Master Thesis:
How to do a excellent thesis (with a company)?

For Industrial Engineering and Management master students

30.10.2017
What you need to know about thesis?

1. What is it and Why is it done?
2. How to find a good topic?
3. How the process goes?
4. How to make most out of results?
Purpose and Topic
What is the Master Thesis?

The Master’s thesis is an independent engineering or research project completed by the student. The purpose of the thesis is to demonstrate capabilities in research, know-how in the topic of the major, and independence and maturity in intellectual efforts. Master’s thesis is done from a topic within the area of the Major. It’s a six months full time project.
Large proportion of theses are done with a company, with funding from the company. This is useful, but it is not required, and it will not affect the grading or requirements.
Finding a Topic
Key issues in finding a good topic

Research Questions

- Relevant and robust question, addressing the “how’s” and “why’s”
- Requires trade-offs → Tests company’s priorities

Methodology

- Foreseeable and accessible data + Method that matches data & question
- Links questions to concrete efforts & tests the sharpness of questions

Mikko Jääskeläinen
Balancing the needs and requirements

A good thesis topic is usually a productive compromise

Company’s needs

Core requirement: Business relevance
Focus on core issues enabling long-term development

Need to compromise on:
Immediate operational needs
Fixes
Confirmation of status quo

Academic Requirements

Core requirement: Scientific method
Robust thinking (conceptual validity)
linked to factual state of the world
(empirical validity & reliability)

Focus on key mechanisms

Need to compromise:
Generalizable knowledge
Integration to state of knowledge

Relevant and robust question, addressing the “how’s” and “why’s”
Common issues

Responsibilities include large amount (more than on third?) of operational tasks that do not directly contribute the thesis project

If you have worked for the company before: Be careful in redefining roles and responsibilities, try to highlight the difference

Some companies either cannot invest enough in long-term development or have different ideas about thesis projects

Company has decided on solution and seeks:

Implementation (e.g. go-to-market-plans, prototypes, strategies, etc.) or Information instead of understanding (e.g. market analyses, best-practice benchmarks, etc.)
Benefit of external needs

The key benefits of a company for your thesis are the
- Anchoring of the core issue
  - Being *accountable* for someone helps both in keeping the thesis focused, and maintaining discipline in the process
- Testing of the relevance
  - The company’s investment in the process is the first indication of its relevance

Even if you don’t have a company commissioning the work, you can (and should) find external stakeholders for your work.

Who is the audience for your work, who will find your results relevant?
How to find a company?

**The easiest**
Spot an ad, apply for position, and get it

Not very common, as it requires 1) the company to become aware of its needs, and 2) decide to solve it by a thesis; and finally 3) you to get the job

**The common**
Use soft search, get in touch with companies, and your contacts, ask around

The dominant form. Requires networks, luck and time.

**The proactive**
Find a tentative topic, iterate with companies, seek interest and revise as best fits the interests

Taking luck in your own hands. Requires initial insight and entrepreneurial spirit
Whom and When to Contact?

Whom:
Check the specialties of each professor, and approach the one whom you perceive as the best first guess. However, you can contact any of the professors in your major regarding your topic, and we’ll then help to find the best fit.

When:
Contact us early enough so that the supervisor can help in finding proper balance in topic. Depending on the company, this may be easier with professorial support.
Specialties:  
**Strategy & Venturing**

**Robin Gustafsson**: corporate and business strategy, industry disruption and institutions, platform strategy

**Timo Vuori**: strategy work, emotions, sense-making

**Jens Schmidt**: resources based view, capabilities, corporate strategy, platform strategy

**Hannele Wallenius**: Economics and decision-making

**Markku Maula**: corporate venturing and finance

**Ilkka Kauranen**: R&D and innovation management

**Marina Biniari**: Firm change management and internal venturing

**Mikko Jääskeläinen**: Entrepreneurship (Start-ups & Corporate), Industry dynamics & networks, Reputation
Specialties: 
Operations and Service Mgmt

Kari Tanskanen: Purchasing and Supply Chain Management
Karlos Artto: Project-Oriented Business
Jan Holmström: Industrial Engineering, Industrial Services and Maintenance, Building Information Management
Paul Lillrank: Industrial Engineering, Especially Quality and Service Management
Risto Rajala: Management of Service Systems, Development of Digital Services, Service Innovation and Business Models
Riitta Smeds: Business Process Networks in Digital Economy
Specialties: Leadership and Knowledge Management

Eila Järvenpää: Knowledge Management, Knowledge Work, Organizational Networks, Communication in Organizations and Organizational Networks, Cross-Cultural Management

Esa Saarinen: Applied Philosophy

Matti Vartiainen: Work Psychology, Competence and Knowledge Management, Knowledge Work, Organizational Innovations, Distributed, Multi-Local and Mobile Work, Reward Systems, Sociotechnical Systems
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The Process
Each process is unique

There is no master’s thesis seminar in Industrial Engineering and Management. Each work is supervised individually.

The process starts when you start it

Writing is a process – start early and have several feedback rounds from supervisor & instructor
Seek advise when doing the Thesis

Formulation of a focused research question and sketching the matching empirics

Find a focus in conceptual part
• “Literature review” is a systematic/insightful synthesis, not a review of what others have done. Think of it as conceptual frame, rather than as a review

Seek advise on doing qualitative and quantitative research upfront (before starting collecting data)
• The impact and quality of your work is based on the accuracy of your data

Sharpen the results and work out implications
• Robustness and presentation are crucial

Balance and fine-tune the overall argument, kill your darlings
The formal process

Prerequisites for starting
• Enrolled, BSc Degree, 45 credits toward Master’s, HOPS approved

Find topic, get supervisor

Apply for a topic
• Approved by Program Committee, valid for 1 year
• NB! Time to completion is a evaluation factor in new criteria

Once ready:
• Deliver and apply for evaluation. (Binding the book no longer requirement)
• Do maturity test: Press release / Article / Blog posting

Evaluation and approval by the Program Committee

CHECK INTO-pages!
What goes in?
Generic Thesis

**Conceptual basis**
- Intro
  - Motivation
  - Research question (Objectives)
  - Scope ((definitions))
  - Structure

- Interest
  - Why the problem exists?
  - Key concepts

- Existing knowledge
  - Review of existing concepts & knowledge for the use of empirical research

**Empirical research**
- Empirics
  - Data
  - Method
  - Context

- Fieldwork:
  - What is the effect / How it works?

**Synthesis**
- Generating new knowledge matching the research question

**Implications**
- What should be done?
  - Suggestions for strategy

**Conclusions**
- Summary
  - Purpose
  - Key results (to RQs)
  - Contribution
  - Implications
  - Limitations
  - Further research

**Solution**
- Mikko Jääskeläinen
Evaluation
Academic results

Academic evaluation has a single yard-stick:

Have you addressed a relevant issue and generated empirically justified and business-wise constructive understanding of the drivers of the issue?

In excellent thesis, each part of the serves this purpose, and none of the elements are there for any other reason than supporting your claim.

There is no other conflict with business interests than the insistence on robustness of thinking and long-term focus
Evaluation

The grading is based on the delivered thesis
• Anything that is not in the thesis cannot be taken into account
• The thesis is a public document

The thesis is accepted and graded by the Program Committee
• The grading is based on the statement by the supervisor
• If grade is 1 or 5, an endorsement from another professor is required

Supervisor may indicate a grade during the process, but this is not a promise of any sort as the supervisor does not grade the thesis
Evaluation Criteria

Definition of research scope and goals
- Clearly defined goals and scope // challenging and relevant engineering problems or research questions,

Command of the topic
- Demonstrates understanding of the relevant frameworks // command and understanding of the topic // appropriate, up-to-date scholarly literature

Methods
- appropriate methods, appropriately explained and justified // Applied in a logical way that fits the problem and research // The results are critically evaluated.

Results and contribution
- Results and justified conclusions // The goals of the thesis have been reached and discussed critically // The results have value and make original contribution

Presentation and language and structure

Thesis process
Grades

Grade 1: The thesis fails to meet the evaluation criteria in multiple areas. Judged as a whole, it is nevertheless acceptable as a master’s thesis.

Grade 2: The thesis meets the evaluation criteria in all or most of the six areas but also has some significant shortcomings.

Grade 3: The thesis meets the evaluation criteria in all six areas and has at most minor flaws. There are also areas that could have been improved.

Grade 4: The thesis meets the evaluation criteria in all six areas, has at most minor flaws, and is excellent in some aspects such as presenting important results.

Grade 5: The thesis fulfills the evaluation criteria in all six areas and is exceptional in some aspect. As a whole, the thesis is excellent.
Making most of it
Dissemination: For the Firm

Choose format and medium according to the audience
Thesis (the book) is seldom the best way to report the key results for the firm
Presentations, summaries, discussions, shaping of practices etc.
These are part of your project, but not part of your thesis. However, presenting the results to one audience will enhance the presentation to another audience
Maturity test

• If your maturity test has no need to demonstrate proficiency in language, the format is a press release. This is to be updated to a blog.

• A LinkedIn blog text that is published (with link to thesis), a video abstract, or podcast on the topic.

• Here the relevant parts are the generalizable results.
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<th>Approval of degree by the Dean</th>
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