. p. 114). This strategy is associated with the highest level

of risk. Companies must have clear ideas based on studies and researches on new markets and products. This can be linked to high costs. On the other hand, diversification could increase customer number and revenue in a fast way (Al-Bostanji. 2015. p. 74).

2.4 Design Thinking

The method of Design Thinking is a fundamental process in this thesis. In the last years Design Thinking has received increased attention in business settings. Reason therefore is, that design of products and service is a major component of business competitiveness now (Razzouk. Shute. 2012. p. 331). According to Christian Mueller-Roterberg, Design Thinking is a comprehensive customer-oriented innovation approach that aims and develop creative business ideas. Thereby it is an integrative approach which means that the solution development functions systematically and holistically by following a process. In addition it focuses on early customer orientation by observing user behaviour and habits. A central element of Design Thinking is empathy. It is necessary to put oneself in the position of a user. Developments can thus be better aligned with the customers. Finally at a certain point prototype is created and tested with real users (Mueller-Roterberg. 2018. p. 1).

The process of Design Thinking consists six phases. First the problem is defined and must be understood. According to Plattner this is the most important phase in the model since occurring errors affect the entire process. The next phase the knowledge is evaluated and interpreted and weighted. The outcome of a clear idea of the problem leads to the ideation phase which consists brainstorming and generating ideas that contain a solution. Afterwards these ideas are transformed into a tangible prototype which does not have to be perfect. Design Thinking ends with the testing phase where the prototype is applied with real users. Observing and interviewing these users help to gain learnings and improve the prototype for the actual product (Plattner et al. 2009. p. 113 ff.)

Design Thinking contains a large number of methods and tools. The persona method helps to identify the user's expectations and needs. Personas are "fictitious, specific, concrete representations of target users" (Pruitt. Adlin, 2006. p. 11). Personas represent a character which allows to engage with in the design process. Another tool is the stakeholder map which shows a visual representation of all groups involved in a particular product or service, such as customers, partners, companies or colleagues. A different tool is the customer journey map which shows all touchpoints from the user point of view from the first to the last interaction. A further tool is the so called rapid prototyping. It represents a quick formation of ideas and helps

to determine which solutions are technologically possible (Chasanidou. Gasparini. Lee. 2015. p. 4-5).

An interview with a Design Thinking expert is conducted and gives more insights. The discussion with her helps to define how the Design Thinking process in moovel's case could look like and which tools and measures can be applied. The interview is applied in the analysis part of this thesis.

3 Methodology

This thesis serves an applied process by solving a practical problem. Thereby two major frameworks play the key roles: The established product development method by Harry Igor Ansoff as well as the new concept of Design Thinking. The reason for that is to have a planned and organized approach to find new ideas and to develop a flawless product. The deductive research aims the goal to test if Design Thinking is an appropriate method to develop products or services for the company moovel.

Regarding the type of research data, in the literature review mainly secondary data is collected and analyzed while in the conducted interviews primary data is gathered. Due to the interviews and the testing observations the applied method on the thesis is a qualitative research.

The thesis is structured as the project itself. The six steps of Design Thinking form the construct of the thesis, whereby the focus lies on ideation, prototyping, testing and the following implementation. These four stages were among the author's responsibility.

In the ideation part the idea of an in-app survey feature is developed and then the appropriate partner is selected. The selection process is the main part of the analysis. The defined requirements for the survey tool are decisive factors in this step. Afterwards, the prototyping phase, design and nature of the questions are determined. In the end, during the test phase, the product is finalized before being implemented.

The interviews give interesting and essential insights, which are important for the requirements on the survey feature and the correct application of the Design Thinking concept. The decision criteria for choosing the interview partners were their expertise level, relevance and accessibility.

In order to emphasize on the core of this thesis - marketing and management, technical details about how the tool is integrated will not be discussed. In addition, confidential information as for example pricing, offer and contract details are not part of the thesis.

4 Analysis

In this chapter the Design Thinking process starts. A discussion with Miriam Steckl, a Design Thinking expert, lead to further and deeper knowledge, how the process flow should be. Later are the requirements of the survey tool defined. Afterwards several suppliers of a survey tool are analysed. For confidential reasons pricing, offer and contract details are not named. In total a number of seven suppliers who offer survey tools for mobile apps was preselected on the basis of an internet research. These are *Wootric Inc.*, *Netigate AB*, *Qualtrics LLC*, *UserVoice Inc.*, *Instabug Inc.*, *Mopinion B.V.* and *Usabilla B.V.* In the following the suppliers are named without the legal form. Every defined requirement is analysed with the publicly available information of each suppliers.

In addition, in a second analysis, the rating and feedback surveys of three moovel competitors Uber, Lyft and Grab are examined. This step is important to verify which features are necessary for building the prototype.

Finally, it is analysed which users are the best to target and are requested to submit the feedback form.

4.1 Design Thinking Method & Process

The conducted interview with Miriam Steckl, a Design Thinking coach from the Hasso-Plattner-Institut (HPI) near Berlin, provided deeper and applied information regarding the technics and process of Design Thinking. The complete interview is located in the annex (interview 2). The goal of the concept is to improve an existing process and to gain more creativity and innovations inside of a company. According to Steckl, Design Thinking is a mindset and holistic approach towards more user-centric solutions (Interview 2. 2019. Annex p. 65).

Design Thinking is a process which consists of six steps. First, it starts with an understanding phase where research is key to gain essential knowledge. Afterwards, observation is a vital method to understand a specific problem such as user behaviour. The next phase is the synthesis phase where all information is compiled and considered. Then ideation is the following phase where thoughts and ideas are collected and discussed. The chosen ideas are developed further to a prototype, which is a way to make concepts, services or products tangible in high or low resolution. In the end the prototype is tested and finalized. Design Thinking is an iterative

process where the team is regularly switching between the phases when problems occur (Interview 2. 2019. Annex p. 66-67).

To apply Design Thinking on the given case of product development, it is necessary to show the methods of the individual phases in more detail. As mentioned in the observation part the focus lies on the user behaviour. For that reason, it is essential to visualize and internalize the users' journey through a product or service (Interview 2. 2019. Annex p. 68). The survey feature will be included at one point of this journey, so it must be placed very carefully to not disrupt the experience.

In the ideation phase it stars with brainstorming and finding ideas. The principle is quantity over quality. Everyone who participates in the project should bring in his ideas and input. In this phase it is not important if ideas are feasible or risky (Interview 2. 2019. Annex p. 68). The ideation phase in this thesis is the analysis of the task in order to find the ideal supplier who had the knowledge and expertise to develop the technical basis of the survey tool and helped to integrate it into the existing apps.

Afterwards the process leads to prototyping. A common mistake here is to try to build an already perfect product. It is very time consuming and in the testing phase it might come out that the product is not finished completely (Interview 2. 2019. Annex p. 68). The survey feature is built by taking into account the survey journey, the content, and logic of the survey as well as the design.

In the test phase the most important functions of the prototype are tested. Different ways for testing can be used, such as conducting interviews and asking for opinions or using a clickable dummy and let volunteers experience the product or the service. A very far developed prototype would be to have a test version then let possible users come to test it and give feedback. The most accurate test group would be users of the existing apps (Interview 2. 2019. Annex p. 69).

4.2   Requirements on survey tool

An interview with one of moovel's performance marketing managers, Daniel Hurrle, was very useful to define which requirements are important to find an appropriate survey tool. According to him the following aspects are important for the implementation of the tool. The complete interview can be found in the annex (interview 1).

First it is important that the software partner provides a tool, which is compliant with the General Data Protection Regulation (GDPR) of the European Union. This regulation came into

force on 25th of May 2018. In terms of lawfulness and fairness there were not many considerable amendments. It is still necessary that a party needs a specific ground for processing of data as for example a contractual agreement. Fairness means that only personal data which is absolutely necessary is collected and handled in ways that people would find reasonable. One of the crucial changes are the new requirements on transparency. Now it must be clearly signposted what happens to the users' data (Information Commissioner's Office. 2018. p. 18-20). That is why it is crucial for moovel to work together with a partner who observes the GDPR law. Here, an important issue is that it is forbidden to store user data outside of the European Union since it is an EU law. Therefore, the company has to find a supplier who is operating its servers in an EU country (Interview 1. 2019. Annex p. 61).

The second important part is the placement of the survey. The questions should appear within the flow of the user journey to have a high visibility and participation rate. At the same time the appearance should not disrupt the user experience and increase the danger of cancelling a ticket purchase or route navigation. To make sure to find the right placement, intense testing of the integrated feature is necessary (Interview 1. 2019. Annex p. 61). Hence, the location of the survey depends not on technical issues, the placement is not a requirement for finding the perfect partner. It is more important for the implementation. To have a flawless result the process of Design Thinking containing prototyping and testing will be applied.

Thirdly, messaging or wording is another central factor. The tool must allow the possibility that text and questions can be customized individually. This is crucial because the feature will be used for different cities or transport means. Next to this benefit the survey software should permit the integration of another tool, which is already used to send out push notifications to the user's smartphone (Interview 1. 2019. Annex p. 62). A push notification is a message to users about relevant and valuable information even when the respective application is not running. It is a powerful tool to increase engagement with an app and improve user retention rates (Isikligil. Samakay. Kılınç. 2017. p. 8).

The same tool that is used for push notifications can be used for segmenting the users. Here it is possible to filter after actions or events the users conducts in an app. For example, searching a trip, booking a ticket or creating an account. Based on these events different users will be asked different questions (Interview 1. 2019. Annex p. 63).

After defining the message and the wording, it is crucial that the tool has the opportunity to adjust the design of the surveys in different apps and different PTOs. This includes logo, colour, font or shapes. Next to the design another requirement is the logic behind the survey. It means

that depending on the answer of a question, another question is following. So, for example when the answer to the cleanliness of a train was negative, the next question should ask which part of the train was not clean. Here it is important to not ask too many questions at once to not disturb the user experience to much (Interview 1. 2019. Annex p. 64).

The last requirement for the survey software is linked to analysing the collected data. Next to the pure raw data, a dashboard or something similar is needed where the information is evaluated. A visualization in the form of graphs, tables or diagrams will be an advantage (Interview 1. 2019. Annex p. 64).

The following table sums up the requirements and their decision criteria. The requirement placement is not part of the evaluation to find the right supplier because it is part of the own implementation process.

Requirements	GDPR	Wording	Logic	Design	Messaging & Segmentation	Analysis
Decision criteria	– Are the servers located in the EU? – Is the supplier working GDPR conform?	– Individually customized questions possible?	– Is it possible to build a logic behind questions?	– Adjustment of design possible? – Logo, font, colours, shapes	– Permission of integration of other tools?	– Visualization in an individual designed dashboard?

Table 1 - Requirements and decision criteria on survey tool

To measure the requirements accurately their decision criteria were also defined. This is useful to classify a tool as being beneficial or not for the company. To find out if the supplier works in a GDPR conform way it is necessary to carefully analyse the partner's product description. An important question here is if customer data is stored on servers in the EU or not.

For the wording requirements it is necessary to have the possibility to individually customize the questions of the survey. This can be linked to the logic requirement. Depending on how a question was answered the one following is referring to the answer.

The design of the displayed surveys must be adjustable since the tool will be integrated in different apps with have different logos, fonts, colours or shapes.

For the correct messaging and audience segmentation which will be conducted by the use of a different tool the option of integrating other tools is important.

The last requirement is the analysis part. Here, the service of an individually designed dashboard for the different apps is needed.

4.3 Survey tool analysis

Figure 1 – Wootric Inc. logo

Wootric Inc. is based in San Francisco (USA) and offers a wide range of survey options for customers. On their homepage the company expresses their commitment to GDPR. They allow the option to export or delete all collected data linked to a customer. After the termination of the account subscription the customer's data is completely deleted within a day. In addition, Wootric appointed a data protection officer who oversees and advises the data management (Wootric Inc. 2019a). Wootric stores the collected data on servers in the United States but the company claims that it commits to the EU-US Privacy Shield Framework (Wootric Inc. 2019b). This regulates the collection, use and retention of personal data from European Union member countries and the transfer to the United States for commercial purposes (European Commission. 2019). In conclusion, Wootric operates GDPR compliant but does not store its collected data in the European Union as demanded from moovel.

Regarding the wording requirement, Wootric, offers three kind of products. With Net Promoter Score it is possible to measure the customer loyalty and to activate promoters. The feature Customer Satisfaction Score allows to measure the customer satisfaction with a recent interaction as a purchase. The Customer Effort Score is useful to measure the ease of the user journey. All these products are relevant in moovel's case, but it is not possible to combine these products or to set up a survey without pre-settings (Wootric Inc. 2019c). Due to the individual nature of the different apps, a survey with the option of complete individualisation is more suitable.

Wootric allows to set up specific logics behind the questions. It is possible to follow up on questions depending on the answer. For example, if there is a negative answer the next question could ask for space for improvements. Another example for asking a positive question would be, what the user of the product likes in particular (Wootric Inc. 2019d). The logical set up of questions is useful for moovel.

On the one hand the design customization of Wootric allows to individually adjust the colours with all possible colour codes. On the other hand, it is not possible to change fonts or shapes

and to upload an own logo (Wootric Inc. 2019e). These limited options do not allow a coherent user experience.

Wootric allows several integrations with other tools. It is important to have a variety of different features that can be integrated seamlessly. moovel would like to integrate Wootric with a messaging and engagement tool which is not possible directly but only via the tool Xplenty (Wootric Inc. 2019f). This detour over a different tool must be seen critical due to an increase of technical issues that could potentially occur.

Finally, Wootric also provides a dashboard, where the results are visualized and analysed instantly. Results can be segmented after location, operating system or frequency of travels. In addition, it is possible to reach out directly to the respondents and reply on the feedback (Wootric Inc. 2019g). Wootric's dashboard contains all features required for the project at moovel.

Figure 2 - Netigate AB logo

The Swedish software company Netigate AB operates offices in Stockholm (SWE), Frankfurt am Main (GER) and Oslo (NOR). Next to customer surveys Netigate offers also employee surveys and market researches. The company's servers where the collected user data is stored are located in Sweden and Germany. Regarding GDPR, Netigate claims on its homepage to abide the data protection regulation. The survey provider promises to grant customers the right to control how their data is collected, stored and used. To guarantee data protection Netigate installed a dedicated GDPR team, which consists of employees of every department and position. In addition, the company uses only certified data centres which all match international information security standards (Netigate AB. 2019a).

Netigate offers, similar to Wootric, also the Net Promoter Score apart from customer satisfaction. The questioning and wording can be individually adjusted. Furthermore, it is possible to choose between media, info text, star rating, slider, dropdown, checkboxes or more (Netigate AB. 2019b). A free combination of all possibilities allows a tailored survey package for each of moovel's app.

Also, Netigate offers logical question routing in its surveys. The provider calls this feature "jump" logic and it allows respondents to receive different follow up questions depending on their answer. For example, respondents with a negative answer will receive the question "What

can we do to improve?", whilst the respondents with a positive rating will be asked "What do you like especially well?" (Netigate AB. 2019c).

Netigate provides customers with a design editor to tailor and adjust and add colours, fonts, size or logos. In Netigate's product description it is written that the editor is only available for certain customers since it is recommended to use one of Netigate's templates (Netigate AB. 2019d). Since it is necessary for moovel to adjust the surveys for each app, using templates is no option.

Regarding integrations of other tools, Netigate offers an API, which allows two systems to communicate with each other (Netigate AB. 2019e). This is useful in moovel's case to see which customers have finished a ride or is using the app multiple times. With an API integration segmentation and messaging of users is possible.

Netigate does not offer a dashboard like Wootric does, but a reporting feature, where the report can be individually designed and filled with content. The report serves all relevant KPIs and is a valuable replacement for a dashboard (Netigate AB. 2019f).

qualtrics

Figure 3 - Qualtrics LLC logo

Qualtrics LLC with its headquarter in Provo (USA) and offices in nine countries is a software company which offers customer or employee surveys or market research (Qualtrics LLC. 2019a). Since the beginning of 2019, Qualtrics LLC is part of the enterprise application software company SAP SE (SAP SE. 2019). To guarantee GDPR compliance, Qualtrics lets its customers have control about their data. The user is able to modify and delete individual data points, complete survey responses and entire projects. In addition, Qualtrics provides security documentation that describes processes and procedures for safeguarding the data (Qualtrics LLC. 2019b). In Qualtrics' security statement they make sure that customer data a is processed in a specific location known to the customer within a specific region such as North America, Europe and Australia. The customer data is stored in the respective region where the customer's primary data centre resides. So, all European customers will have their data stored in a European data centre (Qualtrics LLC. 2019c).

The product portfolio of Qualtrics' customer surveys consists of the Net Promoter Score and a variety of customer experience and feedback surveys. The survey editor enables the user to create different surveys with several options to adjust questions and set different answer

possibilities. Different kinds of content such as texts, graphics, multiple choice, matrix, ranks or sliders are also available (Qualtrics LLC. 2019d).

In addition, Qualtrics supports logic or conditions in the questionnaires. Similar to the other software, Qualtrics leads to different questions depending on the answers. A further feature is that the logic recognizes words in open questions. That means it can measure if an answer is positive or negative and automatically leads the user to a different question. Also, it is possible to ask a block of questions at once or several questions after one another (Qualtrics LLC. 2019e).

With the survey editor it is also possible to adjust layout and design of the survey individually. Here colours and fonts can be changed and logos or pictures uploaded. It is notable that every detail as backgrounds, headers or footers can be adjusted. In addition, Qualtrics serves already a number of design themes which can be used (Qualtrics LLC. 2019f).

For conducting segmentation and messaging, Qualtrics offers an integration of specific tools. For additional tools a connection via an API, similar to Netigate, is possible. This is useful for moovel but depends also on the experience of Qualtrics integration to moovel's used software (Qualtrics LLC. 2019g).

Finally, Qualtrics survey tool includes also an analysis feature where dashboards can be individually created and designed. Thereby relevant KPIs can be imported and evaluated. A great advantage is that relations between metrics can be set and so lead to further results. With the help of demographic, behavioural or further factors it is possible to cluster results (Qualtrics LLC. 2019h).

Figure 4 - Uservoice Inc logo

UserVoice Inc. with its headquarter in San Francisco (USA) and an additional office in Raleigh (USA) offers software which enables to create feedback portals on desktop or in app. In addition, UserVoice serves questions to calculate the Net Promoter Score. In comparison to the other tools, UserVoice does not offer the option to create complex surveys. It offers more a feedback interface on customer's websites or apps. While browsing through the website or app content at a certain point a window with request for submitting feedback appears (UserVoice Inc. 2019a). This tool is not perfect for the use case of moovel but another feature of UserVoice, the so called SmartVote, could be interesting. Here, predefined questions and answer

possibilities are delivered to the user. On the other hand, it is always only possible to predefine two answer possibilities at the same time (UserVoice Inc. 2019b). To have a coherent and holistic result UserVoice is not the right tool to create extensive surveys. Therefore, it is not taken into further consideration.

Figure 5 - Instabug Inc. logo

The Egyptian software company Instabug Inc. with one office in Cairo (EG) offers tools for end customers to report and discover problems in a software. In addition, the company serves the feature to create customizable in-app surveys. Instabug claims that is fully compliant with the European GDPR. The company allows deletion of the data of a specific user on-demand. Every personally identifiable information, custom attributes, logs, screenshots and any data can be irreversible erased. In addition, one can customize how long Instabug retains their users' data (Instabug Inc. 2019a). There is no information available where Instabug stores its data, but due to the location of its only office it can be assumed that the servers are also located in Cairo and not in Europe as demanded from moovel.

With Instabug it is possible to create own custom surveys with any number of questions displayed to the users. Here three types of answers are possible: a text field where the users answer the question by typing their response in a text field (1), multiple choice where the users answer the question by choosing one of the predefined answer possibilities (2), and finally the users can rate a question with five stars (3). Unfortunately, Instabug surveys do not allow a specific logic behind the questions. So, it is not possible to display different questions depending on the answer given previously (Instabug Inc. 2019b).

Regarding the design perspective, Instabug, however, allows to adjust the colours of a survey but not fonts, shapes or logo upload (Instabug Inc. 2019c).

Instabug allows the integration into several software as problem trackers, communication tools or support desks. In contrast to other survey tools, Instabug is limited in its ability to integrate only to a small number of software (Instabug Inc. 2019d). For moovel, this is not the perfect solution because the necessary flexibility of data transfer is not given.

Finally, Instabug provides a dashboard where responses can be analysed. It is possible to filter by timeframe, keyword, specific user or replies. A visual representation in the dashboard sums

up the results. A keyword text analysis as well as rating overviews provide more insights (Instabug Inc. 2019e).

Figure 6 - Mopinion B.V. logo

The Dutch Software as a Service company Mopinion B.V. operates offices in Rotterdam (NL) and London (UK). Mopinion offers a user feedback software as surveys for websites and mobile apps as well as Net Promoter Score research (Mopinion B.V. 2019a). Regarding GDPR aspects Mopinion claims to fulfil all necessary regulations. The company stores data for as long as the contract with the client exists. In addition, data can be removed automatically based on custom time intervals. Further Mopinion promises that all privacy sensitive data like contact details, telephone numbers, email addresses and names will be encrypted. Regarding server location, Mopinion makes sure that for all European clients the data is stored in Ireland (Mopinion B.V. 2019b).

The rich question and answer possibilities allows for a large variety of different question forms. It is possible to display rating scales, text fields, radio buttons, Likert scales, checkboxes, matrixes or the ability to upload media as screenshots. In addition, an advanced question routing option allows a certain logic behind the feedback forms. Depending on how the user answers he receives different questions afterwards (Mopinion. B.V. 2019c). The combination of all these features allows a high flexibility for moovel.

Mopinion surveys can be completely customised and adjusted in terms of design. It is possible to change foreground and background colours, fonts, shapes and allows to upload own logos. Some pre-provided themes allow a clean and smooth user journey (Mopinion. B.V. 2019c).

Mopinion allows integration into a large number of different tools from the fields of web analytics, customer relationship, ticketing and support, project management, testing and content management. In addition, it offers an own API which allows to connect further external software (Mopinion B.V. 2019d). This allows great versatility regarding data traffic and usage for moovel.

Finally, Mopinion serves a customisable dashboard which displays data in real-time. The dashboards can be individually designed and compared to each other. In addition, it is possible to upload own data which allows a holistic view on insights. This is a useful aspect for moovel

because the company can operate in one software and build different dashboards for different customers (Mopinion. B.V. 2019e).

Figure 7 - Usabilla B.V. logo

Usabilla B.V. with its headquarter in Amsterdam (NL) and further offices in New York (USA), Berlin (GER), London (UK) and Sydney (AUS), distinguishes its survey offer into passive and active feedback. Passive feedback is a form where user can report and share something with the app developer when a problem occurs. What is more interesting for the purposes of moovel, though, is the active feedback form which allows to ask specific questions to users. Regarding GDPR, Usabilla expresses its commitment in several statements. First the company claims that all user data is stored in in the European Union, in Ireland. In addition, Usabilla gives full control over data storage to the customer. This means the customer can delete or adjust the given data at any time. To align further with the GDPR compliance, Usabilla anonymise all data and excludes or removes any screenshots, IP addresses, email addresses or text responses which could identify its origin (Usabilla B.V. 2019a).

Questions can be individually designed in Usabilla with the exception that the first question is always a mood rating which consists of stars, emojis or individually specified images. Afterwards additional questions are possible where several forms as text, ratings, multiple choices or comments are possible. In general, less options for individualizing the surveys are possible in contrast to Mopinion e.g. (Usabilla B.V. 2019b).

Using the feature called "control visibility" or page jumps it is possible to include certain logics behind a survey. Depending on the given answer, specific follow up questions can appear. This allows to adjust questions to the mood rating score a user provides (Usabilla B.V. 2019c).

Inside the Usabilla survey editor the customer has the ability to adjust the colour of all elements which are used in the survey. Although texts, sliders, checkboxes or background colours can be changed but it is not possible to upload own logos (Usabilla B.V. 2019d). Consequently, it is not entirely possible to create an app related look and feel as desired by moovel.

Usabilla offers an integration into a limited selection of different software which enlarges the possibilities of segmenting and processing data. However, in comparison to other survey tools Usabilla is not offering an API interface whereby a connection to any other software can be

established (Usabilla B.V. 2019e). Therefore, the options are limited to Usabilla's preselected tools which is not the perfect solution for moovel.

Usabilla provides a dashboard, which allows to have a quick overview over all relevant KPIs generated by a survey campaign. Predefined filters as platform, app, feedback form or date enable to segment the obtained information. Three types of graphs like trendline, amount of feedback and Net Promoter Score give relevant insights from the users' feedback. Similar to the integration, the customisation of the dashboard is limited to a certain point which restricts the flexibility for moovel (Usabilla. B.V. 2019f).

After analysing the seven survey tools it is now possible to conclude which software fits best for the projects of moovel. As it is stated out in the beginning of the chapter, the requirements for the tool are GDPR conformity with server location in the EU, individually customizable wording and design, possibility of logics behind a survey, the integration of further tools and the option of an analysis section as for example a dashboard. Table 2 gives an overview of the analysed information.

	GDPR conform & server location	Wording adjustable	Survey logic	Design customizable	Integration possibilities	Analysis tool
Wootric	✓ but server not in the EU	✗	✓	✗	✗	✓
Netigate	✓	✓	✓	Only available for special customers	✓	✓
Qualtrics	✓	✓	✓	✓	✓	✓
Uservoice	Not the right product for moovel					
Instabug	✓ but server not in the EU	✓	✗	✗	✗	✗
Mopinion	✓	✓	✓	✓	✓	✓
Usabilla	✓	✓	✓	✗	✗	✓

Table 2 - Analyzed product features of survey tools with requirements

As it can be observed from the table there are two survey tools which perfectly fit to the needs of moovel: Qualtrics and Mopinion. The next step was to enter negotiations with both providers, compare prices and terms and select the best option. For negotiations the procurement department of moovel is responsible. Due to compliance reasons, the decision of which survey tool was finally selected and sensitive data like prices or conditions are not part of this master thesis.

4.4   Benchmark: Feedback and rating surveys of Uber, Lyft and Grab

Uber, Lyft and Grab, three of moovel largest competitors in the field of ride hailing, already implemented feedback and rating surveys in their apps. Thereby users are empowered to rate their finished trip, driver and vehicle.

Uber, founded in 2009 in San Francisco, operates in 65 countries and completes 15 million rides every day (Uber Technologies Inc. 2019). According to Bloomberg Uber generated $11.4 billion net revenue in 2018 (Newcomer. 2019). Lyft, founded in 2012 also in San Francisco, operates in the United States and Canada and completes over one million rides per day (Welch. 2017). Forbes revealed that Lyft's revenue reached $2.2 billion in 2018 (Carson. 2019). Grab, founded in 2012 in Singapore, is Southeast Asia's leading ride hailing platform and operates in eight countries (Grab Holdings Inc. 2019a.). Grab provides nearly four million rides every day and had a revenue of $1 billion in 2018 (Grab Holdings Inc. 2019b. Lee. Giles. Amin. 2018).

In all three apps the user has the opportunity to rate his finished trip. After the customer arrived at his desired destination the feedback screen is appearing in the respective app. The decision of rating the trip or skipping the form is up to the user. Additionally, Uber introduced the ability to rate, compliment, and share feedback during the ride (Uber Technologies Inc. 2019). Figure 9 on the next page shows the three feedback and rating screens of the Uber, Lyft and Grab.
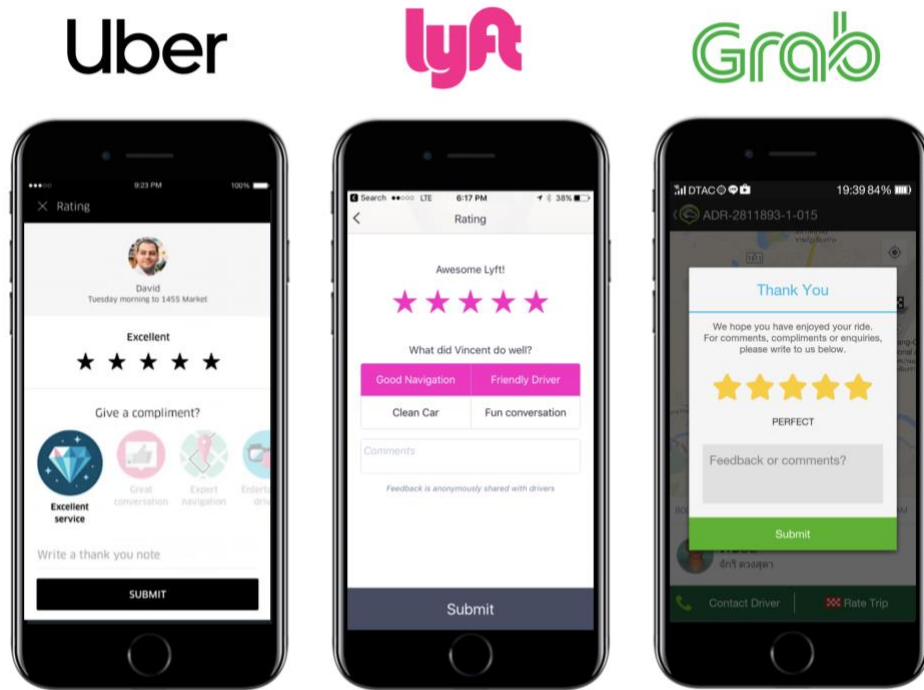
Figure 8 - Comparison of feedback and rating screens between Uber, Lyft and Grab

Noticeable is that all three companies are using five stars for rating the service. The rating scale is displayed at the most prominent areas and immediately catches the user's attention. According to that the rating is the customer's first action in this interface. It is interesting that the commonality between the three examples is the usage of stars for rating. Star ranking was first used to classify hotels according to their service and facility quality. The reason behind it, therefore was to inform potential guests about what to expect. Afterwards the star rating became the standard in online reviews. Prospects orient themselves on customers' ratings on product or services (Ganjalyan. 2018). This form of rating still exists and is now used by the ride hailing operators. By rating the service, namely the driver and his or her vehicle, the passenger influences the driver's average rating. In an official driver guide from 2014, Uber explained how the driver-rating system works. The document says that if the average rating is below 4.6, Uber considers ceasing the service of the driver (Cook. 2015). On the other hand it is also possible for drivers to rate their passengers. The reason for that, according to Uber, is that both sides have a better idea about the person they are riding with and can thus keep the experience safe, comfortable and enjoyable. A high rating on both sides means to be more likely to be prioritized above others (Uber Technologies Inc. 2018). The Lyft two-way rating system works identically to Uber (Lyft Inc. 2019). Grab offers also a two-way rating system with the difference that the driver is able to rate the whole trip including the passenger. There it is additionally possible to report a crash or toll payments (Grab Holdings Inc. 2019c).

Another commonality is that all three operators ask for feedback after the service is fulfilled. Also, the article from Vasudha Mantani, already mentioned in the introduction chapter, evaluated the right placement of the feedback request. According to her, one has to be very cautious about maintaining a balance between enticing users to provide feedback and disrupting their user journey with unnecessary additional steps. She adds furthermore that a user will feel more compelled to give insights once their journey is complete. That is why their task is complete and they are more willing to think in detail about how the experience was. Another advantage is that the feedback can cover a broad range of questions (Mantani. 2018).

Returning to the feedback and rating surveys of the ride hailing operators, Uber and Lyft are using additional one-click feedback buttons. Doing so, it is possible to give compliments to the driver about the navigation, conversation, service, vehicle, entertainment or friendliness. At Lyft the one-click buttons depend on the given rating. While after a poor feedback the users are asked for improvement recommendations, after positive feedback they can add compliments for instance. Grab renounces additional one-click feedback. The text field for own critic is available at the feedback form of all three operators. The author of this master thesis is following the best practice example of Uber or Lyft and considers the new findings regarding the feedback form.

4.5   User segmentations for surveys

Before the right segmentations are conducted it must be evaluated for which factors it is possible to distinguish the user audience. To use the moovel app without limitations the users validate themselves with their identity documents, driving licenses (for using car sharing) and add payment profiles. Based on this information the user can be segmented anonymously by demographical factors like age, sex or geographical factors like place of residence. According to the users' behaviour it is also possible to cluster them as high frequency commuters or car sharing users. At this point it has to be clarified that all user data is treated anonymously in terms of GDPR issues. It is technically not possible to create an exact user profile as for example Mr. Ronaldo, 34 years old, using the green metro line every morning and evening from Cais do Sodré to Campo Grande. It is only possible to cluster all users by demographical, geographical and behavioural factors. An example hereby would be that *segment A* contains all male train commuters in Lisbon between 30 and 39 years or *segment B* contains all female car sharing users in Berlin between 20 and 29 years.

The goal of the surveys is to have insights where transport agencies or moovel's other partners can improve their products. According to that relevant user segments must be created. On the one hand, it can be assumed that high frequency users, namely customers which are using the service multiple time in a specific period, can contribute a high-quality feedback. On the other hand, new users which are lacking experience with the service can contribute unbiased feedback and report potential starting problems that occur individually. Having multiple segments leads to various and more holistic insights.

Even though an exact segmentation can be an advantage because different user groups provide different insights but actually every customer feedback is important. The main focus and challenge is to target every user by making sure not to bother the customer with too much survey requests at the same time. Therefore, it is rather important to distinguish between user who already submitted feedback than geographical or behavioral factors. This leads to the decision to create two segments: users who responded to the questions and users who did not. Further segmentation could be conducted if additional information is required in a later project.

4.6 Prototyping: Content, survey journey and design

When the right survey tool is selected eventually, the next phase consists of building an adequate prototype. This is the first step of developing the actual product. A prototype helps to discover improvement potential. For building the prototype, four settings are defined in this chapter. These are the questionnaire, the survey journey or logic, the placement in the app and the design. It is necessary to mention that the questionnaire and the design can vary depending in which app and for which city they are supposed to be implemented. The developing prototype is a not a finished product. It is expected that during the test phase errors and incomplete features will occur. This is a crucial step for finalizing the implementing of the feature.

4.6.1 Questionnaire

In order to come up with the questionnaire, a list of questions for every service as public transport, car sharing, bike sharing and ride hailing needs to be defined. Furthermore, it is important to distinguish between standardised and individualised questions. This is essential to take into account, because it is planned to implement the surveys into several apps for different cities. So, for example for the question "How satisfied have you been with cleanliness in the train *A*", the train names can vary from city to city. Since the customers of moovel belong to the public transport sector all questions are service oriented.

In 2014 the European Commission conducted a survey and analysed EU citizens' satisfaction of urban public transport in their country. 28,036 respondents in 28 member states of the EU were interviewed. Main topics and questions in the survey were about price, punctuality and frequency, available information, safety, staff, cleanliness and comfort. (European Commission. 2014). This survey serves as inspiration for defining questions for moovel's use case.

The answer possibilities can be rating scales, open text boxes or multiple choices. This flexible variety of response options may achieve deeper insights into user behaviour and opinion than simple one-click options of selection.

Some survey operators provide guidebooks which help to create qualitative questions to achieve reliable results and actionable insights. According to SurveyMonkey, a survey company, the focus should lie on closed-ended questions. Open-ended or free-response questions require more effort and time to answer. If a questionnaire is too time consuming, respondents may leave the survey sooner than if closed-ended questions were asked. Another aspect to consider is to use a wording that creates neutral questions, otherwise it could influence the respondents' answers. In addition to not have a biased result, the answer possibilities should be balanced, so positive and negative as well as a neutral answer. Further, it should be avoided to ask two or more questions at the same time because it can confuse the respondent. The last recommendation is to diversify questions because otherwise it could annoy the respondent and lead to a higher cancellation quote of the survey (SurveyMonkey Inc. 2019). It is important to mention that during the process of survey campaigns additional questions and content may be included in the survey.

Table 3 shows an exemplary list of relevant and qualitative questions for the public transport surveys.

Group	Question	Standardised (S) or individualised (I)
Price	How satisfied are you with the price-service-ratio for day ticket/monthly ticket/annual ticket/short haul/etc.?	S
	Are you aware of the recent monthly ticket offers?	I
Punctuality/ frequency	How satisfied are you with the punctuality in general/of line A/etc.?	S/I
	How satisfied are you with the waiting time for trains, trams or busses/line A/etc.?	S/I

	In your opinion, are the transport possibilities sufficient for the city?	S
Information availability	How understandable are the information displays in the vehicles/at the stations?	S
	How visible are the information displays in the vehicles/at the stations?	S
Safety	How safe do you feel in the train A/at the station A/etc. during the day?	I
	How safe do you feel in the train A/at the station A/etc. during the night?	I
Staff	How satisfied are you with the employee friendliness?	S
Cleanliness/ comfort	How satisfied are you with the cleanliness in train *A*/bus *B*/tram *C*/station *D*?	I
	In your opinion how comfortable are our trains busses/trams/stations?	I

Table 3 - Exemplary list of relevant and qualitive questions for public transport surveys

For the car sharing surveys, the questions were defined out of the public transport questions and in a brainstorming session with colleagues. Goal is to determine if there is improvement potential for the vehicles or operations. Table 4 on the next page shows an exemplary list of relevant and qualitative questions for the car sharing surveys.

Group	Question	Standardised (S) or individualised (I)
Price	How satisfied are you with the price-service-ratio for the different car models?	S
	How satisfied are you with price model to pay per minute?	S
Vehicle	In your opinion how clean are our cars?	S
	How satisfied are you in general with the tank levels at the beginning of your trips?	S
	How satisfied are you with the functionality of our cars?	S
	Is our operating area sufficient for your trips?	S
	How satisfied are you with the availability of our cars around you?	S
Operations	How satisfied are you with the locking and parking process?	S
	How satisfied are you with the unlocking and starting process?	S

Table 4 - Exemplary list of relevant and qualitive questions for car sharing surveys

For finding the right bike sharing questions the same approach as for the car sharing questions is followed. Table 5 shows an exemplary list of relevant and qualitative questions for the bike sharing surveys.

Group	Question	Standardised (S) or individualised (I)
Price	How satisfied are you with the price-service-ratio for the bikes?	S
	How satisfied are you with price model to pay per 30 minutes?	S
Bike	How satisfied are you with the quality of our bikes?	S
	How satisfied are you with the availability of our bikes around you?	S
	Is our operating area sufficient for your trips?	S
	How satisfied are you with the size of our bikes?	S
Operations	How satisfied are you with the unlocking and starting process?	S
	How satisfied are you with the locking and parking process?	S

Table 5 - Exemplary list of relevant and qualitive questions for bike sharing surveys

For finding the accurate ride hailing questions the approach is slightly different. Due to there is another factor in the service included, the driver, there must also be questions about this. The benchmark analysis about the three ride hailing competitors Uber, Lyft and Grab gives valuable insights which questions can be included. All three give the possibility to comment on the friendliness and driving skill of the drivers. Table 6 on the next page shows an exemplary list of relevant and qualitative questions for the ride hailing surveys.

Group	Question	Standardised (S) or individualised (I)
Price	How satisfied are you with our price-service-ratio?	S
Vehicle	How satisfied are you with the cleanliness of our taxis?	S
	How satisfied are you with the comfort of our taxis?	S
Driver	How satisfied are you with the driving skills of our drivers?	S
	In your opinion how friendly are our drivers?	S
Operations	How satisfied are you with the waiting time for a taxi?	S
	Is our operating area sufficient for your trips?	S

Table 6 - Exemplary list of relevant and qualitive questions for ride hailing surveys

4.6.2 Question logic

After defining the questionnaire, the implementation of logic behind the survey can lead to deeper insights regarding user behavior and opinion. A survey logic allows to emphasis on a specific question and ask further. For the cleanliness survey this would mean that after a negative answer a follow up question appears and asks which parts of the vehicle or stations have not been clean. After a positive answer an interface is following with the request to answer more questions. In addition, the survey logic allows to hide or skip questions if they are not fitting into the survey journey due to the specific behavior of the respondent. The great benefit of the logic feature is that it is possible to ask a question at the right time. The moment the user is already willing to contribute with his opinion, he or she may continue to respond to further and deeper questions. How the logic feature works can be seen on the next page in figure 10 using the example of the cleanliness question for the public transport service.
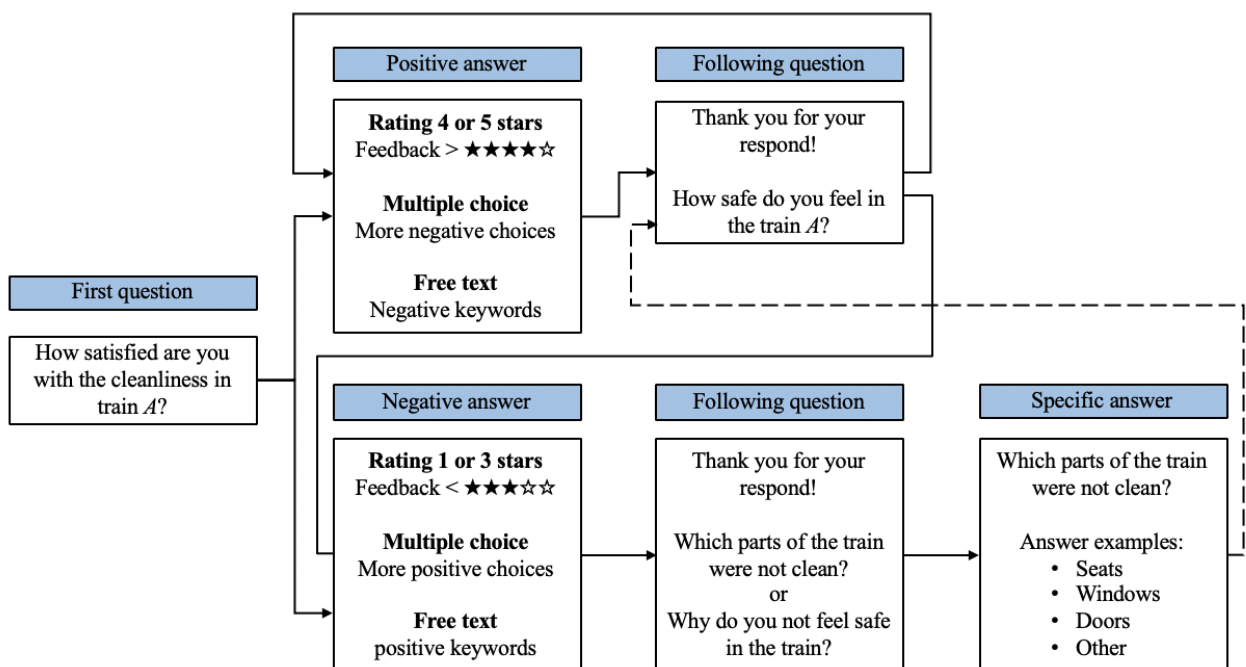

Figure 9 - Exemplary survey logic of the first and following questions

The figure exemplary shows the routing and logic for the question about cleanliness in public transport. The survey starts with the initial question of how satisfied the user is with the cleanliness of *train A*. Depending on the answer possibilities (rating, multiple choice or free text) the logic recognizes if it is a positive or negative answer. When the answer is negative a deeper question will appear and ask which parts of the train have not been clean in the user's opinion. The follow-up question can again contain several answer possibilities. When the

answer is positive a request for answering further question is appearing. From this point on, the logic circle starts again with different questions at the beginning. For every question category a different logic is used. In the price category, the follow up question on a negative respond would be to ask about the user's willingness to pay. In the punctuality and frequency category it would be interesting to find out which lines are not on time or could increase the frequency. In addition, the deeper insights reveal if a broader range of services is desired or needed. In the information availability category, it can be found out which areas require more timetables, displays or staff. However, the most important point is clearly the safety aspect. By inquiring, it can be estimated which areas are not safe enough and measures as more surveillance cameras, light or security personal can be installed.

4.6.3 Placement

The next setting that must be evaluated for building the prototype is the right placement where the survey questions appear in the app flow. Hereby it is important to not disrupt the click flow of the app and to still have a smooth user experience. To find the right placement several stakeholders are queried and together with the product department a coherent solution is found. The survey questions will appear in two places. First, after the ticket purchase, before the ticket is shown, a single question appears. At this point the user is waiting to receive his ticket for public transport and is most likely willing to answer the questions. Reason therefore is to gain as much information as possible. The second appearance is in an extra section in the main menu, which the user can access at any time. This serves as a feedback function if the user wants to report or comment his experience in the vehicles and stations or in the app. The following figure shows the app wireframe with both places of the surveys in the app. A wireframe is a visual representation of a user interface, stripped of any visual design or branding elements. It is used to define the hierarchy of items on a screen and communicate what the items on that page should be based on user needs (Mears. 2013).

Additionally a wireframe shows the relationship of page elements (interfaces), explains interactive elements, their relationship to each other and how the user will get feedback. Wireframes can be sketched manually or created by graphic software tools. Thereby it is not important to have a holistic and sophisticated wireframe. The level of fidelity depends on time and goals. After it is set up, the wireframe can be turned into an active prototype. When more wireframes are connected to each other, experts speak of wireflows. They illustrate one or multiple paths through the user interface. Wireflows highlight what interface elements are used and how the system responds (Dr von Reventlow. Thesen. 2017. p. 46).

Figure 11 on the next page shows a wireframe for the survey elements and interfaces. It was created in Adobe Photoshop and Microsoft PowerPoint and helps to understand the problem analysis.
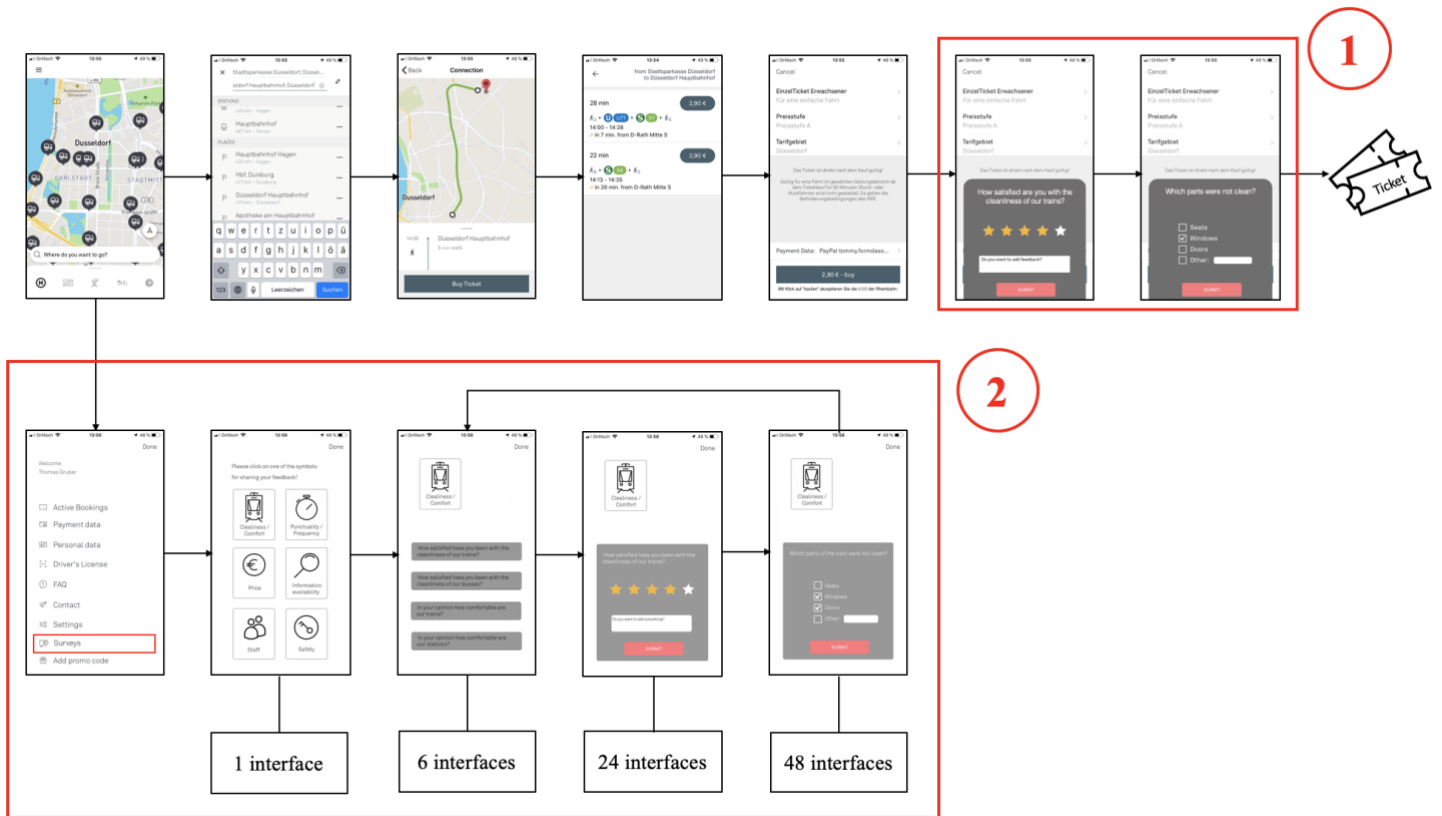

Figure 10 - App wireframe: Existing app flow plus added survey interfaces (red mark)

The following process describes the first use case in the app (see the red mark number 1 in figure 11). The app starts always with a map showing the region where the user is currently located. From here the customer can search a destination which leads to the routing. The app is suggesting several transport possibilities like public transporting, car sharing, bike sharing or ride hailing and how the user can travel to the desired destination. With the decision the customer is purchasing a ticket or ride. At this point, hence, after the user accepted the service and before the ticket or receipt is displayed, a survey question with underlying logic appears. The user is requested to reply to a simple and small question. In both cases the ticket or receipt is shown afterwards.

The second use case starts again with the splash screen and the map (see the red mark number 2 in figure 11). Here the user can choose proactively to answer questions by clicking on the survey button in the main menu. There the consumer can select between the clustered groups:

cleanliness/comfort, punctuality/frequency, price, information availability, staff and safety. Afterwards the user can choose between different questions within these groups. Behind each question the explained logic is underlying and with deeper follow up queries. In the end the user is led again to the question overview of one survey group to persuade him or her to answer more questions. An exemplary extrapolation gives information about the dimensions of additional app screens of the new feature. If six cluster groups with respectively four questions exist, then 79 additional app interfaces are necessary. Figure 11 explains why so many screens have to be included.

Defining the customer or user journey is crucial part of design thinking. The collected information from past or recent developments is taken and the journey is drawn as a map or wireframe as in Figure 10. After the documentation and sketching it is necessary to reveal the highlights or lowlights and recognize where user spends the most time in the app (Dr von Reventlow. Thesen. 2017. p. 25). Historical app developments and user observations demonstrated that user spends most of the time finding the right destination within in the app but the lowest termination rate is while purchasing a ticket. This is an additional reason why the survey questions appear during this stage to achieve a high response rate.

4.6.4 Design

The last setting which needs to be evaluated in order to build the prototype is the design of the survey. Here, the goal is to adapt the colours, shapes and fonts to the general app design. By using the survey tool creator, it is possible select any individual colour code. This is a great benefit to achieve a coherent user experience. In addition, the fonts are part of moovel's corporate identity that are also used in other areas of the app or on the website. Finally, adequate icons are selected, uploaded and placed at the right positions. In general, the same structure as in the rest of the app is chosen. Figure 12 on the next page shows the design elements in detail.
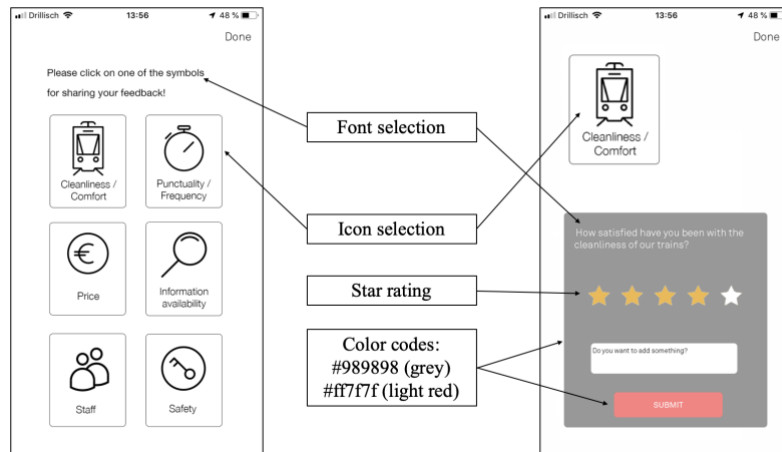
Figure 11 - Design elements of the survey feature in detail

The rating in the form of stars is selected since it is a commonly known evaluation design element as already mentioned in the benchmark analysis for the feedback forms of Uber, Lyft and Grab. As the analysis showed, users are aware of the meaning of a star rating due to the similar handling of star ratings in tourism and ecommerce.

An essential part of the design elements are icons, which are a visual representation of an object, action or idea. It is ensured that mainly universal icons are used, which are easily recognized by the users. The careful icon selection is very important for the user journey because troubles may appear when implementing commonly used icons with contradictory meanings. An apt example for instance are the star and the heart symbols. Both represent a positive attitude towards an object. In summary, icons are hard to interpret and may cause confusion. Therefore, it is recommended to add labels in form of a few words. Here it should be noted that the user needs to see the icon before the accompanying label. The usage of icons is a conscious decision because it provides some advantages enhancing aesthetic appeal and such as saving screen real estate, which means saving space on the screen (Babich. 2016).

After defining and evaluating all relevant settings of the survey feature the prototype is built with the aid of design and wireframe tools as InVision, Balsamiq, Sketch and Adobe Photoshop. In detail the prototype is a click dummy with focus on the survey tool. That means that it is a clickable version of the actual project but with limitations especially in the areas which are not part of this master thesis. Click dummies show parts of a user interface and contain interactive clickable elements, such as links or buttons. It is a valid concept to define and test customer journeys. Click dummies serve as interactive wireframes (Dr von Reventlow. Thesen. 2017. p. 50).

4.7   Testing: Finalization of the product

This chapter describes the testing phase of the prototype in form of a click dummy. For an accurate testing approach, it is fundamental to mention that the prototype is not representing the perfect product. It is expected that several errors or misunderstandings will occur, which then lead to ideas for improvements.

4.7.1   User testing

For validating or testing a prototype, Dr. von Reventlow and Thesen recommends inter alia, a method of user testing. With this method, potential customers are interviewed and observed while testing a product or prototype. Before, a number of tasks and the target group must be defined. In addition, an interview guide with questions should be prepared (Dr von Reventlow. Thesen. 2017. p. 54).

The goal of the testing is to find out how the user react on the included survey feature. As mentioned, the questions appear after the ticket purchase and can be found optionally in the main menu. Therefore, the task for the participants is to search for a ride and purchase a ticket for public transport, car sharing, bike sharing or ride hailing. These actions represent a common and regular task in the actual app out in the market. In addition, the testers are asked to answer additional questions in the main menu.

The next step is to define the right target. After much deliberation, it was decided to test it with two separate target groups. The first is a company-internal group in order to collect insights from people with an understanding in app design and user experience. The second group represents customers, which are people who live and/or work in cities and who are using public transport and/or other mobility solutions on a regular basis. Several usability articles define the number of five test participants for every target group as the ideal amount. Jeff Sauro is explaining this number by means of mathematical and stochastic arguments. There is an average probability that a user encounters an error during testing of 31%. This figure is based on binominal probability which shows the chance of achieving n successes in N trials. According to that it takes five participants to be 85% sure a problem will be detected. After crossing the threshold of five participants the issues that stay uncovered are increasing. The underlying fact of this calculation is that user experiences also overlap (Jeff Sauro. 2010).

Already, in the year 1993, Jakob Nielsen and Thomas Landauer explained this phenomenon mathematically and concluded that if more than five users are added to the number of

participants the same issues will be discovered again and again. The only exception to test with additional participants is when a product has several highly distinct groups of users, such as parents or children for example (Nielsen. Landauer. 1993. p. 208 – 213).

Finally, before the testing will be conducted, an interview guide with questions to the user experience has to be developed. The following questions are defined by walking through the customer journey and shall lead to further insights:

- What is your opinion about the placement when the questions are appearing?
- How satisfied are you with the questions themselves?
- How do you like the design?
- Do you think this is a useful feature?

As mentioned earlier, the first user testing is conducted by employees of moovel. The participants are randomly selected. The transcription of the testing can be found in the annex (test group 1).

Most of the feedback was concerned with the placement. For the majority of the testers, the time when the survey appears is not ideal. According to them it appears too early and disrupts the user experience. Additionally, the costumers do not have an opinion about the condition of the train or the car, yet. Some of the participants wished for an option to close the survey. One employee suggested to engage the users to take part in the survey after the ticket purchasing process. After a specific time users can be attracted through push notifications on the smartphone to answer a question and rate the trip.

Regarding the content of the questions, the majority of the testers are satisfied with the texts. According to them the questions are good, clean and intuitive. Two testers mentioned that the open text field is not necessary and should rather be presented as a comment box. One participant claimed that more general questions would be more useful, because an exact targeting on which lines are used is not possible.

The design received a mainly positive feedback. The star rating was praised because it was immediately clear what to do. According to one tester, the design fits to the rest of the app and provides a nice feeling. Only one participant criticised small design issues as that sometimes the icons are not centred or that the "back to the menu"-button in the end of the survey is not necessary. It should rather directly link back to the menu.

All employees agreed that the survey feature is useful and valuable to satisfy the customers and to improve the products.

The second user testing was conducted with people who represent the customers of moovel. The participants are randomly selected within this target group. The test took place in a public library in Berlin, Germany. The transcription can be found in the annex (test group 2).

Regarding the placement, the majority of the participants claim that it takes too long until the ticket is shown. Additionally, one person asked if it is necessary that also a follow up question is appearing. Another participant mentioned that the question is merely annoying when waiting for the ticket. One participant suggested the approach of Uber, where the survey is appearing after the ride or at the next start of the app.

For most of the participants the questions were clear and understandable. Only one participant mentioned that the questions are too vague. One person asked if questions for the other services also appear.

Regarding the design, one tester claimed that the black font on grey background is not clearly visible. While three participants liked the clean and simple design with the black icons on white background, one person mentioned that more colours would be desirable.

Finally, regarding the question if the testers find the feature useful, three were responding with a positive feedback, under the condition that it leads to improvements. Two persons were not convinced by the feature.

4.7.2   Prototype improvements

The insights of the participants of both test groups show the improvement potential for the prototype. With the help of the collected and precisely evaluated results of the tests, adjustments and changes are conducted. These are discussed and planned in the following paragraphs.

The participants' opinions show that the survey process takes too long and disrupts the user experience too much. A better appearance would be if the question and follow-up question is shown at once. In addition, the survey should appear at a later point of time. An adequate compromise is to show the survey after the ticket validity has been expired. It can be presumed that after this chosen time period the user is able to submit questions about his or her experience. In addition, push notifications are sent to the commuters' smartphone with the request to rate the trip. For a higher participation rate, incentives such as free rides or vouchers can be used as a short-term solution.

Furthermore, the open text field is replaced with a comments box. In addition, the learnings from the design aspects led to the decision to adjust the background colour so the questions are

more legible. The small design issues like centred icons and faster link routing will be conducted. The feedback of one tester to add more colours cannot be realized in order to keep the corporate identity and the same appearance in the other fields of the app.

The following screenshots in figure 13 show the new appearances of the survey after the start of the app.
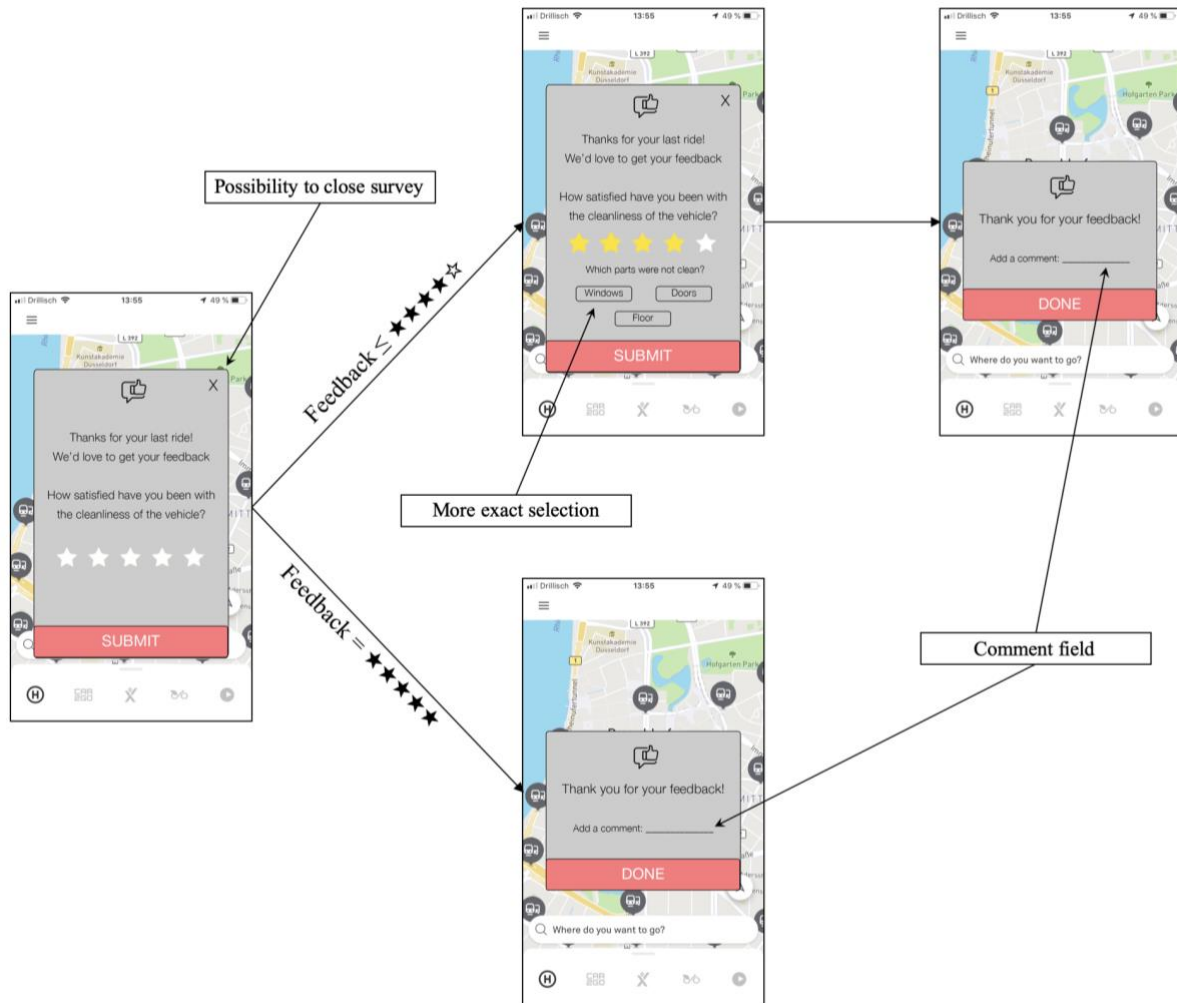

Figure 12 - Feedback form after starting the app

The survey is appearing after starting the app when a previously bought ticket is expired. The user can still rate with one to five stars. If one to four stars are selected, the follow up question appears in the same screens with a more exact selection related to the issue. After submitting, the customer can add a comment or immediately continue using the app. By selecting five stars the follow up question will be skipped. In addition, it is now also possible to close the survey to not annoy the users.

Finally, the prototype is fully finalized and can be implemented in the app. Therefore, every requirement is fulfilled and all the components are prepared. The project is handed over to the product development and engineering department, which is in charge for technical implementations inside of the apps. The author of the thesis and the marketing department is still functioning as consultants for the project.

5 Conclusion

The process and results of the project show how an established theory can be combined with a modern method and lead to an innovative approach of developing products or applications. By using on the one hand Ansoff's popular growth strategies about product development and on the other hand the contemporary concept of Design Thinking, the problem about the accurate and faultless implementation of moovel's survey tool is solved.

Of course, it is necessary to keep in mind that this master thesis describes the work approach from the marketing and operational perspective without technical details. This statement leads to the limitations of the master thesis. In order to not exceed the framework of this thesis, the technical side of the project, regarding development and engineering processes, is not considered. Anyway, in the end the project is finalized regarding content, placement and design issues.

Another limitation to mention is the difficult and problematic handling of sensitive data and company internal information. Therefore, it was carefully paid attention to not violate compliance regulations of moovel. To ensure this, internal details about the purchasing process of the survey tool, communications between moovel and its partners as well as marketing and operational measures are not part of this master thesis.

The thesis shows that Design Thinking is a valuable method to develop products, implement concepts or accompany projects. Especially the ideating and prototyping phase generate not only relevant insights but also an almost finalized result. In the testing phase based on of interviews or observations, appropriate information is collected which leads to improvements of the designed prototype.

In any way, in the opinion of the author, the approach and methods of Design Thinking are no completely new concepts. Actually, it represents a normal project process. It is common to start with research to educate oneself in the framework of different circumstances. Also, the ideation process with brainstorming or generating objectives is a usual approach. It makes also sense to build a first draft of an idea and to test it with the relevant target group.

Otherwise, and this is very important to mention, the concept of Design Thinking serves as a preconceived process with a rich collection of tools and methods to solve a problem. The steps of Design Thinking function as an orientation guide and consequently to increase the

probability of a smooth project operation. In addition, the partly innovative tools are providing new perspectives and ways of working.

Regarding the desired objectives of the projects it can be concluded that the new feature is completely set up and ready to be implemented. The goal to widen the product range of moovel is achieved and it is possible to sell additional services of user surveys and collecting costumer insights. The feature can be sold as a further product to partners like public transport agencies and contributes to the revenue increase of moovel. Furthermore, the results of survey campaigns lead to improvements of moovel's products like the app itself. The user feedback on the satisfaction level of the app or other products helps to locate errors and inaccuracies.

Finally, the author and the university explored an innovative way for developing product by combining growth strategies and Design Thinking. In addition, knowledge and experience about app business, urban mobility and digital marketing are obtained.

The survey tool is completely set up in the moovel app in the third quarter of 2019.

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Annex

Interview transcriptions

Interview 1 with Mr Daniel Hurrle (Senior Performance Marketing Manager of moovel)

Berlin, moovel Group GmbH Office, 21th January of 2019, 14:00 – 15:00

Interviewer: Thomas Gruber (G), interview partner: Daniel Hurrle (H)

G: Hello Daniel, thank you for your time to conduct an interview with me. As you know I am writing my thesis about the survey feature which we want to include in our apps. To define the requirements on the feature, I would like to ask you some questions. I am writing the thesis from a marketing and operational view, so we do not need to discuss technical details. But let's start easy. Since when are you working for moovel and what is your position?

H: Hello Tommy, I am working now already for almost three years for moovel and since the beginning I am in the Berlin office. As you know we also have offices in Stuttgart and Hamburg in Germany. I am working in the marketing department where I am responsible for performance marketing. That means I have a look on all figures and KPIs within our digital marketing campaigns. So, for example I measure how successful a Facebook campaign is in terms of installs or bookings.

G: Interesting! How is this possible that you can see if a user clicked on an ad and installed afterwards the app or even booked a ride with it?

H: That is not that easy to explain, but let's say it is like this: By means of anonymous device IDs we are able to track if a user saw or clicked on one of our ads. This is called device fingerprinting. By using publicly available attributes of a device it is possible to create a user's fingerprint. With this technique we can identify people who have interacted with our ads. Interactions from users can be impressions, clicks or events as bookings, creation of an account or trip searching. With these integrations from the social media channels we can easily track campaigns.

G: Okay makes sense. Let's talk about the planned survey feature which we are implementing in our apps. What is the reason for this step?

H: We have two use cases with the survey feature: First we can use it to enhance our apps. With the users' insights we see if there is potential for improvements. And second, the feature inside our apps is widening our product and service range. With the new feature we can offer an additional service to our customers. In the best case we are collecting user insights which we can offer after a specific period to the public transit operators. With these data they can improve their products and services as for example the cleanliness of the trains or trams. It is cheaper to conduct a survey on the users' smartphones during the ticketing process than send some people into the trains and ask the commuters directly. And we can segment them easier and more specific. For example, if someone searched for the line A, we can ask her or him how punctual the train was.

G: So, it is like an immediate feedback tool. What are the requirements on the tool? What should it contain and what it is to consider?

H: First of all, it is very important to make sure that the implementation is GDPR (editor's note: General Data Protection Regulation) conform. GDPR is an EU regulation about data protection which came into force last year. It proscribes the protection of users' data and where information can be stored. Therefore, it is an EU law we need to find a partner company for the tool which stores the collected data in a country in the European Union. Thereby we cannot only trust the partners statements, we have to test if it is really GDPR conform.

Second, we have to make sure that the new feature is not affected the existing user journey inside an app in a bad way. Therefore, it is essential to find a placement where a survey question appears and it is not disrupting the smooth process of ticketing for example.

G: How is the approach there? How do you make sure that the process is still smooth and is not annoying for the customer?

H: Therefore, a lot of testing is required. Our product department is sketching the user journey inside the app and run through a prototype, the beta version, over and over again. A good concept hereby is Design Thinking. There you go through a "sprint" with prescribed phases and in the end, you have the final version of the app.

G: Previously we talked about the requirements on the survey feature or tool. Let's continue there. You mentioned already the data protection and the user journey. What else is important?

H: Yes, the third important point is the messaging or wording. Thereby, I do not only mean the survey question itself but also the possibility to send the user a push notification on his or her device to engage the user. Push notifications are a nice feature to bring the user to an action or to inform him about something. So here we have to think about how the message looks like and to which time point we sent out the notification. The notification we sent out with another program. Therefore, an integration possibility is important.

Another important aspect is the layout and design of the feature. As you know we serve several PTOs with an app each. So, we have to adapt the feature in every app on the respective brand colour and font. When it comes to design, I also want to mention logic. It would be nice if the tool is so smart that different questions are displayed depending on what was answered before by the user. So, for example a user submits a negative answer to the questions after cleanliness. Afterwards the question should follow, which part was not clean.

For us it is also important that the partner provides a dashboard or similar to evaluate the gained insights. It would be nice if the data is already shown in a diagram. So, we do not have to download all data and create an analysis by ourselves.

The last important point is the segmentation. We can segment users after actions or events they conduct in an app. So, for example, searching a trip, booking a ticket, creating an account. The things I already mentioned. Based on these events we have to think about which users to we want to ask questions. For example, when it comes to cleanliness or safety it will be interesting if there is a difference between day and night. Or due to geo targeting it is possible to find out which train lines are rated poor.

G: Okay after we defined the requirements, how would you start now to find the perfect partner who can provide this kind of tools?

H: We should start with a classic market research and compare some software suppliers. Based on the requirements we may be able to find a selection of five or six partners. To narrow it down we should have some calls with them and discuss what the possibilities are. Of course,

the price is also a main factor. Before we make a decision, we should arrange a demo or tour through their software. Then we have a look and feeling if it fits our needs.

G: After we selected an appropriate partner and tool. How do we start to build it in our apps?

H: After a legal check we procure the service. For implementation, we work together with the product department. The colleagues normally follow the steps of Design Thinking which usually guarantees a smooth implementation. However, intense testing is required in the end.

G: Once it is implemented then we can offer the service to the PTOs. How do we proceed here? How does the introduction of an additional service look like?

H: Therefore, we have to distinguish between already existing and new customers. Existing customers we can easily approach when we for example report the performance of campaigns. Then we have to show the customer the benefit of the service which are the insights and behavior of their user, opportunities of improvements or market information about their products.

When we are reaching out to new potential customers, we will include the service into our pitch. Next to our already applied services it complements our offer.

G: Okay I think that's it from my side. Thank you very much for your time and participation. Now we can start with the project to find and implement the perfect tool.

H: Sure! You're welcome.

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Interview 2 with Ms Miriam Steckl (Design Thinking Coach at HPI Academy in Potsdam)

Berlin, Kaffeebar, 25th January of 2019, 10:00 – 11:00

Interviewer: Thomas Gruber (G), interview partner: Miriam Steckl (S)

G: Good Morning Miriam, thank you for conducting an interview with me. I asked you for this appointment because I am working currently on my master thesis with the topic product development in app business. At moovel, we are working with the modern concept Design Thinking. I chose you as interview partner because you have a hands-on insight about this topic. I am really happy that you want to share your knowledge with me for my master thesis. Let's start easy: Could you please explain your daily routine at the HPI Academy?

S: First of all, it is essential to know that the HPI teaches the method of Design Thinking, which was developed in the Stanford University in California, to students and professionals. The goal is to improve an existing process and to gain more creativity and innovations inside a company. As a coach, my job is to guide interdisciplinary teams through the iterative process. My goal is not only to make the participants experience Design Thinking but also to empower them to use different methods in their own environment.

G: Methods? – You are speaking of Design Thinking in plural? So, it is not only one method?

S: No, definitely not! In my opinion Design Thinking is a mindset and holistic approach towards more user-centric solutions. Usually Design Thinking is taught as a six-step process from understanding to the final solution. In each step there is a pool of different methods which help to solve the challenge.

Let's continue with my daily routine: We organize, manage and iterates Design Thinking workshops which take at least three days. On the first day, we usually teach the basic principles, on the second day we go through the Design Thinking process by working on a case study. On the last day the participants work on own challenges of their company. In the end the participants present their solutions to the audience.

G: Are they participants coming only from Berlin and from the surrounding area?

S: No of course not! The participants come from all over the world and all kinds of industries. That is the good thing about Design Thinking. It can be applied in every business but also life situation. Since I have learned the concept, I am applying it on a regularly basis in my day to day life. For example, when I think about birthday presents, I follow this approach.

G: That's surprising! How did Design Thinking change your work attitude?

S: Oh, it changed tremendously. Before when coming across a problem at work I immediately started thinking about solutions, which in my opinion would fit to the problem. There is a wrong conclusion, that as an expert you would have the right idea for each hurdle. Design Thinking, first of all, investigates into understanding the problem deeper. I often realized that behind the initial problem was underlying another, deeper cause. That could only be discovered through the user him or herself.

G: Ah okay, these are some interesting insights. Before, you talked about a six-step process. What are these steps and how do they look like?

S: Before the process starts off, there has to be a framed challenge, that is precisely describing the topic that you are dealing with. It usually contains the words "Redesign a … experience, in a world where…". The process then begins with the "Understanding" phase, in which it is all about getting to know the field and stakeholders that have something to do with your challenge. It is like drawing the lines of your football field in which you want to play. Secondly, there comes the "Observation". That means getting to know your user more in depth. It can be immersing into the situation of the user, observing behavior or even getting in contact and interviewing. During this phase you are on the lookout for interesting and surprising insights that you have not thought off before. After "Observation" comes "Synthesis", which is the phase of connecting the insights into one "Point of View", that represents the need and view of a specific user. You try to narrow down all the information and create a so called "persona". Next, the process opens up again in the "Ideation" phase. I love that phase, because wild ideas are encouraged. Afterwards, Design Thinking makes you prototype one or more chosen ideas. "Prototyping" is therefore a way to make concepts, services or even products tangible – in high or low resolution. Lastly, you should go out and test your ideas. Ideally with your target group, so the user you have in mind. But as I mentioned, Design Thinking is a very iterative process,

so not at all linear. If a team realizes, that they went into a wrong direction or hit a wall, they immediately go back in the process to continue at the point that needs some more work.

G: At moovel, we are working currently on a project, where we want to include a new feature in of our apps. For me this step, can be seen as a typical business growth method because we are widening our product range. I had the idea to combine the normal product development approach with the concept of Design Thinking. What do you think about this idea?

S: Obviously I support that idea. As the app is a product that is directly in contact with your user, I think there is no better way than designing it in a user-centered way. We often say, "the shoes of your user are the best source of inspiration". And, I think Design Thinking helps to come up with more creative power than you would have usually in the team. As you try to go out testing with prototypes as early as possible, I my opinion that would be a good approach to try to precisely implement a feature that is not only viable and feasible, but more so usable for the end-customer.

G: When you talk about understanding or observing the problem. How do you start here? For example, our customers are mainly transit agencies in different cities. Normally, when they want to achieve user insights as customer satisfaction, they go on the train station platforms and ask several commuters about their opinion.

S: Yes, getting directly in contact with them is never a bad idea. It is often underestimated how much you can get out of just a regular interview. But I would also support to just observe the behavior of people, or even immerse yourself and your team into the situation. What the most important thing is to build empathy to the user. To know their journey, normally we draw and visualize it for internalization. What drives the user? What are the motivations and needs? And do not forget to get in contact to extreme users. Also, maybe you find interesting insight in a context that is related to yours, but you do not necessarily think about. How about the airport? Or a hospital, how do people find their way in that environment?

G: As you mentioned before, in the ideation part great ideas are developed. We are working in teams out of 5-6 people. What would be a good method for us to come up with some great ideas?

S: Well, the first method you would think about is obviously brainstorming. But as Design Thinking wants to encourage wild ideas, I often have the feeling that in regular brainstorming the ideas are also just in the same train of thought that we usually think in. I try to put on other glasses or perspectives first. I think about, how Barack Obama would solve the challenge. Or I take a walk outside with my team to have fresh air. It is actually scientifically proven that in mild motion creativity is being increased. And we have the principle of quantity over quality here. Just try to have as many ideas as possible. A fun method is the "hot potato", where you have an object in the hand that you think is "hot" and you have to say an idea as soon as possible to be able to hand the object to the next person. Another case is that the ideas of others can inspire us. So, you all take a piece of paper and begin with your first thought, then pass it on to the next person that tries to build on it. All in all, ideation is about having fun and not yet think about the feasibility or implementation of an idea.

G: In the prototype phase we would like to create a test version of our desired feature, like a beta version. Do you have any recommendation how we can create such a prototype without missing out important points?

S: To be honest, you will never be able to build the perfect prototype that doesn´t miss anything. But that is why you build a prototype right? To get onto the streets, get feedback and realize what is actually missing. A common mistake is to build very high-fidelity prototypes, that means prototypes that are almost ready to hit the market. You put a lot of effort and work into it and then realize that the customer actually doesn´t want it at all. My suggestion would be to just build it, it could even be one out of paper that has just been sketched and ask for feedback. I always make sure that before you build the prototypes you are sure about what exactly you want to test. Think about the testing scenario or the part of your solution that is crucial. And then build a prototype that tries to just tests a very certain aspect.

G: In the test phase one is applying the discovered solution for the first time in an environment outside its group of developer. In our case, how would you proceed? A reminder: our prototype will be a feature inside an existing app.

S: I would first and foremost be sure about what the most important functionality of this feature should be. And then think about how you could test it in many different ways. Use easy, quick and cheap tools in prototyping. It could be just doing interviews and asking for an opinion. It

could be a clickable dummy that you test on the streets with a phone. A very far developed prototype would be to put it in the existing app and then let possible user come to test it and give feedback. In general, there are many ways to test. But I think you should really let the user have a voice here and try to iterate based on what has been said. Use it basically as a decision accelerator that helps you move further.

G: I can imagine that the implementation part is the most difficult one. What is the best way to introduce the final product inside an existing company? Colleagues as well as clients have to rethink and be convinced by the new situation.

S: When it comes to the customer, I hope that with the approach of a user-centered design you will fill the gap of an need that speaks for itself. There should not be any questions of whether it is useful for the customers. And then I would say: tell your story in a learning journey. You will most likely grow in your smartness during the process, so share what you have learned. As in the "Synthesis" phase, you might have created a persona, or more, that has a specific need. When you present that not only to your colleagues but also your clients and the persona is so real and relatable in what you have found out, I would say you will convince them.

G: Okay that was already a lot of input. Thank you therefore! Do you have any more tips or recommendation in general what is important in Design Thinking?

S: I just want to state again, that Design Thinking is not only about the process. The people and the place will be as essential. Try to have a team around you with many different perspectives on the development of the feature. And have a mindset of learning and failure together. Lastly, the place where you will come up with your solution. Try to find a place that inspires you, try to go out and talk to people. Inspiration lies everywhere, not only while you are hardly thinking about the possible best idea at the desk in your office.

G: Very interesting! So again, thank you very much about you time and commitment for my interview. I wish you all the best!

S: You are welcome. Thank you too!

<u>User testing</u>

Interviewer: Thomas Gruber (G)

Test group 1 – internal

with five moovel employees. 26th March 2019, moovel Group GmbH Office Berlin, Germany.

<u>Person A</u>

31 years old, living and working in Berlin, using public transport every day.

G: What is your opinion about the placement when the questions are appearing?

A: Information is missing if I already purchased my ticket yet. Maybe it is better to show it after the ticket purchase or at the next start of the app. For me the open text field in the feedback form is not necessary. In the end I would add to "Thank you for your feedback" also something like "We value your feedback." or "We take it serious!"

G: How satisfied are you with the questions themselves?

A: Questions are good, but I would ask more in general. Not specifically after line A. It is not easy to target the commuter. More after trains in general.

G: How do you like the design?

A: Design is very nice. Sometimes more icons would be cool. So, you can show that it is about cleanliness on the windows or doors. The back to menu button in the end is not necessary in my opinion. We can immediately show the menu again.

G: Do you think this is a useful feature?

A: Yes.

<u>Person B</u>

32 years old, living and working in Berlin, using public transport almost every day.

G: What is your opinion about the placement when the questions are appearing?

B: The placement appears too early. I just want to see my ticket and not answer questions during the process. Maybe the appearance at the next of the app start is better.

G: How satisfied are you with the questions themselves?

B: Questions are clear and intuitive to answer.

G: How do you like the design?

B: I like the design. The icons are nice.

G: Do you think this is a useful feature?

B: Yes.

Person C

40 years old, living outside Berlin but working in the city, using public transport almost every day.

G: What is your opinion about the placement when the questions are appearing?

C: In my opinion should the ticket be shown immediately. Maybe it is a better solution to show the survey afterwards.

G: How satisfied are you with the questions themselves?

C: The questions are good, simple and intuitive. It is good to keep the questions as easy as possible. The star rating makes sense and everybody know how it works. The text field is not necessary. I would not answer it.

G: How do you like the design?

C: The design looks good, modern and fits to the rest.

G: Do you think this is a useful feature?

C: Yes.

Person D

29 years old, living and working in Berlin, using public transport very often.

G: What is your opinion about the placement when the questions are appearing?

D: It is not good, because I do not know yet how the train looks like. Maybe it is clean, maybe it is dirty. I would close the question but the X is missing. At this point the survey it is too annoying and disruptive.

G: How satisfied are you with the questions themselves?

D: The questions are good and easy to understand.

G: How do you like the design?

D: The icons and the order are nice, but sometimes the icons are not centred.

G: Do you think this is a useful feature?

D: Yes.

Person E

31 years old, living and working in Berlin, using public transport every day.

G: What is your opinion about the placement when the questions are appearing?

E: There is no information about where I can find my ticket. In addition, it does not make sense to answer the question before the ride when I do not have an experience yet. I would close the survey, because it is annoying. What about push notifications after some time as 2 minutes for example? Maybe an incentive makes sense as well.

G: How satisfied are you with the questions themselves?

E: The questions are easy to understand and intuitive.

G: How do you like the design?

E: The design is good and the star rating is easy to understand. The text field is not necessary. I would rather prefer a quick handling.

G: Do you think this is a useful feature?

E: Yes.

Test group 2 – external

with five random people who represents moovel's customer. 27th March 2019, Zentral- und Landesbibliothek Berlin, Germany.

Person A

29 years old, living in Berlin, using public transport almost every day.

G: What is your opinion about the placement when the questions are appearing?

A: Okay. But it is a bit annoying that it takes so long until I receive my ticket.

G: How satisfied are you with the questions themselves?

A: Good. They are clear and understandable.

G: How do you like the design?

A: The black font on grey background is not clear to read sometimes.

G: Do you think this is a useful feature?

A: When the conditions in the trains are improving yes.

Person B

23 years old, living and working in Berlin, using public transport every day.

G: What is your opinion about the placement when the questions are appearing?

B: I do not like it. Why are two steps necessary? How often is the question appearing?

G: How satisfied are you with the questions themselves?

B: For me the questions were a bit vague and not that clear enough.

G: How do you like the design?

B: Clean and not disrupting. I like the icons.

G: Do you think this is a useful feature?

B: Yes.

Person C

34 years old, living outside Berlin but working in the city, using public transport almost every day.

G: What is your opinion about the placement when the questions are appearing?

C: It is annoying that I cannot see my ticket immediately. I mean I book straight before I enter the train. I do not have time to answer questions.

G: How satisfied are you with the questions themselves?

C: It makes sense to ask these questions.

G: How do you like the design?

C: Simple design. Nothing special.

G: Do you think this is a useful feature?

C: No.

Person D

26 years old, living in Berlin, using public transport often.

G: What is your opinion about the placement when the questions are appearing?

D: I would not answer it. I would cancel the survey. I like the approach of Uber where the questions appear afterwards.

G: How satisfied are you with the questions themselves?

D: Is it also possible to ask questions for the other services?

G: How do you like the design?

D: It is convenient and clear. That is good.

G: Do you think this is a useful feature?

D: In some cases, yes. But not if it is appearing every time.

Person E

20 years old, living and working in Berlin, using public transport every day.

G: What is your opinion about the placement when the questions are appearing?

E: I would prefer it appears after the ticket. Or when I can answer it to a later time point.

G: How satisfied are you with the questions themselves?

E: Easy and understandable.

G: How do you like the design?

E: I do not like the font. And it is to clean in general. More colours would be nice.

G: Do you think this is a useful feature?

E: Yes. I can contribute to improve the trains in the city.