Handbook for conducting thesis projects in co-production with industry

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About this handbook

This handbook is developed for thesis students, as well as academic supervisors and industrial supervisors. The handbook aims to clarify the thesis process and make it easier for you to work as a team. By following this process, you will make sure that the thesis will have both academic and industrial contributions.

This guideline is developed by Mälardalen University, with support and sponsorship by the academic strategic collaboration program, APP, at Volvo CE. The guideline is based on the co-production process from the knowledge foundation and has been developed through workshops with supervisors, surveys with former supervisors, and collaboration with several thesis students.

This guideline is available online and printed in a handbook format.

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Purpose

The thesis work is an important final assignment from the university, and for you as a student, this is the opportunity to show what you have learned and put your skills into practice. This is also a good chance to come to a working environment and get new connections to expand your network.

The assignment will also give you a lot of new knowledge about the industry, as well as you will have the chance to contribute with academic knowledge to the industry in exchange. Also, for you as a supervisor, this is a good chance to develop your skills and gain more knowledge within your area from a different perspective.

In thesis writing, during many years, much has been focused on the academic contribution and the strive towards the quality of research. Although this is very important, today's way of co-production with industry also requires a contribution of value for the industry. Writing a thesis based on co-production is a process of giving and taking, where the knowledge exchange reassures a good further relationship.

The purpose of this handbook is to help finding a balance between making academic contributions and making advancements in development at a company. The challenge today is that these two are not always aligned.

What characterizes good co-production?

In order to create good co-production, it is crucial that the students, as well as the academic and industrial supervisor share a common ground that integrates the practical and academic contributions and goals of the thesis. Students and supervisors should be seen as a cohesive team, based on communication, knowledge-exchange and trust.

It is also important that the industrial supervisor has an understanding for the requirements of an academic contribution, as well as the academic supervisor has an understanding for the need of industrial contribution. For you as a student, the best way to ensure this is to conduct some meetings with both supervisors present at the same time.

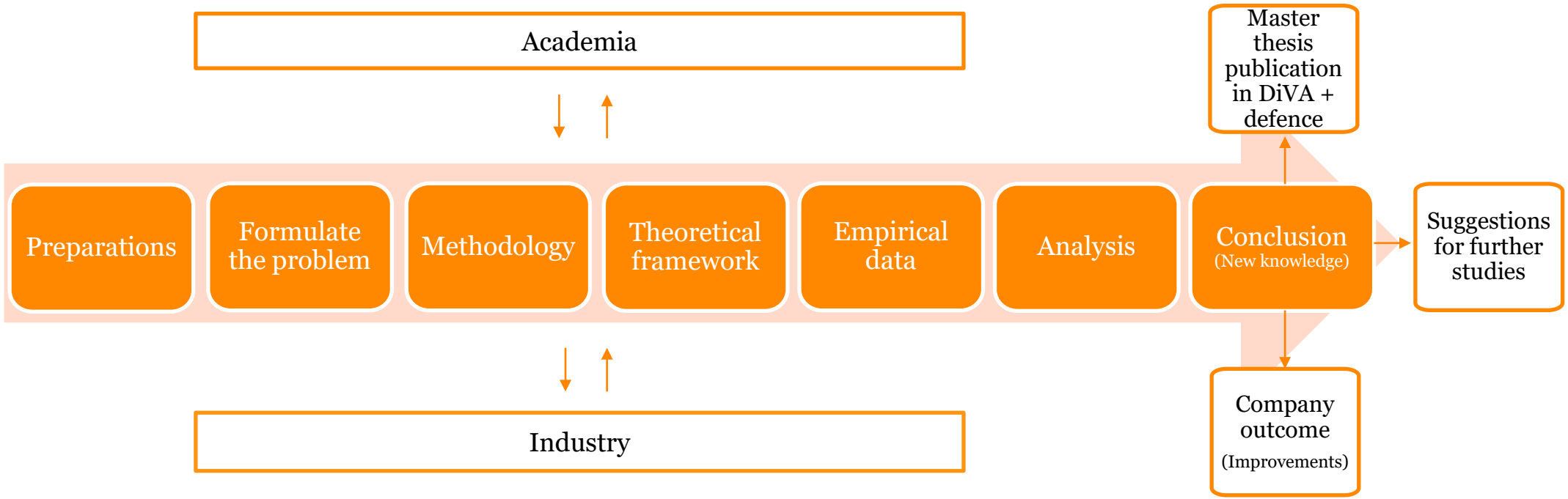
Also make sure that you as a student knows the expectations both from academia and the industry before starting the thesis. This is important to make sure that value is delivered both to the industry and to future research for academia.

Preparations

Before starting the thesis writing, the team consistent of students, academic supervisor, and industrial supervisor needs to agree on a common problem to research and solve. If this is not done properly you as a student may face different expectations. This may result in that the thesis is pushed into different directions by the conflicting interests, with the consequences of a thesis that lacks a common tread as a result.

Also make sure that the team agrees on the chosen limitations of the research question so there is no misunderstandings later. It is also good to in this phase ask about expectations to be aware of, as well as the physical presence and availability of the persons involved. For you as a supervisor these first meetings should be seen as a chance to share your knowledge within the area, as well as gaining new knowledge from the other supervisor's expertise.

Thesis process



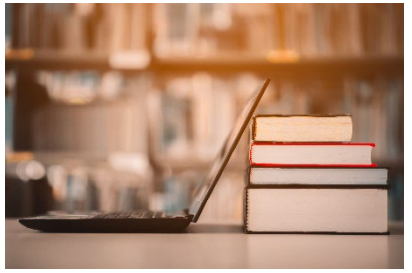
Before you start the thesis project

Students

- [ ] Make sure there is a meeting involving the whole team - students, as well as the industrial and academic supervisor.
- [ ] Develop a clear view of understanding of good research collaboration with industry
- [ ] Early secure resources, for example people that are needed to support the thesis project to improve the quality. Don't be out too late to schedule people.
- [ ] Be clear of what is expected from you being physically present at the company or not. It might vary over the thesis project period too but be transparent.

Industrial supervisors

- [ ] Make sure there is a meeting involving the whole team - students, as well as the industrial and academic supervisor.
- [ ] Give the students a good insight into the working place and practical problem.
- [ ] Make sure that the students can have required access to resources and people in the organization in order to do a good work.
- [ ] Be clear if the students are expected to be physically present at the company or not, and if so to what extent?



Academic supervisors

- [ ] Make sure there is a meeting involving the whole team - students, as well as the industrial and academic supervisor.
- [ ] Support understanding for good research collaboration with industry

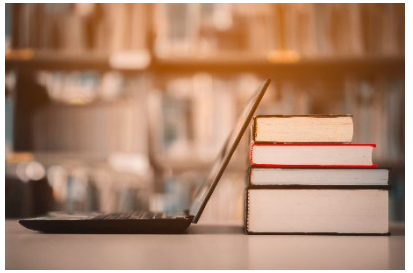
Principles of good research practice

Students

- [ ] Be clear to inform the company about the purpose of the research task and research questions.
- [ ] Be clear to inform the company about the right to decide their participation and their right to stop participation in the case study.
- [ ] Make sure to handle all collected data confidentially, and not for any other purpose than for the thesis.
- [ ] Confidentiality, secure what you can publish on Diva. Check with the case company CE regarding the empirical data.

Industrial supervisors

- [ ] Clarify if some of the information/empirical data given are confidential.



Academic supervisors

- [ ] Support the students in developing good research ethics routines

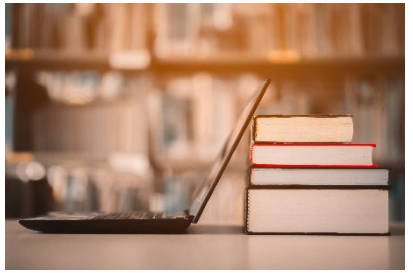
Formulate the problem

Students

- [ ] Is the research questions of interest for the company?
- [ ] Has the problem formulation both an industrial and academic contribution?
- [ ] How will the thesis lead to valuable results, both to the industry and academia?
- [ ] What are the reasonable limitations of the thesis?

Industrial supervisors

- [ ] Will the problem formulation contribute to valuable industrial results?
- [ ] Clarify what is expected of the industrial contribution in the thesis.
- [ ] Is there still room for the expected industrial contribution within the chosen limitations?



Academic supervisors

- [ ] Will the problem formulation contribute to valuable academic results? Is there a good combination of academic and industrial aims?
- [ ] Clarify what is expected of the academic contribution in the thesis.
- [ ] Is there still room for the expected academic contribution within the chosen limitations?

Purpose formulating table

What is the aim with your thesis?	Expected results
Fill in with your industrial and academic supervisors:	***Fill in with your industrial and academic supervisors:***
- The research question is… *-The contribution to solving a practical problem is…* --- --- --- --- --- *The aim usually combines formulating a research question and contribution to solving a practical problem. For example, your research develops new knowledge as answer to the research question that can be applied in solving a practical problem.*	- *The academic contribution expected is…* - *The practical improvement expected is…* --- --- --- --- --- *Results combine outcomes of value for industry and academia*

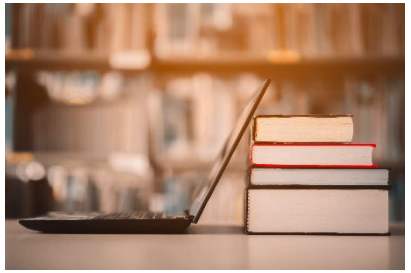
Methodology

Students

- Can the chosen research methods ensure results of value both academically and industrially?
- Is the chosen methods most sufficient to contribute to relevant results?
- Choose participants, e.g., respondents for data collection, related to the problem formulation.

Industrial supervisors

- Can the chosen methods ensure results of value industrially?
- Is the chosen methods most sufficient to contribute to relevant results?
- Initiate contact with suitable colleagues related to the problem formulation.
- Can the methods be designed to engage and work jointly with the company personnel?



Academic supervisors

- Can the chosen methods ensure results of value academically?
- Is the chosen methods most sufficient to contribute to relevant results?

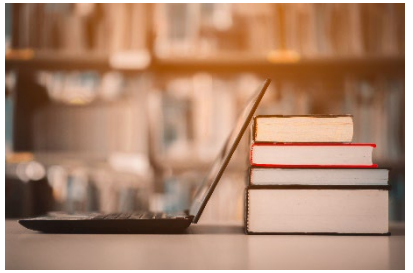
Theoretical framework

Students

- [ ] In the report, just add the theoretical parts that will be used in the analysis chapter. Be clear and concise in your language.
- [ ] Make sure that the theoretical framework is detailed enough to give a high-quality answer to the research question.
- [ ] Make sure that the theoretical framework is well designed and easy to understand even for readers with no previous experience within the subject.

Industrial supervisors

- [ ] How can the theoretical framework help us to solve our practical problem?
- [ ] Is the theoretical framework understandable and well connected to the industrial problem?
- [ ] Do the theoretical parts deliver valuable industrial results?



Academic supervisors

- [ ] Is earlier knowledge of the problem sufficiently included?
- [ ] Do the theoretical parts cover enough to deliver valuable academic results?
- [ ] Does the theoretical framework contribute with something new?

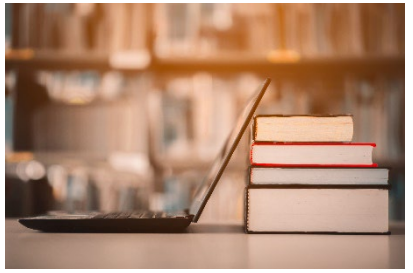
Empirical material

Students

- Design your research to get best possible empirical material to develop academic and industrial results aimed at.
- In the report, just add the empirical parts that will be used in the analysis chapter. Be clear and concise in your language.
- Make sure that the empirical findings are detailed enough to give high-quality answers to the research question.
- Make sure to use the principles of good research practice while collecting data.

Industrial supervisors

- Is the best possible information sources for understanding problem and develop solutions used in the organization?
- Do the empirical parts cover enough to deliver valuable industrial results?



Academic supervisors

- Is the empirical material sufficiently relevant and trustworthy?
- Do the empirical parts cover enough to deliver valuable academic results?

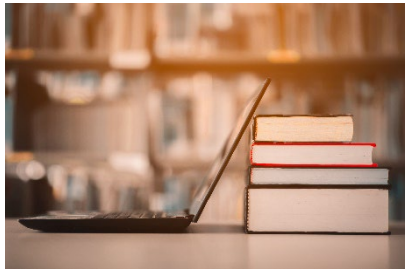
Analysis & Conclusion

Students

- [ ] Have sufficient results been obtained in both academic and industrial respects? Is some aspect in need of further development?
- [ ] Are the research questions answered based on the theoretical framework and empirical findings?
- [ ] What are the benefits for the company? Any improvements implemented/ achieved through the thesis and for whom?
- [ ] Is there any suggestion on how to further implement the improvement at the company?

Industrial supervisors

- [ ] Have sufficient results been obtained in industrial respects? Is some aspect in need of further development?
- [ ] Are there results in need of dissemination and implementation to realize benefits?



Academic supervisors

- [ ] Is the analysis sufficiently trustworthy, creative and critical to back the development of academic and practical results?
- [ ] Have sufficient results been obtained in academic respects? Is some aspect in need of further development?

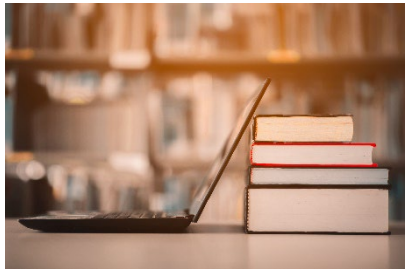
Presentation of the findings to the company

Students

- [ ] Check with the industrial supervisor if a separate report with industrial contribution is expected.
- [ ] Plan how you will present your thesis to the company.
- [ ] Think about what parts of your thesis project you should present for the company.
- [ ] What people should be involved and take part in the results?

Industrial supervisors

- [ ] Clarify if a separate report with the industrial contribution is expected.
- [ ] Make sure to give proper and valuable feedback when the results are presented.
- [ ] Support the dissemination and implementation of results in practice



Academic supervisors

- [ ] Support the students in developing good validation of results through dialogue, presentation and feedback
- [ ] Make sure there is time to deliver results to industry within the academic deadlines.

Summary

This handbook was created with the aim to guide thesis students, as well as academic supervisors and industrial supervisors, in facilitating the process of thesis projects carried out in collaboration with industry. The goal of this handbook is to help you to create a thesis with both academic and industrial contributions. A key point from this handbook is the importance of finding a problem that is relevant from both an academic and industrial perspective and to design the process with both aspects in mind.

Another important success-factor is to have a good and regular communication between students and supervisors, and to ensure that the team shares a common ground of the practical and academical contribution of the thesis. By following the advices from this handbook, we believe you will be able to design a thesis that benefits both academia and industry. We hope this guide was helpful and wish you the best of luck with your thesis.

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