



FOM Hochschule für Oekonomie & Management

University Location Nürnberg

Bachelor Thesis

in the study course Wirtschaftsinformatik - Business Information Systems

to obtain the degree of

Bachelor of Science (B.Sc.)

on the subject

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

by

Joschua Böhm

Advisor: Prof. Dr. Klemens Waldhör

Matriculation Number: 604968

Submission: 2024-10-31

Contents

List of Figures	III
List of Abbreviations	IV
1 Introduction	1
1.1 Background	1
1.2 Problem Statement	2
1.3 Structure of the Thesis	3
1.4 Scope and Limitations	3
2 State of Research	4
2.1 Expert Finder Systems	4
2.2 Enterprise Organizational Structures	4
2.3 Knowledge Management in Organizations	4
2.4 Existing Expert Finder Solutions	4
3 Methodology	5
3.1 Design	5
3.1.1 Requirements Analysis	5
3.1.2 UI Design	5
3.1.3 UX Design	5
3.2 Piloting	5
3.3 Evaluation	5
4 Implementation	6
4.1 Requirements Engineering	6
4.2	6
4.3 Testing	6
5 Evaluation	7
6 Conclusion and Outlook	8
Bibliography	9

List of Figures

Figure 1: Organization Chart Field Operations Mobile (T-FOPS)	3
Figure 2: Organization Chart Business Operations (T-FOBIZ)	3

List of Abbreviations

EFS	Expert Finding System
ELS	Expertise Location 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 Systems (EFS) [or Expert Finding System (EFS)], also called Expertise Location System (ELS) enable users to discover subject matter experts in order to hire or acquire their knowledge.” (M. T. Maybury 2006, page vii) It is an important asset especially for big corporations, as it can boost efficiency and lower the barrier of entry for new employees. 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, though 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).

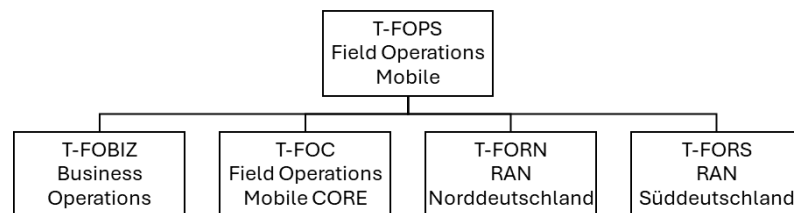
Geschäftlicher Nutzen? Forschungslücken

1.2 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 least 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

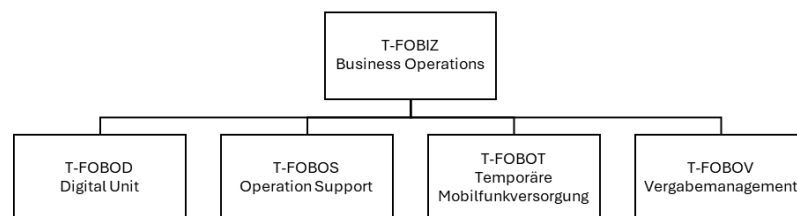
of different organizational structures. On the top-level it is a functionally and partially geographical divided in the sectors T-FOBIZ, Field Operations Mobile CORE (T-FOC), RAN Norddeutschland (T-FORN) and RAN Süddeutschland (T-FORS), the last two meaning North- and South-Germany. The Thesis will focus 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



source: own illustration

1.3 Structure of the Thesis

1.4 Scope and Limitations

2 State of Research

2.1 Expert Finder Systems

2.2 Enterprise Organizational Structures

2.3 Knowledge Management in Organizations

2.4 Existing Expert Finder Solutions

3 Methodology

3.1 Design

3.1.1 Requirements Analysis

3.1.2 UI Design

3.1.3 UX Design

3.2 Piloting

3.3 Evaluation

4 Implementation

4.1 Requirements Engineering

4.2 ...

4.3 Testing

5 Evaluation

6 Conclusion and Outlook

Bibliography

- Administrator (2023). *The Role of Natural Language Processing in AI*. en-US. 2023-03. URL: <https://onlinedegrees.sandiego.edu/natural-language-processing-overview/> (visited on 2024-08-10).
- Becerra-Fernandez, Irma (n.d.). 'Facilitating the Online Search of Experts at NASA using Expert Seeker People-Finder'. en. In: ().
- Expertise Finder | Expert Systems, Online Directory* (2024). en-US. URL: <https://expertisefinder.com/> (visited on 2024-08-10).
- Heidari-Robinson, Stephen and Suzanne Heywood (2016). 'Getting Reorgs Right'. In: *Harvard Business Review* (2016-11). Section: Business management. ISSN: 0017-8012. URL: <https://hbr.org/2016/11/getting-reorgs-right> (visited on 2024-08-08).
- Inc, Gallup (2024). *State of the American Workplace*. en. URL: <https://www.gallup.com/workplace/238085/state-american-workplace-report-2017.aspx> (visited on 2024-08-08).
- LinkedIn* (2024). URL: <https://www.linkedin.com/> (visited on 2024-08-10).
- Mattox, David, Mark Maybury, and Daryl Morey (1999). *Enterprise expert and knowledge discovery*. Journal Abbreviation: Proceedings of the 8th International Conference on Human-Computer Interaction, Munich, Germany Pages: 307 Publication Title: Proceedings of the 8th International Conference on Human-Computer Interaction, Munich, Germany. 1999-01.
- Maybury, Mark T (2006). 'Expert Finding Systems'. en. In: (2006-09).
- National Forum on Expert Finder Systems* (2024). URL: <https://expertfindersystems.org/2019/> (visited on 2024-08-07).
- Organ, Christine (2023). *7 Organizational Structure Types (With Examples)*. en-US. Section: Business. 2023-04. URL: <https://www.forbes.com/advisor/business/organizational-structure/> (visited on 2024-08-07).
- ResearchGate | Find and share research* (2024). en. URL: <https://www.researchgate.net/> (visited on 2024-08-10).
- What is a Functional Structure in an Organization?* (2024). *What is a Functional Structure in an Organization?* | Miro. en-US. URL: <https://miro.com/organizational-chart/what-is-a-functional-structure/> (visited on 2024-08-07).
- What is Matrix Organization?* (2024). *What is Matrix Organization? Definition of Matrix Organization, Matrix Organization Meaning*. en. URL: <https://economictimes.indiatimes.com/definition/matrix-organization> (visited on 2024-08-08).

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

I hereby declare that I produced the submitted paper with no assistance from any other party and without the use of any unauthorized aids and, in particular, that I have marked as quotations all passages which are reproduced verbatim or near-verbatim from publications. Also, I declare that the submitted print version of this thesis is identical with its digital version. Further, I declare that this thesis has never been submitted before to any examination board in either its present form or in any other similar version. I herewith **agree** that this thesis may be published. I herewith consent that this thesis may be uploaded to the server of external contractors for the purpose of submitting it to the contractors' plagiarism detection systems. Uploading this thesis for the purpose of submitting it to plagiarism detection systems is not a form of publication.

— Nürnberg, 10.8.2024 —
(Location, Date)


—
(handwritten signature)