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Guidelines for bachelor and master thesis in SCOM major at HWR Berlin

Bachelor and master theses belong to scientific works. A thesis is written to investigate a scientific (i.e., defined in literature) problem in regard to a research gap you need to identify in literature and to close with the help of a research method and primary or secondary data. The ultimate objective of the thesis should therefore be a sound answer to a superordinated research question rather than a solution of a particular problem in a company. You may use different research methods such as simulation, optimization, case-study analysis, action research or surveys.

Each academic work is one of a kind production and can hardly be administrated. In spite of that some general recommendations can be provided. These recommendations should help you to organize your research work and write the thesis on the appropriate level.

The preparation of the thesis can be divided into four parts as follows:

- Defining the topic and finding the supervisor
- Doing research
- Writing the thesis
- Formatting and submitting the thesis according to the HWR guidelines

How to find a supervisor

1. Prepare a short summary of your future thesis that should contain:
   - Management problem statement (object of investigation, process of investigation, main goal of investigation, decision for which you are seeking for improvements, sub-questions to be answered, KPI to measure results of investigation)
   - Data needed to solve management problem
   - Research method
   - Analysis of results
   - Expected results and practical recommendations on the solution of the management problem in regard to main goal of investigation, decision to be taken, sub-questions to be answered to take the decision, and KPI to measure results of investigation.

2. Name literature sources which you already identified

3. Provide you current grade record

Topic and title

First, you should define the topic you are going to elaborate on. You concentrate here on the following questions:

- Research objective: formulation of the central question that is going to be answered in the thesis
- Survey about related topics and classification of own topic
- Survey and review of the most relevant literature
- Identification of the research gap
- How will your research be conducted?
- What should be the result of your research and why this result is needed in terms of practice contribution to existing knowledge?
- Ask yourself if you are really prepared to work on the intended subject

Next, you will need to define the title that will be registered in the study office and needs to be confirmed by the supervisor. A right title of the thesis should not be too general such as "Lean Management in the Supply Chain" but also not too detailed. Usually, the title comprises 10-15 words and answers the following questions:

- What is the object of investigation (supply chain, company,…)
- What is the process under investigation (sourcing, manufacturing, logistics,…)
- What is your research method (case-study, survey, mathematical optimization, action research)
- Why are you investigating this topic (analysis, optimization, comparison …)
- Which specific parameters will be analysed (lead-time, capacity, transportation costs,…)

Research methods

Quantitative methods, modeling and optimization is one popular direction of conducting research in SCOM. Other research methodologies are qualitative-oriented and include case-study research, action research, surveys and interview-based research (Kotzab et al. 2005, Yin 2009).

Case-study research is based on deductive analysis of existing practical examples described in literature. Single case, some isolated cases, or even embedded cases can be analysed to develop some general recommendations for a problem.

Action research presumes active participation of the investigator in the problem solving. It can be, e.g., a traineeship in a company where students are involved into a project. Unlike in case-study research, results of the project are typically unknown at the beginning. In ongoing project, comparison of "as-is" and "to-be" states can be complicated. Benchmarking analysis can be successfully used here.

Surveys and interview-based research presumes data collection from different sources, e.g., interview of some experts in a particular area. The questionnaires are designed and evaluated with the help of statistical methods. Frequently, structural equation method is used.

Structure of the thesis and writing style

Important: A thesis structure is different from the structure of a text book but it is also different from a fiction book. A fiction book has been written to entertain you. A text book has been written to introduce you to a subject. A thesis is written in order to pose a question and to derive answers to the imposed questions.

We recommend using the following structure:

For case-study research:

1. Introduction
2. State-of-the-art
3. Research methodology
4. Case-studies
5. Analysis
6. Recommendations
7. Conclusion
   References
   E-Appendix: Source file with calculations, e.g., Excel.

For action research:

1. Introduction
2. State-of-the-art
3. Research methodology
4. Company and process description
5. Development and analysis of process improvement suggestions
6. Recommendations
7. Conclusion
   References
   E-Appendix: Source file with calculations, e.g., Excel.

For optimization and simulation research:

1. Introduction
2. State-of-the-art
3. Research methodology (method and software)
4. Verbal and formal problem statement (objective function, constraints, parameters, variables; if optimization models: set of equations, if simulation model: process diagrams and schemes)
5. Implementation in software and description of experiments
6. Computational results and their analysis
7. Recommendations on the solution of the management problem stated in 4) in regard to main goal of investigation, decision to be taken, sub-questions to be answered to take the decision, and objectives to measure results of investigation.
8. Conclusion
   References
   E-Appendix: Source file with calculations, e.g., Excel.

We prefer the length of 45-55 pages for bachelor and 70-80 pages for master thesis including 3-10 tables, 5-15 figures, and all necessary directory structures but excluding the appendices. The

tables and figures must be cross-referenced in the text. We prefer concise writing style, „to-the-point"! Think of the „elevator talk". Having written the texts, read it many times in order to condense the sentences. Look at each word and think of the need having this word in the sentence. If the exclusion of this word does not make any influence on the sense and the fullness of the sentence or your thought, delete it! The same may happen for the whole sentences.

Avoid jargon! Write in a classical academic style! Avoid long sentences! Check the grammar and typo errors! Let your thesis be proof-read by a native speaker!

For example, instead of writing "In the past year we have seen many companies relocating their manufacturing facilities to countries offering benefits in terms of for example low labour cost or tax incentives." → please write "In recent years, it could be observed that many companies relocated their manufacturing facilities to low-cost countries".

Next example: "Supply chain disruptions have always been a challenging problem for the companies in the past as well as in the modern globalization world where products or services are traveling from one corner of the World to another" → please write "The issues of supply chain disruptions have been studied in literature and practice in recent years. In light of the global value chain developments, these issues becomes more and more important".

Introduction

- Why your topic is important in practice and theory?
- What is your motivation to work on this topic?
- What is the research gap?
- What is your research question and objective to perform this research? → Find a precise research question! Otherwise, the results will be imprecise and hardly applicable!
- What would you like to achieve, what should be the contribution of this study?
- How will your research be conducted and the thesis is structured?

State-of-the-art analysis

- Survey about related topics and classification of own topic
- Survey and review of the most relevant literature
- Identification of the research gap

In this section, you should justify the selection of the literature for the analysis. Very important: all the references should be made in the same style according to the HWR guidelines!

Research method

Here you will justify the selection of the concrete research method and describe the theory on doing research with the help of this method.

Main part: analysis, optimization, results, recommendations

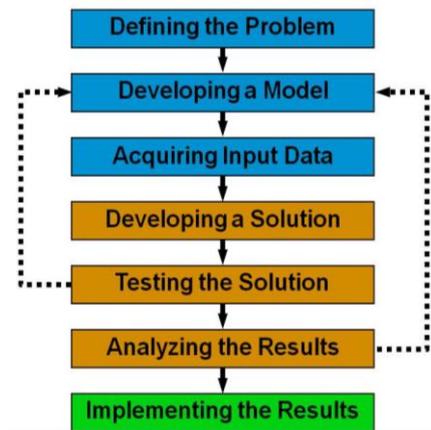The following scheme is recommended for doing the research (see Figure 1):

Figure 1: Structure of the problem analysis (Render et al. 2012)

Here you describe the problem, process, etc. and develop the model to investigate it. Then you will fill your model with data and perform experiments and analysis. Finally (typically in a separate section), you describe the gained results, their theoretical importance and the practical applicability. Formulate the results clear! Do not forget to critically analyse your results subject to advantages and limitations regarding the used methods and data.

References

The reference list should contain books, articles from peer-reviews international journals, and internet sources. This list has to meet the HWR guidelines for referencing.

What should you do while working on the thesis

- Structure your work and time in advance
- Be precise and concise
- Respect formal guidelines
- Communicate with your supervisor
- Listen carefully to comments and suggestions from your supervisor
- Scan carefully the relevant literature
- A clear research question should be stated
- State-of-the art analysis should be performed and the contribution of the study to the existing literature needs to be clearly stated
- Research methodology should be clearly described
- Analysis of results and practical recommendation from the analysis need to be clearly stated.
- Figures and tables need to be included into the main text body. They must be of a good quality and made by the author (not just copy and paste of some screenshots).

„Dont's"

- Don't lie or pretend something that can be revealed
- Don't suppose but know
- Don't be too general, think and write at the process and parametric level
- Don't think that you can simply ignore modification wishes from your supervisor

- Don't underestimate the time for preparing a high-quality text and the review of the relevant literature
- Don't use the "copy and paste" method, each thesis will undergo the plagiarism check

References

Ivanov, D., Tsipoulanidis, A., Schönberger, J. (2017). Global Suppy Chain and Operations Management. Springer, 1st edition.

Karlsson, C. (2016). Research Methods for Operations Management. Routledge, 2nd Ed.

Kotzab, H., Seuring, S., Müller, M., Reiner, G. (Eds.) (2005). Research Methodologies in Supply Chain Management.Springer, Berlin, Heidelberg.

Render, B., Stair, R.M., Hanna, M.E. (2014). Quantitative analysis for management. Pearson,12th Ed.

Yin, R.K. (2013). Case Study Research: Design and Method. Sage Publications Ltd, 5th Ed.

Anlage 1 Journals for SCOM

A+	*Management Science* *Operations Research* *Information Systems Research*
A	*Transportation Science* *European Journal of Operational Research* *Production and Operations Management* *International Journal of Production Research* *Journal of Operations Management* *OR Spectrum* *MIS Quarterly*
B	*International Journal of Production Economics* *Omega* *Transportation Research Journal of Business Logistics* *Journal of Supply Chain Management* *International Journal of Operations and Production Management*
C	*Supply Chain Management. An International Journal* *International Journal of Integrated Supply Management*

Publishers:
INFORMS (*Management Science, Operations Research, Transportation Science, Information Systems Research)*
POMS (*Production and Operations Management)*
Elsevier (*European Journal of Operational Research, Journal of Operations Management, International Journal of Production Economics, Omega, Transportation Research)*
Springer (*OR Spectrum, Journal of Scheduling*)
Wiley (*Journal of Business Logistics, Journal of Supply Chain Management)*
Taylor and Francis (*International Journal of Production Research)*
Emerald (*International Journal of Operations and Production Management, Supply Chain Management. An International Journal)*

Search machines:
- **SCOPUS** (Contains journals of Elsevier, Taylor and Francis, Emerald, POMS, Wiley, Inderscience)
- INFORMS and Springer have only their own search machines
  Each publisher has also its own search machine, e.g.: www.sciencedirect.com (Contains journals of Elsevier)
- **You can also use the search machine EBSCO and other available search machines in the HWR library, e.g., Springer E-Books and Springer Journals**