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Bachelor Thesis

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on the subject

Design, Piloting, and Evaluation of an Expert Finder System Prototype for Enterprise Organizational Structures

by

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Contents

List of Figures

List of Abbreviations

EFS	Expert Finding System
DTT	Deutsche Telekom Technik GmbH
T-FOPS	Field Operations Mobile
T-FOBIZ	Business Operations
T-FOC	Field Operations Mobile CORE
T-FORN	RAN Norddeutschland
T-FORS	RAN Süddeutschland
T-FOBOD	Digital Unit
T-FOBOS	Operations Support
T-FOBOT	Temporäre Mobilfunkversorgung
F-FOBOV	Vergabemanagement
NLP	Natural Language Processing
AI	Artificial Intelligence
UI	User Interface

1 Introduction

1.1 Background

Expert finding is an important asset especially for big corporations, as it can boost efficiency and lower the barrier of entry for new employees.

In the context of this thesis, an (Expert Finding System (EFS)) is defined as a specialized system, designed to help employees identify and find:

- Individuals with specific expertise, skills or responsibilities
- Relevant topics and information
- Workflows to solve specific concerns

In addition the (EFS) is characterized by:

- An AI search to match the user's query with the most relevant results
- A user interface that is intuitive and easy to use
- An administration and maintenance system that allows the administrators to manage the data and the users to report changes and errors in the data

First appearances of EFS can be traced back to the papers "Enterprise expert and knowledge discovery" (Mattox, M. Maybury, and Morey 1999) and "Facilitating the Online Search of Experts at NASA Using Expert Seeker People-Finder" (Becerra-Fernandez n.d.) . Further research has been conducted by Mark T. Maybury in his Paper "Expert Finding Systems" (M. T. Maybury 2006). The National Forum on Expert Finding Systems states Research Gate, LinkedIn or Harvard Catalyst Profiles as current examples of EFS. (*National Forum on Expert Finder Systems* 2024)

While examples like Research Gate or LinkedIn are more general approaches to EFS, corporations face the challenge of implementing EFS that fit their specific needs and organizational structures. Four of the most commonly used organizational structures are the functional structure, which focuses of a clear chain of command and separates the organization into different departments based of their expertise (*What is a Functional Structure in an Organization?* 2024) , a product- or market-based structure where different departments are based on different products or markets instead of expertise, the geographical structure which divides teams based on their location and a process based

structure which groups the employees into teams based on the business processes they are engaging in. (Organ 2023) An alternative approach is the matrix structure. The matrix structure is on the rise with 84% of employees being “matrixed” in some way according to a study of cross-functional teams conducted by Gallup. (Inc 2024, page 65) The Matrix organization stands out by having multiple lines of reporting, meaning that employees have two or more bosses effectively. (*What is Matrix Organization?* 2024)(Organ 2023) This makes the Matrix organization a great match for agile working and cross functional teams. The main challenge that needs to be addressed regarding an EFS in a Matrix organization are dynamic and constantly changing tasks and fields of expertise, as people are incentivized to grow in those environments. Therefore, an EFS has to be able to handle those constant changes in ability, especially because it nearly impossible for the employees to keep track of all their colleagues’ skills over time.

The efficiency of EFS is closely tied to the different technologies that are being used. Therefore the following components and technologies are of interest for the EFS:

- **Reliable data:** Data quality is one of the most important factors for the success of an EFS as it is the basis for the search algorithm. Some of the more popular data sources of commercial tools are Self declared data, Documents and Databases (M. T. Maybury 2006, page 18)

- **Search algorithm:** The search algorithm is the core of the EFS. It has to be able to handle the data and provide the user with the most relevant results. Here Keyword search, and Boolean search are the most common methods with the Natural Language Search which utilizes Natural Language Processing (NLP) being on the third place, thogh since the release of the paper by Mark T. Maybury in 2006 (ibid., page 18), NLP has gained a lot of popularity especially through the rise of Artificial Intelligence (AI) and Machine Learning with applications in Chatbots, Voice Assistants and Sentiment analysis (Administrator 2023).

- **User Interface (UI):** The UI is the interface between the user and the EFS. It has to be intuitive and easy to use in order for the user to actually use the EFS. The UI of an EFS most commonly consists of different components like a search bar, a results overview and detail pages for each result based on the review of big EFS like LinkedIn (*LinkedIn* 2024), Research Gate (*ResearchGate | Find and share research* 2024) or Expertise Finder (*Expertise Finder | Expert Systems, Online Directory* 2024). Regarding the results overview, a list of experts seems to be the most common approach, with related documents and related concepts also being provided in some cases. (M. T. Maybury 2006, page 18)

- **Administration and Maintenance:** The EFS has to be maintained and updated regularly in order to keep up with the changes in the organization. This includes an Admin-Panel for the administrators to manage the data, as well as a feedback system for the users to report changes and errors in the data.

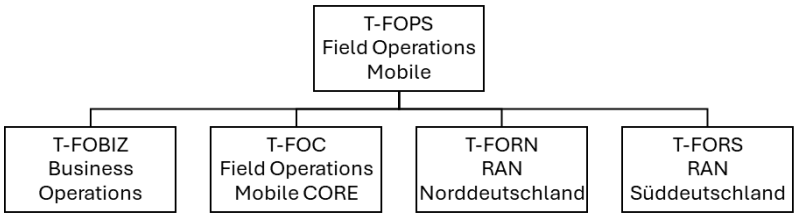
Geschäftlicher Nutzen? Forschungslücken

1.2 Research Question

1.3 Problem Statement

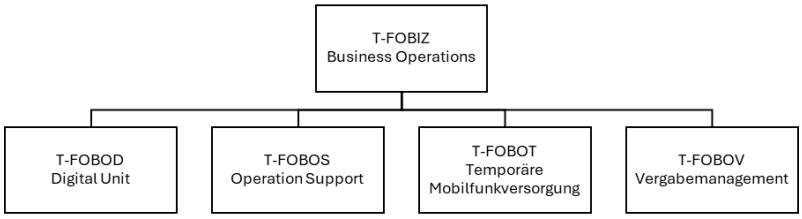
In an Harvard Business Review article, John Ferraro, the former COO of Ernst & Young suggests, that in order to keep up with the pace of change, companies have to constantly reorganize. (Heidari-Robinson and Heywood 2016) On the other hand, according to a McKinsey survey, over 80% fail to deliver the hoped-for value in time, with 10% even causing real damage to the company.(ibid.) The article also states that two-thirds of company reorganizations do at lease improve the performance to a degree. (ibid.) This suggests that there is still some room for improvement regarding the performance. This room can be utilized by increasing the efficiency of internal processes with an EFS in a few ways. This paper evaluates the design and piloting of such an EFS at the T-FOPS (Figure 1) team at Deutsche Telekom Technik GmbH (DTT). T-FOPS utilizes a mixture of different organizational structures. On the top-level it is a functionally and partially geographical divided in the sectors T-FOBIZ, Field Operations Mobile CORE (T-FOC), RAN Norddeutschland (T-FORN) and RAN Süddeutschland (T-FORS), the last two meaning North- and South-Germany. The Thesis will focus on T-FOBIZ (Figure 2) which is subdivided functionally into the Digital Unit (T-FOBOD), Operations Support (T-FOBOS), Temporäre Mobilfunkversorgung (T-FOBOT) meaning temporary mobile coverage, and Vergabemanagement (F-FOBOV) meaning procurement management.

Figure 1: Organization Chart T-FOPS



source: own illustration

Figure 2: Organization Chart T-FOBIZ



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1.4 Structure of the Thesis

1.5 Scope and Limitations

2 State of Research

2.1 Expert Finder Systems

2.2 Technological Foundations

2.3 User Interface Design for Expert Finder Systems

2.4 Integration of Workflows in Expert Finder Systems

2.5 Gaps in the Literature

3 Methodology

3.1 System Design

3.1.1 UI Design

3.1.2 Wporkflow Integration

3.2 Prototype Development

4 Implementation

4.1 Architecture and Design

4.2 Technical Challenges and Solutions

4.3 Testing and Debugging

5 Evaluation

5.1 Evaluation Criteria

5.2 User Testing

5.3 Strengths and Weaknesses

6 Conclusion and Outlook

6.1 Conclusion

6.2 Outlook

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Reference of AI Tools

I hereby declare that I have used the following AI tools for this thesis:
• DeepL for translating parts of the thesis from German to English
• GitHub Copilot for code suggestions and completions for the LaTeX code
• OpenAI ChatGPT for supporting the brainstorming ideas for the thesis

Declaration in lieu of oath

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