

Guidelines for Wageningen University Thesis Requirements

As a PhD candidate, you are in charge of your personal PhD trajectory that allows you to develop into an independent scientist. Together with the supervisory team, you are responsible for the quality of the research conducted and described in the doctoral thesis, according to the prevailing Code of Conduct for Research Integrity. To complete your PhD trajectory, you will need to write a doctoral thesis and defend it in public.

The doctoral thesis is a written document demonstrating your scientific ability, capacity, and independence. More specifically, you should show that you are capable of:

1. functioning as an independent scientist who is able to:
 - a. formulate scientific questions, either based on societal issues or scientific challenges;
 - b. conduct original scientific research;
 - c. produce articles for scientific journals, produce book chapters, or make a technical design.
2. placing the research within the scientific context, and position it against the background of a broader scientific or societal perspective.

In the Netherlands, a PhD trajectory comprises a period of 48 months or a part-time equivalent of this time. The aim is to submit your doctoral thesis to the thesis committee within this period of 48 months and to defend your thesis soon thereafter. Article 12 of the Wageningen University [Doctoral Degree Regulations](#), provides a general description of the content and scope of the thesis.

The thesis can be:

- a. a number of distinct (publishable) scientific chapters that display sufficient coherence on a specific topic; this coherence is to be demonstrated by the inclusion of a general introduction and general discussion; or
- b. a scientific monograph concerning a specific topic; or
- c. a technological design based on appropriate theoretical knowledge and methodologies, accompanied by a scientific explanation and documentation.

Description of the thesis

This document aims to provide a more detailed description of the thesis content:

a. Chapter-based thesis

Your doctoral thesis contains at least a general introduction, chapters with (published and/or publishable) research data, and a general discussion. The chapters in such a thesis form a collective scientific “story” that is reflected upon in the general discussion.

General introduction:

In the general introduction, you describe your view of the current state-of-the-art in your research field. You highlight gaps in scientific knowledge, the research questions that come from this

knowledge gap, and introduce an overview of your thesis detailing the aims and objectives, followed by the approaches taken to answer the research question(s). The general introduction contains information and context that will assist readers, including members of the Thesis Committee to comprehend and appreciate the research chapters. You should strive to be concise in the introduction and write in an inviting and attractive style for the reader explaining the importance and relevance of the research which is described in the following chapters. There are no explicit length or word count criteria for the introduction, quality is the only criterion.

A (publishable) single-author review article can be used as (part of) the general introduction. A review with additional co-authors cannot substitute the General Introduction, but can be included in the thesis as a separate chapter, provided that you made a significant contribution to the review.

Research chapters:

There is no requirement for the number of original research chapters in a thesis: quality, coherence and your specific contributions prevail over quantity. A thesis can contain three, four or more (publishable) original research chapters, but in exceptional cases fewer original research chapters can be justified, for example, by the extensiveness or exceptional quality of the work. The whole thesis together should provide evidence of the candidate's research capabilities from which the thesis committee can ascertain whether the candidate has proven itself as an independent scientist. It is the supervisory team that determines whether the thesis contains sufficient evidence of the candidate's research capabilities and scientific independence.

We define a publishable research chapter as a (future) publication or a substantial part of a more extensive study. Such a manuscript may have gone through the process of submission to a scientific journal, peer review, and rebuttal, but this is not mandatory. Each research chapter contains work that you conducted and analysed (experimental and/or modelling and/or data analysis), demonstrating that you followed the scientific research cycle: identification of the research gap, outline of the approach, description and interpretation of the results that you either generated yourself or used from other sources, and discussion of their significance from a scientific perspective. The length and format of a chapter, the number of figures, the scientific depth, the quality of data collection, and the analysis thereof, should be of a level customary to your specific research field(s). Chapters can also report on studies that did *not* lead to the expected outcomes.

General discussion:

While research chapters may be collaborative efforts, the general discussion (like the introduction) should be your own individual product. In this final chapter, you synthesize, conclude, reflect, and position your individual research work in relation to the overarching research question of your thesis, e.g., you discuss notable findings or methods developed from a bird's-eye perspective by placing them in the context of a broader scientific discussion. The aim is to aid the reader in appreciating the significance of the research described by providing a novel model, a new perspective, or a new mechanism in relation to the general notion up to that point. You align your findings with the objectives you formulated in the general introduction, identify where future research should be directed toward, and discuss the impact of your work on research as a whole and society. In brief, this chapter allows you to show that the thesis is more than the sum of the individual chapters.

When can a manuscript be part of a doctoral thesis?

- ✓ You should have followed the scientific research cycle and thus a chapter should also involve data analysis, interpretation, summarizing, and reflection on the results. You should be able to explain and defend all the results and conclusions. Research data can be part of your thesis chapter. A chapter can refer to online research data that are accessible with a persistent identifier on the condition that they fulfil minimum quality requirements mentioned at [Research data quality and management - WUR](#). The mere collection of data is not sufficient to qualify as a chapter in your thesis.

A publishable research chapter does not have to be submitted or accepted for publication to be included in the thesis. It would be nice and a plus if (parts of) these chapters are published in peer-reviewed open-access scientific journals or books.

b. Scientific monograph

A thesis can also be a scientific monograph of which (parts of) chapters can be published as peer-reviewed journal articles or as peer-reviewed book chapters in an edited book. The monograph is usually single-authored by you as PhD candidate. However, if you publish (parts of) chapters together with others as journal articles or book chapters in an edited volume, you should acknowledge the contribution of co-authors in the monograph. In monographs you can elaborate much more on empirical data that cannot be included in single articles, and there is more room for reflection on relevant theoretical debates, or ethical dilemmas. As described for a thesis with separate chapters, also in the case of a monograph you create a coherent story that starts with a general introduction and is reflected upon in the general discussion, and these two sections are solely your product.

c. Technological design

A thesis can also consist of research on an original technological design. In such a thesis you describe the development and use of tools, materials and methodologies to create a design (the designing phase). A design can be a product, a prototype, a (computational) model but also a methodology or software. In your thesis, you need to describe the empirical validation of the design and interpret the performance of the design in relation to the original aim. This can be followed by an iterative process of validation and re-designing with an emphasis on making use of the design. The final result is a design that is applicable, e.g., it may contribute to societal issues, be used as research methodology, or by industry. You can discuss these application areas in the general discussion or as part of the test cases in the validation phase. The design process or parts thereof can be published in scientific journals or methodology books, but the emphasis is more on the use of the design.

A thesis can also be a combination of these three types of theses.

Author contributions:

The General introduction and General discussion are solely your product. For all other chapters in which other researchers have participated, you should indicate the contribution of each author to the study, and explicitly mention your contribution. If you, as part of a team effort, have conducted a crucial part of a larger study, but you are not the (shared) first or last author, the work can still be included in your thesis. The extent of your scientific contribution determines whether such a manuscript can be part of your thesis. If your contribution to that study/publication is not sufficient to make it a chapter in your thesis, you may supplement the material with your own relevant work.

Your contribution to each chapter should be described in a separate document, the Authorship statement (see Appendix 4 of the Doctoral degree regulations) which you submit along with the manuscript through Hora Finita.

Submission thesis manuscript

The doctoral manuscript that you submit to the promotor and the thesis committee for assessment should include the following elements: (i) a title page with the names of the supervisors; (ii) a table of contents; (iii) the scientific chapters or scientific treatise (stating co-authorships, if applicable), including the general introduction and general discussion; (iv) a reference list of the literature consulted, which may also be included in the chapters; (v) at least one summary in English; an additional summary in another language is optional.

The thesis committee assesses the quality of the thesis manuscript using the rubrics for evaluation of theses as described in Appendix 5b of the Doctoral Degree Regulations.

Propositions

A Wageningen University thesis is accompanied by a set of 6-8 propositions. After approval by the supervisors, you submit these propositions together with the reading version of your manuscript. The propositions are evaluated by a member of the Academic Board.

The regulations for the 6-8 propositions are: (i) two propositions concern the topic of the thesis; (ii) two to four propositions concern a different scientific field or science in general; (iii) two propositions concern a socially relevant topic. Propositions consist of one sentence and are formulated in such a way that they can be debated at a scientific level. See Article 12 of the Wageningen University Doctoral Degree Regulations.

Conflicts of interest

If you and your supervisors cannot reach an agreement on the content of the thesis, the number of chapters or the quality/size of a research chapter, either of you have the right to approach the Academic Board. This can be done via the Dean of Research, or via your Graduate School's PhD advisor. The Academic Board assigns a member of the Board or an external expert (e.g., someone from the relevant Graduate School) the role of mediator in the dispute and come to a satisfactory solution. The final decision will be made by the Academic Board.