The improvement of the UI and UX of a mobility App

based on the feasible functional and technical developments of the Company

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Practical Information

Title

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Summary

The objective of the research was to provide the company with a feasible redesign of the user interface and user experience of their mobility App, taking into account the technical and functional developments of the company. The research focused on identifying the relevance of selected developments and exploring the opportunities these developments provide for the company and their user. The method used is a combination of quantitative research and iterative design research. A method has been developed which allowed to quantifiably determine the relevancy and feasibility of a development for the company. The output was used to develop a set of solutions through which the selection evolved into a final prototype.

The developments were identified by analyzing the company and the documentation provided by the company. The documentation gave insight into their vision, their ambition, the current and planned developments. Different developments taking place in the electric mobility sector have been found. Company meetings gave further insight into how the company functions and how the developments should be interpreted. Background literature gave insight into the relevancy of the developments in the mobility sector. The App has been analyzed to identify problems and the current state. The target group analysis and stakeholder analysis gave insight into the users of the involved parties.

After the initial analysis, developments have been selected which showed an interaction with the user through the App. The developments have been further defined through A SWOT analysis which identified the potential opportunities of the developments and a function analysis revealing the functions needed to integrate the development into an App. To identify the most relevant and feasible development from the selection of developments, a method has been developed referred to as “function comparison”. The function comparison compared the functional requirements of the development against the functional requirements of the current App. This resulted in a matrix showing which functions were shared amongst the developments and which were not. By applying set theory, the differences and the similarities have been quantified into matrices.

The function analysis revealed the most relevant and feasible development to be integrated into the App. Also development themes have been identified revealing potential future roles of the mobility App and verifying the choice if the feasible and relevant developments.

Parallel, to the conduction of the function comparison, user requirements have been identified. This has been done by analyzing the user problems to identify user needs. Needs have been found by analyzing the support documentation provided by the company and communicating directly with the company. Combining these user needs with theory on design guidelines, resulted in establishing user requirements. The user requirements have been combined with the functional requirements of the previous identified development, resulting in the list of requirements for the further development of the redesign.

From the function comparison two developments have been found as the most relevant and feasible developments for the App. They showed equal relevance and high flexibility for the company. Four concepts per development were developed showing different solutions for the integration into the App. From these eight concepts, three were selected through the validation against the list of requirements. The three chosen concepts were further developed in such a way that they could be combined and integrated into the existing redesign of the App. The result of the design process was a prototype which facilitates an increase in the guarantee for mobility; an increases in the utilization of the vehicles; streamlines the charging experience and exposes more people to the company brand to increase the companies impact on mobility behavior.

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Introduction

GoodMoovs is a mobility platform. GoodMoovs provides vehicles to organizations, individuals and companies which are used to fulfill their mobility need in a sustainable way. GoodMoovs is not just another car-sharing platform. As the name suggests, there is an emphasize on the way a mobility need is fulfilled. It needs to be good. GoodMoovs wants to change the mobility behavior of people and wants to encourage people to move around sustainably. It is doing this by providing electric bikes and electric vehicles to its users through a sharing platform. This way the cost for mobility gets reduced and vehicles can be used more efficiently. Users access these vehicles through an App GoodMoovs developed. The App can unlock and lock the vehicle. It gives users also access to support resources through which users can be assisted in using electric mobility effectively. GoodMoovs is aware of current developments taking place in the mobility sector. They keep improving and evolving their service to provide the best user experience they can offer. The next step is to improve the user interface of their current GoodMoovs App. This gives them also the opportunity to introduce new features to the GoodMoovs community, which will enhance the experience of their service. GoodMoovs has several developments in mind. The developments need to be explored to find relevant functions and interesting opportunities for the future.

Research Objective

The objective of the research is determined as follows:

> To provide GoodMoovs with insight and solutions into how to improve their App that is part of their product-service system from a functional and technical perspective. It aims at identifying relevant technical developments and how these developments can be effectively implemented in the App in such a way that it will contribute to the improvement of the overall user-experience.

Research Questions

To fulfill the research objective a main research questions has been derived from the objective. This main research question has a guiding role in selecting relevant resources and methods for the research (Peffers et al., 2007). The main research question is formulated as follows:

> **Main research question**
> What is a feasible UI/UX redesign of the GoodMoovs App that considers the technical and functional developments of the company?

Central research questions will be used to answer the main research question and define the scope of the research. The central research questions are focusing on different aspects of the research context. Four central research questions have been established:

> **First central research question**
> What is the current state of GoodMoovs with regards to its technical and functional developments and its App?
>
> **Second central research question**
> Which technical and functional developments are relevant for the integration into the redesign of the App?
>
> **Third central research question**
> What are the requirements for the redesign of the GoodMoovs App taking into account the relevant developments and the user requirements?
>
> **Fourth central research question**
> What are possible solutions to integrate the relevant technical and functional developments into the redesign of the App?

Research Methodology

The research methodology describes the method that will be used to answer the research question. The research will be conducted in different phases, in which the different central research questions will be answered. In the last phase the answers of the research central research questions will be used to answer the main research question. Each phase has a different focus to identify relevant knowledge. Answers found in the previous phases will be used in the subsequent phase. This knowledge will then be combined into one solution and used to answer the main research question effectively. This methodology is based on "the road-map of product design" by (Eger et al., 2013) and on "A Design Science Research Methodology for Information Systems Research" by (Peffers et al., 2007).

Phases

The research is conducted in 7 phases. In the first four phase different central research questions are answered. In the last phase the answers of the central research questions will be used to answer the main research question. The phases are as follows will be described in this phase:

- Phase 1 Problem definition
- Phase 2 Define the objective
- Phase 4 Demonstration
- Phase 5 Prototype evaluation and recommendations
- Phase 6 Research evaluation
- Phase 7 Conclusion

Phase 1 Problem definition

The first phase answers the first central question. Answering this question, will identify the current problems regarding the GoodMoovs App. It is important to understand the context of the problem. Therefore, it will be looked at GoodMoovs as a company to understand the objective of the company, the functioning of the company and the technical developments they are working with and interested in. The App will be analyzed as well to understand who their users are, what functionalities and interactions current App realizes and what difficulties current users perceive.

The following central research question will be answered in this phase:

> **First central research question**
> What is the current state of GoodMoovs with regards to its technical and functional developments and its App?

Accordingly, sub research questions (SQ) have been setup that indicate the focus of the central question above. These sub research questions are:

> 1.1 What is the vision of GoodMoovs?
> 1.2 What are current developments of GoodMoovs?
> 1.3 What are planned developments of GoodMoovs
> 1.4 How can the current user of the App be described?
> 1.5 Which functionalities can be identified in the current design of the App?
> 1.6 Which interactions can be identified in the current design of the App?
> 1.7 What are difficulties currently perceived by the user in the App?

To answer the sub research questions above, different methods will be used to gather the necessary knowledge and thereby answer the central question too. These methods are:

A) **Company meetings** - To get a better understanding of the company, the company will be asked directly. The founder and CEO of the company will provide the necessary and requested information. More insight

can be gained on certain topics by asking questions. The company works closely together with a research-group at the University of Twente, this group can be asked questions as well, regarding technical and functional developments the company is working on. This method is used to answer SQ1.1, SQ1.2, SQ1.3, SQ1.4 and SQ1.7.

B) **Desk research** - The company and the research group can provide literature and other resources, such as company-documents, that provide the necessary information. This information can be used to gain insight into the objectives, goals, developments, and strategies of the company. Other literature can be used to gather relevant information to answer the research questions and for background knowledge. This method is used to answer SQ1.1, SQ1.2, SQ1.3, SQ1.4, SQ1.5, SQ1.6 and SQ1.7.

C) **Stakeholder analysis** - A stakeholder-analysis will help in understanding the context of the problem and identify the involved parties. This method is used to answer SQ1.4

D) **SWOT-Analysis** – A SWOT-Analysis will be used to identify strengths, weaknesses, opportunities, and threats of the GoodMoovs App. This method is used to answer SQ1.5, SQ1.6 and SQ1.7

E) **Analysis of the GoodMoovs App** – Through hands-on testing, the App can be analyzed thoroughly. Also, through a demo-account, the functions can be tested from a user perspective and the different interactions can be identified. This method is used to answer SQ1.5, SQ1.6 and SQ1.7.

Phase 2 Define objective for solution

The second phase is dedicated to identifying which developments are most relevant for the App and what requirements are needed to integrate these developments into the App. By analyzing the current and planned developments it can be explored what opportunities these developments provide for GoodMoovs and whether they should be integrated into the App. A functional analysis will be used to identify the functions that are facilitated by the development. Additionally, a SWOT-Analysis will be conducted to identify potential strengths, weaknesses, opportunities, and threats of each development. With this information the functions of the developments will be compared to each other and to the GoodMoovs App. From this, functional requirements can be identified for the redesign of the App and relevant developments as well. Technical and functional requirements should be identified that also take into the account the user's perspective and needs on the problem. The problems identified in previous phase will be used to create user requirements. The functional requirements and the user requirements will be combined to create the requirements for the redesign of the App.

The following central questions will be answered in this phase

Second Central Question

Which technical and functional developments are relevant for the integration into the redesign of the App?

Third Central Question

What are the technical and functional requirements for the redesign of the GoodMoovs App taking into account the relevant developments and the user?

The sub-questions are:

2.1 Which current and planned developments are interacting with the App on a system level?
2.2 What are the potential strengths, weaknesses, opportunities, and threats of those developments?
2.3 What functions do these developments provide and how are they facilitated?
3.1 What are general design rules for the user experience in user interfaces?
3.2 Which requirements can be identified when looking at the user needs?
3.3 Which requirements can be identified when looking at the relevant developments?

To answer these sub-questions the following methods will be used to gather the necessary knowledge:

A) **Company meetings** - In this phase it also important to talk directly with the company about the future technical developments and get a better understanding by taking interviews. The company

will also be given the chance to indicate preferences and share their perspective. This method will be used to answer SQ2.1, SQ2.2, SQ2.3, SQ2.4 and SQ3.2.

B) **Desk Research** – The research-team previously mentioned can give insight on how the system works since they work closely with GoodMoovs. Literature provided by the company gives more insight into the developments themselves. Design rules can be identified which will be of used for the redesign of the App. This method will be used to answer SQ2.1, SQ2.2, SQ2.3, SQ3.1 and SQ3.2.

C) **Function Analysis** – The function analysis will be used to describe the functionality provided by the development and identify the functions facilitated by the development. This method is used to answer SQ2.3.

D) **SWOT-Analysis** – This method will be used to analyze the current and planned developments and discover the potential strengths, weaknesses, opportunities and threats these developments have. The SWOT-Analysis serves as a first impression of the opportunities these developments provide. This method will be used to answer: SQ2.2.

Phase 3 Design and Development

In the third phase the requirements of the previous phase will be translated into solutions. The result of this phase will be a set of solutions that can be developed into tangible solutions. Of the found solutions, one or two solutions will be selected as being the most relevant and feasible development for the company. This development will be translated into a prototype in phase 4.

The following central question will be partially answered in this phase:

> **Fourth Central Question**
> What are possible solutions to integrate the relevant technical and functional developments into the redesign of the App?

The following sub-questions have been determined to answer this central question:

> 4.1 How should the redesign of the App facilitate the functions of the redesign of the App?
> 4.2 What information is needed from other systems to facilitate the functions of the redesign of the App?

To answer these sub-questions the following methods will be used to gather the necessary knowledge:

A) **Company meetings** – The meetings with GoodMoovs will be held to receive input on the solutions presented. What has been mentioned previously about these meetings applies here. This method will be used to answer SQ4.1 and SQ4.2.

B) **Ideation** – Ideation will be used to find different solutions for the developments. It will be an iterative process. This method will be used to answer SQ4.1.

C) **Desk research** – Desk research will be used to collect background-information and discover potential solutions. This method will be used to answer SQ4.1, SQ4.2 and SQ4.3.

Phase 4 Demonstration

In the fourth phase a static prototype will be developed to demonstrates how the most relevant proposed solutions from the previous phase can be translated into a tangible solution. Through an iterative process, suitable solutions will be developed. An existing design provided by GoodMoovs will be taken as a guideline. It is important that the solutions found in the previous phase will be visualized in such a way that they speak the same design-language as the prototype of GoodMoovs. The design provided will be revised with the relevant functional and technical requirements in mind. This phase will also focus on giving an advice on how the development of the redesign of the App should be taken up into the current technical development roadmap of the company and what aspects should be taken into account when turning this solution into a final product. Therefore, this phase will give the final answer to the fourth central question:

Fourth Central Question

What are possible solutions to integrate the relevant technical and functional developments into the redesign of the App?

In this phase the following sub-question will be answered:

4.3 How does the redesign of the GoodMoovs App affect the existing redesign?
4.4 What steps should the technical development roadmap include to realize the changes made to the UI/UX of the redesign of the GoodMoovs App?

To answer these sub-questions the following methods will be used to gather the necessary knowledge:

A) **Ideation** – Ideation will be used to find different solutions for the developments. It will be an iterative process. This method will be used to answer SQ4.3.
B) **Desk research** – Desk research will be used to discover potential solutions and collect background knowledge. This method will be used to answer SQ4.3 and SQ4.4.
C) **Existing redesign of GoodMoovs App**– A proposed design for the GoodMoovs App will be used to form the basis of the redesign. The Design will be compared with the current functionalities for the GoodMoovs App. This method will be used to answer SQ4.3 and SQ4.4

Phase 5 Prototype Evaluation and recommendations

In the fifth phase the proposed design will be evaluated based on the requirements and the UI guidelines setup in phase 2. Recommendations for the redesign will be given.

Phase 6 Research Evaluation

This phase will discuss the limitations of the research and provide advice on the topics that should be further researched. It will also reflect on the execution of the research.

Phase 7 Conclusion

In the last phase the conclusion of the research will be given, and the main research question will be answered.

Research Framework

A research framework has been created to schematically represent the objective and the steps required to achieve this. (Verschuren & Doorewaard, 2010).

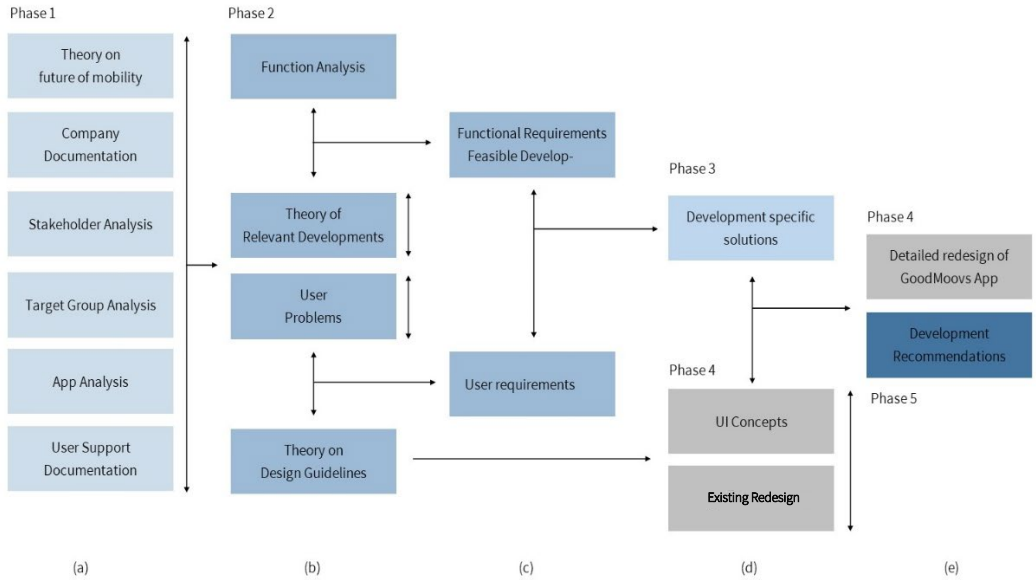

Figure 1 Research Framework

(a) By analyzing the company's documentation about their development and support issues insight will be gained into the problem context. Different analysis will gather useful information important to understand the problem and to understand the context in which this research will be conducted.
(b) The gathered data will lead to identifying relevant developments the company wants to further explore and the user problems users are facing. Theory on design guidelines wil be gathered to understand how to design efficient user experience in interactive systems. The function analysis will lead to understanding the identified developments.
(c) The theory and analysis will lead to identifying feasible developments together with their development requirements. The user problems can be translated into user requirements by using the theory on design guidelines. The functional requirements and the user requirements can be combined into a list of requirements to effectively integrate the feasible developments into the design of the App.
(d) Development specific will be developed as well as UI concepts which show how using the design provided found solutions can be integrated into the design of the App.
(e) The most suitable solutions can be selected and integrated into a final design of the GoodMoovs App. Recommendations will be given on the development of these solutions.

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