



TOTO Guidelines for the structure and scope of doctoral dissertations

Table of contents

Key objectives and requirements of doctoral dissertation	3
Compilation thesis	3
General principles	3
Describing the doctoral researcher's independent contribution in co-authored publications	5
Monograph	6
Describing the use of external service providers and information systems in doctoral dissertations	7

Key objectives and requirements of doctoral dissertation

Doctoral researchers complete a dissertation to demonstrate critical thinking and their capability to pursue independent scientific work. The doctoral researcher should in their dissertation work demonstrate:

- Ability to define the scope of the dissertation and develop research-based expertise in this area.
- Sufficient theoretical knowledge and understanding of the main concepts in the field of expertise.
- Sufficient methodological skills and ability to produce research results and conceptualize and present their impacts for research and practice.
- The ability to produce research results, to understand them, and to present their impacts in research and in practice.
- Ability to operate in a scientific community and communicate about one's field of expertise, research, and the significance of results within the community.

All dissertations must satisfy the general requirements for dissertations in terms of logicity, objectivity, critical thinking, ethics, academic honesty, and the novelty and significance of research results. In this regard, the author, supervisor as well as internal and external examiners evaluate the dissertation in the light of the requirements of the doctoral program (i.e., reflected in this document), reflecting general criteria set for dissertations by the scientific community. The novelty and scientific significance of the dissertation is not primarily dependent on the number of publications (and quantitative criteria) but is decisive on overall contribution by doctoral researcher as well as content merits against a set of criteria.

Compilation thesis

General principles

The following principles apply to compilation theses:

- A compilation thesis comprises an introductory section and a collection of scientific publications dealing with the same overall problem. The introductory section must set forth at least the premises and objectives, theoretical background and related literature, methodology

and results of the research, and indicate the main contributions and their scientific and practical novelty. Additionally, the significance, reliability and validity of the research and their limitations need to be discussed, and practical/managerial implications and avenues for further research should be proposed. In the introductory section also the role of the included publications within the overall research should be specified.

- A compilation thesis may include scientific publications that have been, at the time of initiating the review, primarily published in a peer-reviewed scientific journal, at a conference, in a scientific book, in a publication series, or other scientific forums. The publications must have undergone an appropriate peer review.
- Any conference papers incorporated in a compilation thesis must be from conferences that are respected within the scientific community, that peer review the entire article instead of abstract-only, and have either been published or approved for publication in the conference proceedings.
- The scientific publications included in a compilation thesis may include co-authored publications. Single-authored publication is not required. A co-authored publication may appear in multiple dissertations (and this must be mentioned when describing the doctoral researcher's independent contribution).
- The number of publications included in a compilation thesis is not decisive as such. Instead, it is essential that the publications constitute a coherent entity, the contribution of the researcher in the original submission is sufficient, and the dissertation as a whole satisfies the requirements depicted in this document and general expectations of novelty in the respective field. A compilation typically includes 3-5 publications, depending, among others, on
 - the scientific quality and significance of the publications.
 - number of co-authored publications, the doctoral researcher's independent contribution to the co-authored publications.
 - the scientific prestige of the publication forums. The evaluation of the prestige of a publication forum should take into consideration the differences of the fields of study given the scope and focus of the dissertation.
 - The publications form a whole. The article dissertation must form a whole that is in line with the general practices of the scientific field and scientific quality expectations.
- At least one of the publications should have appeared in a journal. Replacing a journal publication with another publication can be considered if a scientific forum (e.g., conference) in the scientific field and the subject area of the dissertation can clearly be equated with a high-quality journal.
- One of the publications of the compilation can be an unpublished manuscript, which the preliminary examiners examine as part of the dissertation work. Including an unpublished

manuscript in the compilation requires that the published articles are of high scientific quality and the forums are of a high standard from the perspective of the scientific field, especially when the number of publications in the bundle is close to the minimum.

- In the article dissertation, typically several or all articles can be co-written, in which case the researcher's own contribution is conveyed through the independently made introduction of the dissertation and the description of the author's contributions for each article or article manuscript.
- As a rule, the printed version of a compilation thesis must be accompanied by the scientific publications included therein. Doctoral researchers are responsible for obtaining the required written permissions from the publishers.
- In order to determine the doctoral researcher's independent contribution to any co-authored publications, the doctoral researcher must prepare a statement (in collaboration with the responsible supervisor), which precisely outlines this contribution. See the detailed instructions below.

Describing the doctoral researcher's independent contribution in co-authored publications

In an article-based dissertation the doctoral researcher must specify his/her contribution to all co-authored publications, including both the author's independent work and collaboration with other researchers. Doctoral researchers are advised to discuss the author-specific contributions with the responsible supervisor and co-authors of each article, so that they achieve shared understanding of the doctoral researcher's independent contribution. Such a description is not needed for articles written alone, unless the research they contain involves significant collaboration or the work of other researchers. The doctoral researcher's contribution is described after the article list in the section "Thesis author's own contribution in the co-authored articles".

The independent role of the doctoral researcher and participation in the co-operation may concern the following matters, of which only those that have been realised in practice are explicated (and those that have not been realised are excluded).

- Inventing the original idea, or an idea that significantly changes the direction of the research
- Designing and planning the research (implementation)
- Implementing the literature review
- Identifying and selecting research objects
- Acquiring/collecting research data
- Analysing research data
- Implementing significant visualizations and/or illustrations

- Discussing the findings and drawing conclusions on contributions
- Writing different sections of the article content
- Drafting and finishing an entire manuscript version
- Presenting an article at a conference or other event
- Processing peer review feedback and improving the text based on the feedback
- Acting as the article's main contact (corresponding author), if this is not apparent from the order of authors.

More than one matter from the above issues may be included in the same sentence. The doctoral researchers may refer to themselves as 'I' (I) or 'thesis author' (author of the dissertation) and to collaborators either by their names or by the term 'co-author(s)'.

Typically, the description for each article is one text paragraph (about three to ten lines per article). If the division of work among the authors is exactly the same in more than one article, one common description for those articles is sufficient. If the same article is used in the dissertation of another doctoral researcher, this must be mentioned in conjunction with the description of each doctoral researcher's own contribution and consistency of the division of work must be ensured.

Monograph

The structure of a monograph must conform to the principles of scientific reporting in accordance with the selected research design and methodology. The monograph must set forth at least the premises and objectives of the research, introduce the key concepts, provide an in-depth analysis of previous research, identify and justify key research gaps/problems, describe methodology and results, include a discussion of the results, indicate the main contributions of the dissertation and their scientific and practical novelty. In addition, the significance, reliability and validity of the research and their possible limitations, practical/managerial implications and avenues for future research should be discussed.

The following principles apply to monographs:

- Doctoral researchers are advised to prepare a statement, which precisely outlines the contributions of themselves and others in the research, in case the dissertation research is conducted within a research group (or if such a statement is otherwise deemed necessary). The doctoral researcher may use the above tips concerning co-authored publications in preparing such a statement. This description may be included in the introduction or method section.
- Responsible supervisors are expected to exercise special care to ensure that the quality of a monograph meets the quality requirements.

- The recommended length of a monograph is no more than 250 pages.

Describing the use of external service providers and information systems in doctoral dissertations

The doctoral researcher must, as part of his/her thesis, clarify and specify which external service providers (e.g., companies), software, information systems, or artificial intelligence he/she has used in his/her research and dissertation and how/for what purposes. The description is placed after the table of contents (and a possible list of articles and a description of the doctoral researcher's contribution), before the first actual text chapter in the section "Use of external services and information systems in the thesis". The doctoral researcher himself/herself bears full responsibility for the content and quality of his/her dissertation and publications.

The uses of an external service may include: literature search, identification of data sources, data acquisition, transcription of material, translation of the language of the questionnaire or research material, technical implementation and distribution of the questionnaire, editing/processing/analysis of research material, language revision or linguistic editing of text, improvement/harmonisation of the layout of images and/or tables, editing the bibliography or the layout of the dissertation file. If necessary, the doctoral researcher may outline the above issues by sub-study, article by article. If the same service providers or software have been used in all articles/sub-studies, it is sufficient to mention the partners and uses once.

The default scope when describing the contributions of external service providers and systems is one text paragraph (about one to ten lines).

General principles have been approved by the Doctoral Education Committee of the Faculty of Business and Built Environment (Tampere University of Technology) on 8 June 2017.

Instructions on describing the doctoral researcher's independent contribution in co-authored publications and the use of external service providers and information systems have been added in May 2023.

General principles have been updated by the Planning Group of the Doctoral Programme in Business and Technology Management (Tampere University) in May 2024.