

A Structured Approach for Presenting Theses

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ABSTRACT

How should a postgraduate research student present a thesis? This paper provides a structure as a starting point for understanding what a thesis should set out to achieve, and also provides a basis for communication between a student and his or her supervisor. Firstly, criteria for judging a thesis are reviewed and justification for its structure is provided. Then writing style is considered. Finally, each of the five sections are described in some detail: introduction, literature review, methodology, analysis of data, and conclusions and implications.

INTRODUCTION

An important issue for postgraduate research students is how to present the thesis. Many universities provide little guidance to students, prompting the criticism that, at one university, 'the conditions for the award of degrees in the Graduate Study section of the calendar give more precise information on the size of the paper to be used and the margins to be left on each side of the sheet than on the university's understanding of what a thesis is' (Massingham 1984, p. 15). Many students need a structure for presenting a thesis that will ensure it demonstrates the three requirements of (Moses 1985):

- a distinct contribution to a body of knowledge through an original investigation or testing of ideas, worthy in part of publication (see section 5 described below) - this requirement is usually the most important one for a Ph.D. thesis but may not be so important for a Master's or honours thesis;
- competence in research processes, including an understanding of, and competence in, appropriate research techniques and an ability to report research (see sections 3 and 4, plus the whole report format); and
- mastery of a body of knowledge, including an ability to make critical use of published work and source materials (see section 2) with an appreciation of the relationship of the special theme to the wider field of knowledge (see sections 2 and 5).

The student should ask to see a copy of the letter sent to examiners to determine the priorities of his or her faculty for the three criteria above and if the faculty has additional criteria (Nightingale 1992). As well, a supervisor may be able to produce copies of previous examiners' reports.

This paper aims to provide a thesis structure that matches the requirements above. Essentially, I argue that a thesis should follow certain style conventions and have five sections: introduction, literature review, methodology, analysis of data, and conclusions and implications. Following this structure and using care about a standard style will make the thesis match the expectations of most examiners and provide training for much research work afterwards. My contribution arises from other writers having provided general procedures for the many parts of the Ph.D. research process (for example, Davis & Parker 1979; Phillips & Pugh 1987; Perry 1990), but not for the thesis itself in as comprehensive a way as this paper does (for example, Clark 1986; Pratt 1984; Witcher 1990).

The paper has two parts. Firstly, the five section structure is introduced, possible changes to it are justified and writing style is considered. In the second part, each of the five sections are described in some detail.

Delimitations

The structured approach may be limited to postgraduate theses in marketing. That is, the structure may not be appropriate for theses in other areas or for theses using relatively unusual methodologies such as historical research designs or grounded theory. Moreover, the structure is a starting point for thinking about how to present a thesis rather than the *only* structure that can be adopted, and so it is not meant to inhibit the creativity of postgraduate researchers.

Another delimitation of the approach is that it is restricted to presenting the *final* version of the thesis. This paper does not address the techniques of actually writing a thesis. Moreover, the approach in this paper does not refer to the actual *sequence* of writing the thesis, nor is it meant to imply that the issues of each section have to be addressed by the student in the order shown. For example, the hypotheses at the end of section 2 are meant to *appear* to be developed as the section progresses, but the student might have a well-developed idea of what they will be *before* he or she starts to write the section. Moreover, although the methodology of section 3 must *appear* to be selected because it was appropriate for the research problem identified and carefully justified in section 1, the student may have actually selected a methodology very early in his or her candidature and then developed an appropriate research problem and justified it.

Moreover, after a student has sketched out a draft table of contents for each section, he or she should begin writing the 'easiest parts' of the thesis first as they go along, whatever those parts are - and usually introductions to sections are the last to be written (Phillips & Pugh, 1987, p. 61). But bear in mind that the research problem, delimitations and research gaps in the literature *must* be identified and written down before other parts of the thesis can be written. Nor is this structure meant to be the format for a research proposal - one proposal format is provided in Parker and Davis (1979). Finally, although this structure is meant for theses, it can also apply to journal articles. Varadarajan (1996), the Editor of the prestigious *Journal of Marketing*, offered guidelines for articles that are remarkably similar to those presented below.

BASICS OF STRUCTURE AND STYLE

The thesis should have a *unified* structure (Easterby-Smith et al. 1991), as shown in the five sections of a thesis summarised in figure 1 and table 1. Firstly, section 1 introduces the core research problem and then 'sets the

scene' and outlines the path that the examiner will travel towards the thesis' conclusion. The research itself is described in sections 2 to 5:

- the research problem and hypotheses arising from the body of knowledge developed during previous research (section 2),

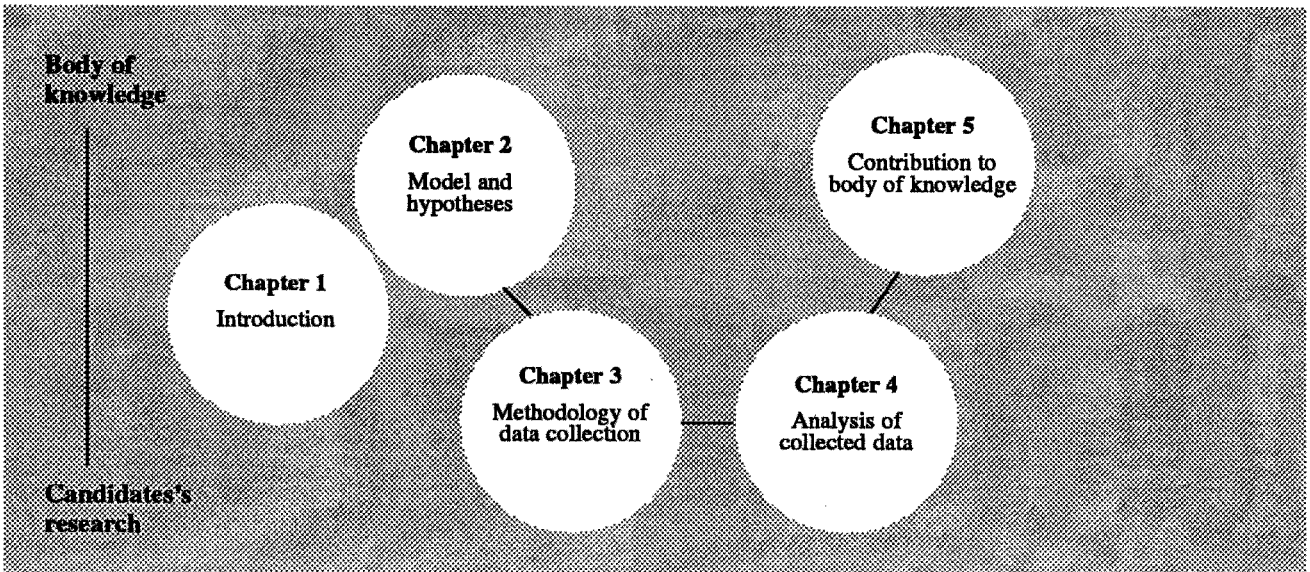


Figure 1. Model of the sections of a thesis

Title page	3.1 Introduction
Abstract (with keywords)	3.2 Justification for the paradigm and methodology
Table of contents	3.3 (Research procedures)
List of tables	3.4 Ethical considerations
List of figures	3.5 Conclusion
Abbreviations	
Statement of original authorship	4 Analysis of data (this section usually refers to the analysis of the major stage of the research project)
Acknowledgments	4.1 Introduction
1 Introduction	4.2 Brief description of subjects
1.1 Background to the research	4.3 (Patterns of data for each research question or hypothesis)
1.2 Research problem and hypotheses	4.4 Conclusion
1.3 Justification for the research	
1.4 Methodology	5 Conclusions and implications
1.5 Outline of the report	5.1 Introduction
1.6 Definitions	5.2 Conclusions about each research question or hypothesis
1.7 Delimitations of scope and key assumptions	5.3 Conclusions about the research problem
1.8 Conclusion	5.4 Implications for theory
2 Research issues (sections 2.3 and 2.4 might be allotted a chapter to themselves in a Ph.D. thesis)	5.5 Implications for policy and practice
2.1 Introduction	5.5.1 Private sector managers
2.2 (Parent disciplines/fields and classification models)	5.5.2 Public sector policy analysis and managers
2.3 (Immediate discipline, analytical models and research questions or hypotheses)	5.6 Limitations (if the section is necessary)
2.4 Conclusion	5.7 Further research
3 Methodology (there may be separate chapters for the methodologies of stages one and two of a Ph.D. thesis)	Bibliography
	Appendices

Table 1. Sequence of a structured thesis

- methods used in this research to collect data about the hypotheses (section 3),
- results of applying those methods in this research (section 4), and
- conclusions about the hypotheses and research problem based on the results of section 4, including their place in the body of knowledge outlined previously in section 2 (section 5).

Justification of the structured approach

This five section structure can be *justified*. Firstly, the structure is unified and focussed on solving the one research problem. Thus it addresses the major fault of postgraduate theses in Nightingales' (1984) survey of 139 examiners' reports, that is, it clearly addresses those examiners' difficulty in discerning what was the 'thesis' of the thesis? Nightingale concluded that unity and focus depend on supervisors emphasising 'throughout students' candidacies that they are striving in the thesis to communicate one big idea' (Nightingale 1984, p. 174). That one big idea is the *research problem* stated on page 1 or 2 of the thesis and explicitly solved in section 5. Easterby-Smith et al. (1991) also emphasise the importance of consistency in a thesis, Phillips and Pugh (1994, p. 41) confirm that a thesis must have a thesis or a 'position' which is argued for, and Lindsay (1995, pp. 104, 105) insists that 'the unifying hypothesis ... the purpose of the thesis must be clear from the very beginning'.

There are seven other justifications for the structure, for it:

- carefully addresses each of the 31 requirements of an Australian Ph.D. thesis outlined by the authoritative Higher Education Research and Development Society of Australia (Moses 1985, pp. 32-34) (five of the 31 are not required for Master's or honours theses and they relate to appreciation the relationship of the research to the wider body of knowledge and to originality as shown by the topic researched or the methodology employed)
- is explicitly or implicitly followed by many writers of articles in prestigious academic journals such as *The Academy of Management Journal* and *Strategic Management Journal* (for example, Datta et al. 1992), and so students learn skills required by reviewers of those journals while writing their thesis
- has been the basis of several Ph.D. and Masters theses at Australian universities that were completed in minimum time and passed by examiners with no or negligible revisions required

- is much like that which will be used by students later in their career, to apply for research grants (as shown in Krathwohl, 1977; Poole, 1993)
- provides an analytical framework for studying the writing processes used in the five to ten previously completed theses that a student should read
- provides a mechanism to shorten the time taken to complete a postgraduate degree like a Ph.D., an aim becoming desired in many countries (Cudé, 1989), by reducing time wasted on unnecessary tasks or on trying to demystify the thesis-writing process
- inhibits inefficient thesis writing that squanders taxpayers' funds, wastes supervisors' time and risks the health, careers and families of students

Justified changes to the structure

The term 'section' used to describe parts of the structure does not imply that there must be exactly five chapters in a thesis. Honours and masters student who use just one methodology in their research have found five chapters are adequate. However, other students might find it convenient to expand the number of chapters to six or seven because of unusual characteristics of the analysis in his or her research. For example, a Ph.D. might consist of two stages: some qualitative research reported in chapters 3 and 4 of the thesis which is then followed by some quantitative research to refine the initial findings reported in chapters 5 and 6; the section 5 described below would then become chapter 7.

In addition, Ph.D. theses at universities that allow huge theses may have extra chapters added to contain the extended reviews of bodies of knowledge in those theses. I am thinking here of those universities which allow a Ph.D. thesis to rise from a minimum length of about 50 000 to 60 000 words (Phillips & Pugh, 1987), up beyond the 70 000 to 80 000 words preferred by myself and many other examiners, to the upper limit 100 000 words specified by many established universities like the University of Queensland. Nevertheless, the principle of having a structure based on five sections, should be useful for the eight reasons provided above.

In brief, the five section structure has some limitations but it also has many benefits for students learning the basics of their research craft and beginning their research career, as well as for a busy supervisor who has had little training in research writing or supervision. The structure provides a starting point for understanding what a thesis should set out to achieve, and also provides a basis for communication between a student and his or her

supervisor. Moreover, with this tested and proven structure, students can focus on being creative in their research and not dissipate their creative energies on trying to devise another structure. Indeed, if they do not follow this structure, the risk of examiners requiring revisions to their submitted thesis are heightened and their training for a research career after their degree, is diminished.

Links between sections and chapters

With the overall structure justified above, we can turn to how to the sections themselves and how they are linked. Each chapter in a section should stand almost alone. Each chapter (except the first) should have an introductory section *linking* the chapter to the main idea of the previous chapter and outlining the *aim* and the *organisation* of the chapter. For example, the core ideas in an introduction to section 3 might be:

Chapter 2 identified several research questions; this next chapter describes the methodology used to provide data to investigate them. An introduction to the methodology was provided in section 1.4 of chapter 1; this chapter aims to build on that introduction and to provide assurance that appropriate procedures were followed. The chapter is organised around four major topics: the study region, the sampling procedure, nominal group technique procedures, and data processing.

The introductory section of section 5 (that is, section 5.1 in table 1) will be longer than those of other sections, for it will summarise all earlier parts of the thesis prior to making conclusions about the research described in those earlier parts. Each chapter should also have a concluding summary section that outlines major themes established in the chapter, *without introducing new material*. As a rough rule of thumb, the five sections have these respective percentages of the thesis' words: 5, 30, 15, 25 and 25 percent.

Style

As well as the structure discussed above, examiners also assess matters of style (Hansford & Maxwell, 1993). Within each of the sections of the thesis, the spelling, styles and formats of a style guide such as *Style Manual* (Australian Government Publishing Service, 1988) and of the Macquarie Dictionary should be followed scrupulously, so that the student uses consistent styles from the first draft and throughout the thesis for processes such as using bold type and italics, indenting quotations, single and double inverted commas, making references,

spaces before and after side headings and lists, gender conventions, and so on. After all, the *Style Manual* will be the standard for later submissions to the Australian Research Council and to most journals published in Australia. Moreover, using the authoritative *Style Manual* provides a defensive shield against an examiner who may criticise the thesis from the viewpoint of his or her own idiosyncratic style. Finally, using a style guide in this way provides training for when articles are prepared for journals, for each journal has its own style which should usually be followed scrupulously.

In addition to usual style rules such as each paragraph having an early topic sentence, a thesis has some style rules of its own. For example, section 1 is usually written in the present tense with references to literature in the past tense; the rest of the thesis is written in the past tense as it concerns the research after it has been done, except for the findings in section 5 which are presented in the present tense. More precisely for sections 2 and 3, schools of thought and procedural steps are written about using the present tense and published researchers and the student's own actions are written about using the past tense. For example: 'The eclectic school has [present] several strands. Smith (1990) reported [past] that...' and 'The first step in content analysis is [present] to decide on categories. The researcher selected [past] ten documents...'

In addition, value judgements and words should not be used in the objective pursuit of truth that a thesis reports. For example, 'it is unfortunate', 'it is interesting', 'it is believed', and 'it is welcome' are inappropriate. Although first person words such as 'I' and 'my' are now acceptable in a thesis (especially in section 3 of a thesis within the interpretive paradigm), their use should be controlled - the student is a mere private in an army pursuing truth and so should not overrate his or her importance until their degree has been finally awarded. In other words, the student should always *justify* any decisions where his or her judgement was required (such as the number and type of industries surveyed and the number of points on a Likert scale), acknowledging the strengths and weaknesses of the options considered and always relying upon as many references as possible to support the decision made. That is, authorities should be used to back up any claim of the researcher, if possible. If the examiner wanted to read *opinions*, he or she could read letters to the editor of a newspaper.

Easily-followed communication with the examiner can be achieved by using several principles. Firstly, have sections

and sub-sections starting as often as very second or third page, each with a descriptive heading in bold. Secondly, start each section or sub-section with a phrase or sentence linking it with what has gone before, for example, a sentence might start with 'Given the situation described in section 2.3.4' or 'Turning from international issues to domestic concerns, ...' The important issue here is that the examiner is led on from old ideas which he or she has already digested with, to new ideas: we all need 'an opportunity to get "comfortable" with old material before new material is thrown at us' (Lindsay 1995, p. 56). Thirdly, briefly describe the argument or point to be made in the section at its beginning, for example, 'Seven deficiencies in models in the literature will be identified'. Next, make each step in the argument easy to identify with a key term in italics or the judicious use of 'firstly', 'secondly', or 'moreover', 'in addition', 'in contrast' and so on. Finally, end each section with a summary, to establish what it has achieved. This summary sentence or paragraph could be flagged by usually beginning it with 'In conclusion,..' or 'In brief,..' In brief, following these five principles will make arguments easy to follow and so guide the examiner towards agreeing with a student's views.

Another style rule for theses is that the word 'etc.' is too imprecise to be used in a thesis, and that the use of adjectives and adverbs should be kept to a bare minimum to avoid the impression of being imprecise and flowery. Furthermore, words such as 'this', 'these', 'those' and 'it' should not be left *dangling* - they should almost always refer to an object; for example, 'This rule should be followed' is preferred to 'This should be followed'. Some supervisors also suggest that brackets should rarely be used in a thesis - if a comment is important enough to help answer the thesis' research problem, then it should be added in a straightforward way and not be hidden within brackets as a minor concern to distract the examiner away from the research problem.

In addition, definite and indefinite articles should be avoided where possible, especially in headings; for example, 'Supervision of doctoral students' is more taut and less presumptuous than 'The supervision of doctoral students'. Paragraphs should be short; as a rule of thumb, three to four paragraphs should start on each page if my preferred line spacing of 1.5 and Times Roman 12 point serif font is used, to provide adequate structure and complexity of thought on each page. (A line spacing of 2 and more than about three paragraphs per page make a thesis appear disjointed and 'flaky', and a sanserif font is not easy to read.) A final note of style is that margins should be those nominated by the university or those in

Style Manual (Australian Government Publishing Service 1988).

Incidentally, some examiners may think too many appendices indicate the student cannot handle data and information efficiently, so do not *expect* examiners to read appendices to pass the thesis. Appendices should be used only to provide evidence that procedures or secondary analyses have been carried out.

Final considerations

The thesis will have to go through many drafts (Zuber-Skerritt & Knight, 1986). The first draft will be started early in the candidature, be crafted after initial mindmapping and a tentative table of contents of a section and a section, through the 'right', creative side of the brain and will emphasise basic ideas without much concern for detail or precise language. Supervisors and other students should be involved in the review of these drafts because research has shown that good researchers 'require the collaboration of others to make their projects work, to get them to completion' (Frost & Stablein, 1992, p. 253), and that social isolation is the main reason for withdrawing from postgraduate study (Phillips & Conrad, 1992). By the way, research has also shown that relying on just one supervisor can be dangerous (Conrad, Perry & Zuber-Skerritt, 1992; Phillips & Conrad, 1992).

DETAILS OF SECTIONS

Turning from the general issues of style and structure above to more precise details of the structure of each section, each section of a thesis and its parts are discussed next.

1 INTRODUCTION

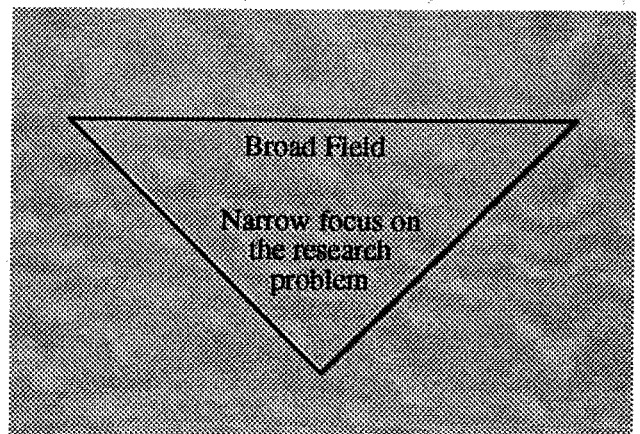


Figure 2 The triangle of section 1.1 of section 1

1.1 Background to the research

Section 1.1 outlines the broad field of study and then leads into the focus of the research problem. This section is short and aims to orient the readers and grasp their attention.. In graphical form, section 1.1 is the triangle shown in figure 2.

A thesis should be able to reference at least four or five writers in the first one or two paragraphs, to demonstrate from the start of the thesis that care has been taken to acknowledge and chart the depth and breadth of the existing body of knowledge. Most of the material in section 1.1 is covered in more detail in later sections such as section 1.3, and so these sections will have to be referred to, and section 1.1 is usually only about one or two pages maximum. For these reasons, section 1.1 is often *one of the last sections of sections 1 and 2* to be written.

Section 1.1 could use either a 'field of study' approach or a 'historical review' approach. For example, using a field of study approach, section 1.1 of a thesis about a firm's licensing of technology would start with comments about international trade and development, Australia's GDP, the role of new product and process development in national economic growth, and then have an explanation of how technology licensing helps a firm's new product and new process development leading into a sentence about how little research has been done into it.

An alternative to the field of study example of the previous paragraph is to provide a brief historical review of ideas in the field, leading up to the present. If this alternative approach to structuring section 1.1 is adopted, it cannot replace the comprehensive review of the literature to be made in section 2, and so numerous references will have to be made to section 2. While the brief introductory history review may be appropriate for a journal article, section 1.1 of a thesis should usually take the field of study approach illustrated in the paragraph above, to prevent repetition of its points in section 2.

1.2 Research problem and hypotheses/research questions

Section 1.2 outlines the core or one big idea of the research, starting with the research problem printed in bold or italics on page 1 or 2 of the thesis. The research problem is one or two sentences that cannot be answered 'yes' or 'no'; it is the broad problem that the researcher will examine more precisely in the hypotheses and is the problem prompting and placing a boundary around the

research without specifying what kind of research is to be done (Emory & Cooper 1991). As Leedy (1989, p.61) notes in his thorough introduction to writing research problems, 'The statement of the research problem *must* imply that, for the resolution of the problem, *thinking on the part of the researcher* will be required'. Sometimes there may be sub-problems to the major research problem.

Examples of research problems from Masters theses are:

- How do New South Wales and Queensland private sector managers successfully implement telemarketing into their organisations?
- How do Australian manufacturers select distribution channels for their exports to Japan?

The research problem in a Ph.D. thesis is often more theoretical than the two examples above, for a Ph.D. research problem should not be merely a 'problem-solving' one but should 'test out' the limits of previously proposed generalisations (Phillips & Pugh, 1987, p. 45). That is, '[Ph.D.] research, even when narrowly and tightly defined, should be guided by some explicit theoretical or conceptual framework' and without this, the thesis becomes a 'mindless ... theoretical wasteland' (Adams & White, 1994, pp. 566, 574). That theoretical framework will be developed in section 2, but one or two of its constructs could be reflected in the research problem. Examples of appropriate Ph.D. research problems are:

- How culturally appropriate is TQM for 'reconceptualising' African management?
- How effective for strategic marketing in the Australian finance industry are Porter's models of competition and European models of networks?

Note that the constructs referred to in the research problems are high level ones and are not the more specific constructs developed for hypotheses at the end of section 2 or their operational definitions developed in section 3.

When formulating the research problem, its boundaries or delimitations should be carefully considered, even if these considerations are not made explicit in the wording of the research problem. In effect, the research problem outlines the research area, setting boundaries for its generalisability of, for example:

- one broad area of interest, for example, 'telecommunications marketing', (students might consider ensuring that this area of interest has its own academic discipline from which several examiners could be selected - a two-discipline thesis may produce conflicts among examiners from different disciplines)

- level of decision making, for example, directors, managing directors, senior managers, customers, or public policy analysts
- private or public sector organisation
- industry, for example, transport industry
- geographic limits, for example, Queensland or Australia and
- time or business cycle limits, for example, in the late 1980s before the Australian economy entered a recession

Asking the familiar questions of 'who', 'what', 'where', 'how' and 'why' (Yin, 1989, p. 17) may lead the student towards placing appropriate boundaries around the research problem.

All the boundaries of the research problem will be explicit in the research problem *or* in section 1.7, however, *all* the boundaries should be *justified* in section 1.7. In the example above, restricting the research problem to Queensland and New South Wales telemarketing could be based on those states being more advanced than the rest of Australia. That is, the boundaries cannot be arbitrary. Within those boundaries, the data and the conclusions of this research should apply; outside those boundaries, it can be questioned whether the results will apply.

Identifying the research problem will take some time, and is an exercise in 'gradually reducing uncertainty' as it is narrowed and refined (Phillips and Pugh, 1994, p. 83). Nevertheless, early identification of a preliminary research problem focuses research activity and literature searches, and so is an important early part of the research project (Zuber-Skerritt & Knight, 1986). An example of the gradual narrowing of a research problem is a student's problem about the partners in small Australian architectural practice which initially referred to 'practice of strategic management', then to 'designing and implementing a strategy', then to 'implementing a strategy' and finally to 'the processes involved in implementing a strategy'.

After the research problem is presented, a short paragraph should say how the problem is solved in the thesis. This step is necessary because academic writing should *not* be a detective story with the solution kept a mystery until the end (Brown, 1995). An example of this paragraph following a research problem statement is (based on Heide, 1994, p. 71):

The problem addressed in this research is:

How can relationships involved in interorganisational governance in marketing

channels be managed?

Essentially I argue that interorganisational governance is a heterogeneous phenomenon and that different relationship management strategies are appropriate under different conditions.

Another example of a research problem and its solution in section 1.2 is (based on Eisenhardt & Zbaracki, 1992, pp. 17-18):

The problem addressed in this research is:

Which of the three major paradigms best explains strategic decision making?

I conclude that a strategic decision makers are boundedly rational, that power wins battles of choice and chance matters. I also propose a new agenda for future research which centres on a few, key research areas and opens up research to new paradigms.

This openness right at the beginning of a thesis about the positions that will be developed later should also be shown in sub-sections and even in paragraphs. That is, *expectations are created* about the intellectual positions which will be developed in the section, section and paragraph (in the topic sentence of a paragraph), then those expectations are *fulfilled* and finally a conclusion *confirms* that the expectations have been met.

After the research problem and a brief summary of how it will be solved is presented, section 1.2 presents the major bodies of theory which will be covered in section 2, with references to parts of section 2 where these bodies of knowledge will be examined in more detail (in about one page or so). Then it lists the research questions or hypotheses that will be developed in section 2, and references the relevant parts of section 2. The research problem above usually refers to *decisions*; in contrast, the research questions and hypotheses usually require *information* for their solution. The research questions or hypotheses are the specific questions that the researcher will gather data about in order to satisfactorily solve the research problem (Emory & Cooper, 1991).

As part of the approach to a thesis not being a detective story, this section should also briefly describe the *contributions* that the thesis will make in its final section. This description should be limited to about two pages.

1.3 Justification for the research

Examiners are concerned that the student has not addressed a trivial research area. It is not enough to show there are gaps in the body of knowledge, they must be *important* gaps (Varadarajan, 1966). That is, the research

problem should be important on several theoretical and practical grounds; for example, a thesis about small businesses could justify its research problem through:

- i importance of small business and/or the importance of the specific area of the small business discipline being investigated (this justification is usually accompanied by a mass of statistical data showing how huge the area of the research problem is in terms of constructs such as revenue, employment and assets, and often by authoritative discussions and quotations from government publications about committees of inquiry)
- ii relative neglect of the specific research problem by previous researchers (some of this justification would refer to section 2, for there is no need to repeat parts of section 2 here; however, section 2 deals with the nitty gritty of *individual* research questions while this section should emphasise the *whole* research problem and possibly conclude with some appropriate quotes from authorities about the research problem)
- iii relative neglect of the research's methodologies by previous researchers (with references to section 3 being required, with an acknowledgment that the methodology is *justified* there and is not simply used for the sake of novelty) and
- iv usefulness of potential applications of the research's findings (this justification is based on the researcher's *initial* assumptions, in contrast, section 5.4 is a statement of the completed research's usefulness).

These four sorts of justification could also be used to justify a research problem in other areas, with several paragraphs of section 1.3 devoted to each.

1.4 Methodology

Section 1.4 is an introductory overview of the methodology, and is placed here in section 1 to satisfy the initial curiosity of the examiner. This section should refer to sections in section 2 and 3 where the methodology is described and justified in far more detail.

That is, this section first describes the methodology in general terms, including a brief, one or two paragraph description of major statistical processes, for example, of regression. Then the section could refer to sections in section 2 where methodology is discussed, and possibly justify the chosen methodology based upon the purpose of the research, and justify not using other techniques. For example, the choice of a mail survey rather than a telephone survey or case studies could be justified.

Alternatively and preferably, these justifications for the methodology used could be left until the review of previous research in section 2 and the start of section 3. Details of the methodology such the sampling frame and the size of the sample are provided in section 3 and not in section 1.4.

In summary, this section merely helps to provide an overview of the research methodology, and can be perfunctory - two pages would be a maximum length. Because of the openness of thesis writing noted above, this section should also introduce the data analysis methods as well as the data collection methods and briefly summarise the findings of the data analysis.

1.5 Outline of this report

Each section and chapter is briefly described in this section. (Incidentally, the student must use either 'report' or 'thesis' consistently.)

1.6 Definitions

Definitions adopted by researchers are often not uniform, so key and controversial terms are defined to establish positions taken in the Ph.D. research. The term being defined should be in italics or in bold, and the format for presenting each of the definitions should be standard. Definitions should match the underlying assumptions of the research and students may need to *justify* some of their definitions. A definition of a core construct may be discussed in depth at the beginning of section 2, and defining the construct in this section 1.6 can merely present the definition and refer to the discussion in section 2.

Students should try to use definitions of authorities wherever possible, so that the results of the research can be fitted into the body of literature and so that the thesis can withstand attacks by examiners with trivial personal preferences. Perhaps the student could make some minor changes to a standard definition to make it particularly appropriate to the thesis; doing this will illustrate a critical mind at work which is aware of the overriding need to solve the research problem.

1.7 Delimitations of scope and key assumption

This section 'builds a fence' around the research findings which are additional to the limitations and key assumptions established in the previous section about definitions. For example, the explicit boundaries of the research problem described in section 1.2 above should be noted again in this section and other, implicit boundaries should be clearly expressed. Other delimitations could be

the industries chosen, the locations chosen, environmental factors, and variables that could not be controlled. In effect, the 'population' about which findings are to be made, is outlined here. In most theses, other limitations caused specifically by the *methodological* methods chosen are placed in section 3 rather than in this section.

In this section, the researcher is trying to forestall examiners' criticisms, so *justifications* for these delimitations must be provided in the section. It would be wise not to emphasise that 'time' and/or 'resources' were major influences on these delimitations of the research for an examiner may think that the student should have chosen a research project that was more appropriate for these obvious limitations of any research. For example, if the population is restricted to one state rather than a nation, perhaps differences between states may be said to have caused just one state to be selected. No claims for significance beyond these delimitations will be made.

Incidentally, 'delimitations' are sometimes called 'limitations' in theses. Strictly speaking, limitations are beyond the researcher's control while delimitations are within his or her control. The first term is common in US theses and is suggested here as referring to the planned, justified *scope* of the study beyond which generalisation of the results was not intended.

Some students might like to describe the *unit of analysis* here, for example, firm or manager. Whether it is described here or in section 3 is not important, just as long as it is identified and justified in the thesis.

1.8 Conclusion

The final paragraph of each section usually summarises the key achievements of the section. So the conclusion of section 1 should read something like:

This chapter laid the foundations for the report. It introduced the research problem and research questions and hypotheses. Then the research was justified, definitions were presented, the methodology was briefly described and justified, the report was outlined, and the limitations were given. On these foundations, the report can proceed with a detailed description of the research.

2 RESEARCH ISSUES

The second section aims to build a *theoretical foundation* upon which the research is based by reviewing the relevant literature to identify research issues which are worth researching because they are controversial and have

not been answered by previous researchers. That is, the literature review is *not an end in itself*, but is a *means to the end* of identifying the worthy research issues which will be listed in the section's conclusion and were briefly introduced to the examiner in section 1.2. It is this point about the section being a means to an end which prompts its title being 'Research issues' rather than 'Literature review'. Incidentally, the section is about the extant literature, so the students' own ideas or opinions have no place in this section, except where they are used to structure the treatment of the literature *and* are clearly supported by authorities, evidence or logic.

The survey of the literature in a thesis should not concentrate only on the area of the research problem described in section 1.2, for as well as including the *immediate discipline/field* of the research problem (for example, employee motivation or customer service) it should also demonstrate a familiarity with its *parent discipline/field* (for example, employee psychology or services marketing). The authorities Phillips and Pugh (1994) descriptively name these two disciplines/fields as background and focus theories, respectively. Relatedly, they say that a student's research should be 'testing out' research, that is, research which tests out the limits of previously proposed theories. For example, theory about marketing brands has almost been completely based on research about goods. Research could test out whether this goods-based theory applies to services. Brands and services marketing would be the parent disciplines and the immediate discipline would consider them together. Another example would be to test out whether the theory about relationship marketing applies to cybermarketing. Thus this concept of testing out research is valuable for ensuring postgraduate research makes a contribution and helps the design of section 2.

The immediate discipline/field of the research problem should preferably relate to *one* academic discipline from which examiners will be selected, but there may be more than one parent discipline/field; for example, a thesis examining the immediate discipline/field of marketing orientation might discuss two parent disciplines/fields of marketing theory and strategic management. In other words, the literature review of a thesis tends to extend further beyond the boundaries of the research problem than it does in most other types of research. Nevertheless, the literature review should be focussed and should not contain disciplines that are not directly relevant to the immediate discipline/field - these indirectly associated disciplines should be relegated to section 5.4 of the thesis as areas for which the research has implications. In other

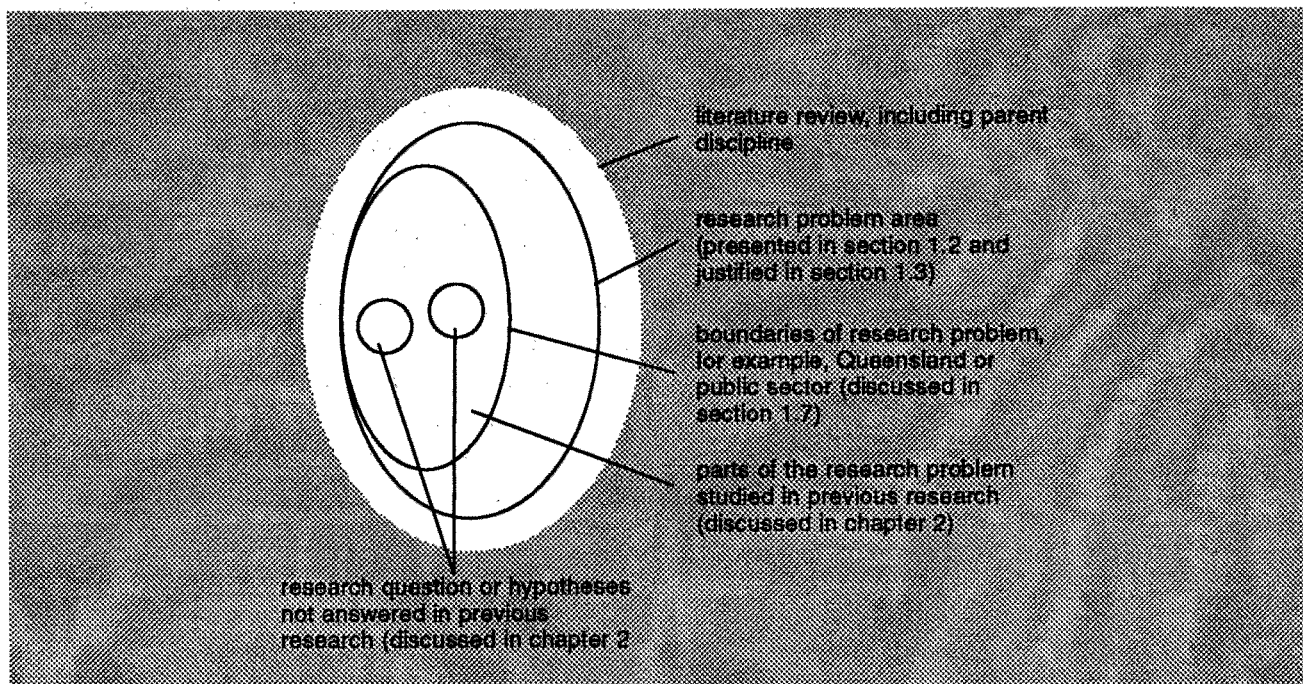


Figure 3. Relationships between the parent and immediate discipline/field and its research problem, and between the research problem and the research questions or hypotheses

words, only *parent* disciplines/fields are involved, not uncles, aunts, or other relatives. The relationships between several of the concepts above are shown in figure 3.

Classification models of the literature review and analytical models of the theoretical framework

Some judgement may be required to balance the need to focus on the research problem and its immediate discipline/field, and the need for a thesis to show familiarity with the literature of the parent discipline/field. One way of balancing these two needs is to develop 'mind maps' such as a new *classification* model of the body of knowledge showing how concepts can be grouped or clustered together according to schools of thought or themes, without necessarily considering relationships between groups (figure 3 is an example). These concepts could be the section headings in the outline of the section that should precede the writing of the section (Zuber-Skerritt & Knight, 1986). The new classification model will begin to show that the student's literature survey is constructively analytical rather than merely descriptive as it often is in a textbook, for the rigour in a thesis should be predominantly at the upper levels of Bloom and Krathowl's (1956) six-level hierarchy of educational objectives. Levels 1, 2 and 3 are mere knowledge, comprehension and application which every undergraduate should display. Levels 4, 5 and 6 are analysis, synthesis and evaluation - the higher-order skills

which academic examiners consider a postgraduate research student should develop (Easterby-Smith et al. 1991).

Presenting an analytical classification model in a figure near the beginning of section 2 will help the examiners follow the sequence of the section. Referring briefly to the figure as each new group of concepts is begun to be discussed, will help the examiner follow the intellectual journey of the section. In other words, the literature review is *not* a string of pointless, isolated summaries of the writings of others along the lines of Jones said...Smith said...Green said. The links between each writer and others must be brought out, and the links between each writer and the research problem should be clear. What the student says about a writer is more important than a description of what a writer says (Leedy, 1993), and this emphasis is helped by using a bracketed reference like '(Leedy, 1993)' in the first part of this sentence, rather than leading with the writer by saying 'Leedy (1993) says...'. In brief, the literature review is not a textbook for a reader who knows little about a topic, rather, it is an interesting rearrangement of material with which the examiner should already be familiar.

After the classification model of the parent discipline/field is developed, the immediate discipline/field of the research problem is explored to unearth the research questions or hypotheses; these should appear to 'grow' out of the discussion as gaps in the body of knowledge are discovered. This immediate discipline/field part of the

literature review is clearly different from the parent discipline parts, for the student's *own* views come to the fore now, as he or she constructs a new theoretical framework which has not been developed previously in the literature - this theoretical framework is used to develop the hypotheses or research issues about which data will be collected in later sections. The parent disciplines/fields were merely the *points of departure* for the main journey of the research, that is, the development of a new theoretical framework from which research issues/hypotheses will be used to focus data collection. Indeed, some thesis writers prefer to put this immediate discipline/theoretical framework into a chapter of its own, to clearly demonstrate how it differs from the somewhat less creative literature review of the parent disciplines.

A second, more *analytical* model of core constructs and their relationships based on this analysis of the immediate discipline/field, is developed as the text describing the theoretical framework is written. This analytical model will usually explicitly consider *relationships* between concepts, and so there will be arrows between the groups of concepts (figure 1 is an example). Sekaran (1992, chapter 3) discusses this model building procedure for quantitative research. This analytical model is a very important part of section 2, for it summarises the theoretical framework from which the propositions or research questions flow at the end of the section. Showing appropriate section and subsection numbers on these models (like 2.1, 2.2 and so on) will help referencing of them in the body of the report. In other words, a theoretical framework with justified variables and their relationships that provides an anchor for the development of research issues/propositions towards the end of section 2, is essential.

An example

In brief, section 2 reviews the parent and immediate disciplines/fields of the research problem, with the aims of charting the body of knowledge with a summary model or two, showing where the research problem fits into that body of knowledge and then identifying research questions or hypotheses. These will focus the discussion of later sections on directions where further research is required to answer the research problem, that is, having sections in section 3 and 4 explicitly related to the hypotheses or research questions facilitates the 'seamless' characteristic of an effective thesis.

Of course, each student will write section 2 differently because it involves so much personal creativity and understanding and so the section's structure may end up

being different from that suggested in these notes. Nevertheless, an example of section 2 might be useful for beginning research students. Note how skillfully the student has linked their reviews of the parent and immediate disciplines/fields.

The example of how to structure section 2 was provided in a Ph.D. thesis which had a research problem about inward technology licensing. Section 2 began by developing a definition of inward technology licensing, and then reviewed the parent discipline/field of new product development. In a chronological discussion of major researchers, the review showed a familiarity with major conceptual issues in the parent discipline/field of new product development such as: approaches to new product development which are alternatives to inward technology licensing, the importance of new product development, its riskiness, and its stages with their influencing factors. The review acknowledged disagreements between authorities without developing hypotheses, and established that inward technology licensing was an interesting part of the parent discipline/field to research, summarised in a table which compared inward technology licensing with some other methods of new product development on three criteria, using a high-medium-low scale. After fifteen pages of reviewing the parent discipline/field, the section addressed the immediate discipline/field of inwards technology licensing by reviewing literature in four groups of influencing factors, summarised in a classification model of the theoretical framework being constructed. As sections of the section considered each of these groups, researchers were compared with each other and some hypotheses were developed where controversy or methodological weaknesses existed or research 'gaps' in possibly interesting areas were identified. Particular concepts and the hypothesised directions of relationships between them were summarised in a detailed analytical model which grew out of the earlier classification model used to structure the literature review.

Details of section 2

Having established the overall processes of section 2, this discussion can now turn to more detailed considerations. Each major piece of literature should be discussed *succinctly* within the section in terms of:

- topics covered, including the year, the industry, the country and/or region, and the subjects in the research (for example, managing directors or middle managers)

- survey and statistical methodologies used
- findings
- limitations and problems of the research, for example, was the data collection or its analysis appropriate?
- contribution to the body of knowledge *that is relevant to the research problem*, that is, how it compares and contrast with the positions developed by other researchers.

Providing a concise description of the research topics and methodologies underlying findings reached by writers will provide a basis for the students' view of the value of their findings to the body of knowledge, will remind the examiner of the research involved, and will help the student to carefully chart the boundaries of the body of knowledge. (Incidentally, it is courteous to reference as many publications as possible of likely examiners.)

Useful guides to how contributions to a body of knowledge can be assessed and clustered into groups for classification and analytical models are many articles in each issue of *The Academy of Management Review*, the literature review parts of articles in the initial overview section of major articles in *The Academy of Management Journal* and other prestigious academic journals, and the chairperson's summing up of various papers presented at a conference. Heide (1994) provides an example of a very analytical treatment of two parent disciplines/fields and one immediate discipline/field, and Leedy (1993, pp. 88-95) provides a thorough guide to collecting sources and writing a literature review. Finally, Cooper (1989) discusses sources of literature and suggests that keywords and databases be identified in the thesis to improve the validity and reliability of a literature review.

If a quotation from a writer is being placed in the literature review or elsewhere in the thesis, the quotation should be preceded by a brief description of what the student perceives the writer is saying. For example, the indirect description preceding a quotation might be: 'Zuber-Skerritt and Knight (1986, p. 93) list three benefits of having a research problem to guide research activities:' Such indirect descriptions preceding quotations demonstrate that the student understands the importance of the quotation and that his or her own ideas are in control of the shape of the review of the literature. Moreover, quotations should not be too long, unless they are especially valuable; the student is expected to précis long slabs of material in the literature, rather than quote them - after all, the student is supposed to be writing the thesis. References in section 2 should include some old, milestone references to show that the student is aware of

the development of the research area, but the section must also include *recent* writings - having only old references generally indicates a worn-out research problem. Old references that have made suggestions which have not been subsequently researched might be worth detailed discussion, but why have the suggestions not been researched in the past?

Incidentally, having numbers in the headings of each section and subsections of the thesis, as shown in table 1, will also help to make the large thesis appear organised and facilitate cross-referencing between sections and subsections. However, some supervisors may prefer a student to use headings without numbers, because articles in journals do not have headings with numbers. But articles are far shorter than theses, and so I prefer to include an explicit skeleton in the form of numbered sections and subsections to carry the extra weight of a thesis.

Exploratory research and research questions

If the research is *exploratory* and uses a qualitative research procedure such as case studies or action research, then the literature review in section 2 will unearth *research issues or questions* that will be the focus of the data collection described in later sections and answered in section 4. (Essentially, exploratory research is qualitative and asks 'what are the variables involved?'; in contrast, explanatory research is quantitative and asks 'what are the precise relationships between variables?' Easterby-Smith et al. (1991) distinguish between qualitative and quantitative methodologies in management research, in detail.) Research issues or questions ask about 'what', 'who' and 'where', for example, and so are not answered with a 'yes' or a 'no', but with a description or discussion. For example, a research issue or question might be stated as:

How are conflicts between owners and managers which are resolved in the board of directors of a big business, resolved in a small professional practice without a board of directors?

'Pure' exploratory research or induction which does not use research issues or questions developed in section 2 to guide data collection, is *not* appropriate for Ph.D. research because a body of knowledge (the core of a Ph.D.) is not the foundation for that kind of research (Phillips & Pugh, 1994). Indeed, Phillips and Pugh (1994, p.52) assert that pure exploratory research is *less* likely to produce a contribution to knowledge than the testing out research recommended in this paper. As noted earlier, the first person may be used in section 3 of exploratory research

theses when describing what the researcher actually did; similarly, many quotations from interviewees should be used in section 4 to illustrate findings.

Explanatory research and hypotheses or propositions

On the other hand, if the research is *explanatory* and so refers to queries about 'how' or 'why' and uses some *quantitative research* methodology such as regression analysis of survey data, then section 2 unearths *testable* hypotheses that can be answered with a 'yes' or 'no', or with a precise answer to questions about 'how many' or 'what proportion' (Emory & Cooper 1991). That is, research issues or questions are open and require *words* as data to answer, and hypotheses are closed and require *numbers* as data to solve. For example, a hypothesis might be presented as a question that can be answered 'yes' or 'no' through statistical testing of measured constructs such as:

Does the number of successful telemarketing calls correlate with the level of specialisation of telemarketing representatives?

Each construct in the hypothesis (for example, 'specialisation of telemarketing representatives') must be capable of being measured; *precisely* how the instruments were designed to measure the constructs is described later in section 3. That is, operational definitions of the constructs developed for hypotheses are not divulged until section 3, that is, the statistical form of a hypothesis involving null and alternative hypotheses about means, distributions or correlation coefficients, for example, is not presented until sections 3 and 4. Indeed, this distinction between hypotheses about constructs in section 2 and hypotheses about population statistics in section 3 can be confusing. Several students prefer to refer to section 2's hypotheses as *propositions* and restrict the term *hypothesis* to the associated and similarly numbered statistical forms developed in section 3 after operational definitions of constructs identified in section 2, have been constructed.

Generally speaking, the total number of research questions and/or hypotheses should not exceed about four or five; if there are more, sufficient analysis may not be done on each within the space constraints of a thesis. Whether research questions or hypotheses are used, they should be presented in the way that informed judges accept as being most likely. For example, the hypothesis that 'smoking causes cancer' is preferred to 'smoking does not cause cancer'. The transformation of the

hypothesis into *statistical* null and alternate hypotheses is left until section 3.

The research questions or hypotheses developed during section 2 should be presented throughout the section as the literature survey unearths areas which require researching, that is, they should appear to 'grow out' of the review, even though the student may have decided on them long before while writing very early drafts of the section. When first presented at intervals through section 2, the research questions or hypotheses should be numbered and indented in bold or italics. The concluding section of section 2 should have a summary list of the research questions or hypotheses developed earlier in the section.

In brief, section 2 identifies and reviews the conceptual/theoretical dimensions of the literature and discovers research questions or hypotheses from a new theoretical framework that are worth researching in later sections.

3 METHODOLOGY

Section 3 describes the major methodology used to collect the data which will be used to answer the hypotheses. In some theses, *several* methods may be used for 'increasingly authors and researchers who work in organisations and with managers argue that one should attempt to mix methods to some extent, because it provides more perspectives on the phenomena being studied' (Easterby-Smith, 1991, p. 31) and the same position is recommended in Ph.D. theses by Gable (1994). But within the time and other resource constraints of most theses, I consider that there will usually be only one *major* methodology which suits the research problem and associated research gaps uncovered in section 2. Other methodologies would be used in a *secondary* role to help formulate research issues (for example, some interviews to help design a survey's questionnaire could be described in section 2 if they help in formulating hypotheses or in section 3 if they help in developing the operational definitions of constructs) or to slightly extend or generalise the findings of the main method (for example, some interviews to confirm an unexpected result which could be described in section 4 or 5). So section 3 usually centres on the major methodology of the research, although the same considerations might be briefly mentioned when discussing any secondary methodologies.

Level of detail in section 3

Section 3 about data collection must be written so that another researcher can replicate the research. That is, there must be enough detail for 'a reasonably knowledgeable colleague' to repeat the data collection and analysis (Lindsay, 1995, p.14). But there is a second consideration involved in deciding how much detail to put in the section - the candidate must also show the examiner that he or she understands the methodology. The candidate can assume that the examiner has a good undergraduate training in the methodology and two to three years research experience (Brown, 1996, p. 49), but the *examiner cannot assume that about the candidate*. Thus students will have to provide *enough detail* to show the examiner that the student also knows the body of knowledge about the methodology and its procedures, even if it is in only a couple of sentences with references. If the techniques are advanced ones like structural equation modeling which are only covered in postgraduate courses, one or two of the examiners may have to be 'brought up to steam' on the technique and so more material will be necessary to cover more details of the technique and why they were used, than when a basic technique is being used.

That is, examiners need to be assured that *all* critical procedures and processes have been followed. For example, a thesis using regression as the prime methodology should include details of the pilot study, handling of response bias and tests for assumptions of regression. A thesis using factor analysis would cover preliminary tests such as Bartlett's and scree tests and discuss core issues such as the sample size and method of rotation. A thesis using a survey would discuss the usual core steps of population, sampling frame, sample design, sample size and so on in order (Davis & Cosenza, 1993, p. 221)

In addition to critical procedures and processes, students must show familiarity with controversies and positions taken by authorities. That is, students must show familiarity with the body of knowledge about the methodology, just as they did with the bodies of knowledge in section 2. Indeed, Phillips and Pugh (1994) equate the body of knowledge about the methodology with the body of knowledge about the background and focal theories of section 2, calling the former the 'data theory'. An example of this familiarity for students using a qualitative methodology would be an awareness of how validity and reliability are viewed in qualitative research, in a discussion of how the ideas in Easterby-Smith et al. (1991, pp. 40-41) and Lincoln and Guba (1985, chapter 11) were used in the research. Familiarity with this body

of knowledge can often be demonstrated as the methodology is *justified* and as research procedures are described and *justified*, rather than in a big section about the body of knowledge on its own. For example, merely providing details of a telephone survey is inadequate, for the advantages and disadvantages of *other* types of surveys must be discussed and the choice of a telephone survey justified (Davis & Cosenza, 1993, p. 287). Another example would be to show awareness of the controversy about whether a Likert scale is interval or merely ordinal (Newman, 1994, pp. 153, 167) and justify adoption of interval scales by reference to authorities like a student who said:

A number of reasons account for this use of Likert scales. First, these scales have been found to communicate interval properties to the respondent, and therefore produce data that can be assumed to be intervally scaled (Madsen 1989; Schertzer & Kernan, 1985). Second, in the marketing literature Likert scales are almost always treated as interval scales (for example, Kohli, 1989).

Yet another example would be to show awareness of the controversy about the number of points in a Likert scale by referring to authorities' discussions of the issue, like Armstrong (1985, p.105) and Newman (1994, p.153).

The student must not only show that he or she knows the appropriate body of knowledge about procedures as noted above, but must also provide *some evidence* that the procedures have been followed. For example, dates of interviews or survey mailings should be provided. Appendices to the thesis should contain copies of instruments used and instruments referred to, and some examples of computer printouts; however, well constructed tables of results in section 4 should be adequate for the reader to determine correctness of analysis, and so *all* computer printouts do not need to be in the appendices (although they should be kept by the student just in case the examiner asks for them). Note that appendices should contain all information to which an intensely interested reader needs to refer; a careful examiner should not be expected to go to a library or write to the student's university to check points.

Details of the methodology are required whether a qualitative or quantitative research methodology is used (Yin, 1989). Indeed, a qualitative thesis may contain even *more* details than quantitative one, for a qualitative researcher may influence subjects more - for example, how subjects were chosen, how they answered, and how notes and/or recordings were used. Moreover, the student

should occasionally use 'I' in the methodology section when a qualitative methodology is used in thesis, to describe what he or she actually did in the field, so as to reflect an awareness that the researcher cannot be independent of the field data.

A rigorous methodology

In brief, section 3 describes the methodology adopted (for example, a mail survey and a particular need for achievement instrument), in a far more detailed way than in the introductory description of section 1.5. The *operational definitions* of constructs used in questionnaires or interviews to measure an hypothesised relationship will be described and justified, for example, how an interval scale was devised for the questionnaire. Note that some authorities consider that Ph.D. research should rarely use a previously developed instrument in a new application without extensive justification - they would argue that an old instrument in a new application is merely Master's level work and is not appropriate for Ph.D. work. However, often *parts* of the Ph.D. instrument could have been developed by authorities (for example, a need for achievement instrument), but those parts must still be justified through previous studies of reliability and validity and/or be piloted to the Ph.D. student's requirements in order to assess their reliability and validity, and alternatives must be carefully considered and rejected. Any revisions to the authority's instrument must be identified and justified. Alternatively, multi-item measures could be developed for constructs that have been previously measured with a single item, to increase reliability and validity. It can be argued that an old instrument in a new application will be an original investigation, and so a new or partly-new instrument is

not an absolute necessity for Ph.D. research (Phillips, E. 1992, pers. comm.). Nevertheless, I recommend some qualitative pilot studies before an old instrument is used - they will confirm its appropriateness and may suggest additional questions that help develop new ideas for the thesis, thus reducing the risk that an examiner will disapprove of the thesis.

Let us turn to more precise details of section 3. The section should have separate sections to cover:

- *justification for the methodology* in terms of the research problem and the literature review, for example, a qualitative methodology requires a research problem involving people's constructions of meanings which have not previously been explored (Hassard, 1990) - Yin (1989, p. 17) has a table which might help in writing about this; incidentally, recent theses are showing an awareness of the strengths and weaknesses of the positivist and phenomenological paradigms as a basis for discussing choice of methodology (Phillips & Pugh, 1987, p. 55; Orlikowski & Baroudi, 1991; Easterby-Smith et al. 1991, pp. 22-32; Patton, 1992, pp. 1-63; Newman, 1994, chapter 4; Perry & Coote, 1994; Guba & Lincoln, 1994); table 2 summarises these considerations
- the *unit of analysis* and subjects or sources of data, for example, explicit reference to steps such as deciding the population, the sampling frame and the sample, and the sample size; for case study research, these are discussed in Perry & Coote (1994) and Perry (1998)
- instruments or procedures used to collect data, including how the *dependent variable* was measured, details of pilot studies and explicit concern about

QUALITATIVE RESEARCH	QUANTITATIVE RESEARCH
Research problem: how? why?	Research problem: who (how many)? what (how much)?
Literature review: exploratory - what are the variables involved? constructs are messy research questions are developed	Literature review: explanatory - what are the relationships between the variables which have been previously identified and measured? hypotheses are developed
Paradigm: critical realism/interpretive	Paradigm: positivist
Methodology: for example, case study research or action research	Methodology: for example, survey or experiment

Table 2. Aspects of a unified thesis

specific procedures used to handle internal and external validity (as in Yin, 1989, p. 41; Parkhe, 1993, p. 260-261 and - for qualitative research - Lincoln & Guba, 1985, pp. 290-294); note that the boundaries of external validity were *implicitly* addressed in sections 1.2, 1.6 and 1.7

- administration of instruments or procedures (for example, when, where and who, non-response bias (which is a *very* important issue and is discussed in Armstrong & Overton (1977)), response rates, dates and protocols of interviews (Yin, 1989)), so that the research is reliable, that is, it could be repeated
- *limitations* of the methodology if they were not explicitly discussed in section 1.7, for example, practical limitations on the sampling frame or size of questionnaire in survey research might be clarified and justified (for example, some types of respondents might have been missed because of their religious beliefs), and Parkhe (1993, p.255) discusses some possible limitations of the case study methodology which should have been addressed in a thesis
- any special or unusual treatments of data before it was analysed (for example, special scoring of answers to a survey question)
- evidence that the *assumptions* of analytical techniques were met, for example, that the sample sizes were large enough and assumptions of normality were tested for (Hair et al. (1995) clearly discusses these assumptions for each multivariate technique)
- computer programs used to analyse the data, with justifications for their use (for example, why chi-square was used instead of a Wilcoxon test) - this may require a brief description of the type of data and some appropriate references where similar procedures had been used in similar circumstances; and
- ethical issues.

In addition to the above details, section 3 should show that other variables that might influence results were *controlled* in the research design (and so held at one or two set levels) or properly measured for later inclusion in statistical analyses (for example, as a variable in regression analysis). This point is a very important consideration for examiners.

To fully demonstrate competence in research procedures, the *statistical* forms of hypotheses could be explicitly developed and justified in a thesis, even though such precision is often not required in far shorter journal articles describing similar research. Sekaran (1992, pp. 79-84) provides an introduction to how this hypothesis

development is done. Some students are confused between these statistical hypotheses and the *verbal* hypotheses and propositions developed during a literature review. The verbal hypotheses and propositions are framed in the form with which most experts would agree. In contrast, the statistical hypotheses developed in sections 3 or 4 have a formal null and alternative hypothesis format. The null and the alternative hypotheses could be either directional or not. An example of each type of null hypothesis is:

- The level of specialisation of telemarketing representatives will not increase the probability of successful telemarketing.
- The level of specialisation of telemarketing representatives will not influence the success of marketing.

A directional hypothesis will require different forms of statistical tests of significance than a non-directional hypothesis, for example, the use of a directional hypothesis allows a one-tailed test of significance.

The penultimate section of section 3 should cover ethical considerations of the research. Emory and Cooper (1991), Easterby-Smith et al. (1991), Patton (1992), Lincoln and Guba (1986) and Newman (1994, chapter 18) describe some issues which the student may consider addressing. A student may like to include in appendices the completed forms required for Australian Research Council (ARC) grant applications and reports - his or her university's Research Office will have copies of these. By the way, it is an ethical position of theses that the writer has verified that a reference does actually say what the thesis says it does. For example, if a thesis says Smith (1995) referred to the sample size for a multivariate technique, the student must have read Smith's article, or at the very least read an abstract which clearly confirms that Smith did discuss sample sizes in the way the student says Smith did.

In summary, writing section 3 is analogous to an accountant laying an 'audit trail' - the student should treat the examiner as an accountant treats an auditor, showing he or she knows and can justify the correct procedures and providing evidence that they have been followed.

4 ANALYSIS OF DATA

Section 4 presents patterns of results and analyses them for their relevance to the research questions or hypotheses. Frequent *summary* tables and figures of results are essential, so that readers can easily see patterns in the mass of data presented in this section. Tables of statistical data are presented in quantitative research and

matrices are used in qualitative research (Miles & Huberman 1985).

This section should be clearly organised. The introduction has the normal link to the previous section, the section's objective and outline, but often also has basic, *justified* assumptions like significance levels used and whether one or two tailed tests were used; for example:

Significance of test results is reported in the three ways suggested by Coolican (1990, p. 174), based on p the probability level:

- 'significant': $0.05 > p < 0.01$;
- 'highly significant': $0.01 > p < 0.001$; and
- 'very highly significant': $0.001 > p$.

All probabilities reported are based on two-tailed tests as each comparison had two possible directions.

Note that some statisticians prefer to not *accept* the null hypothesis just because it is *not rejected* (because the type II error involved in acceptance is not known, although the Type I error involved in rejection is), hence the *practical* implications of a statistical test involving no significant difference between test statistics must be made explicit, and not confused with the statistical result. An example of this separation of statistical and practical meanings of statistical test is shown below.

The introduction of section 4 may be different from introductions of other sections because it refers to the following section as well as the preceding section, for section 5 will discuss the findings of section 4 within the context of the literature. Without this warning, an examiner may wonder why some of the implications of the results are not drawn out in section 4. In my experience, section 4 should be restricted to presentation and analysis of the collected data, without drawing general conclusions or comparing results to those of other researchers who were discussed in section 2. That is, although section 4 may contain references to the literature about methodologies, it should not contain references to other literature. If the section also includes references to other research, the more complete discussion of section 5 will be undesirably repetitive and confused. In any case, it is traditional in science to separate the results from the discussion of their significance, to preserve objectivity. 'To qualify each result, or group of results, with comments and comparisons gives the strong impression that you are trying to influence the objective judgment of the reader.' (Lindsay, 1995, p. 17)

After the introduction, descriptive data about the subjects is usually provided, for example, their gender or industry

in survey research, or a brief description of case study organisations in case study research. This description helps to assure the examiner that the student has a 'good feel' for the data, that is, they know good researchers have to 'handle their own rats' (Frost and Stablein, 1992, p. 271).

Then the data for each research question or hypothesis is usually presented, in the same order as they were presented in sections 2 and 3 and will be in sections 5.2 and 5.3. Structuring the data analysis around the research questions or hypotheses will ensure the student does not make the mistake of falling in love the data (Brown, 1996) and telling the reader how beautiful it is - the data analysis must focus on solving the research problem by looking at each research question or hypothesis in turn. Sensitivity analyses of findings to possible errors in data (for example, ordinal rather than assumed interval scales) should be included. If qualitative research is being done, an *additional* section could be provided for data which was collected that does not fit into the research question categories developed in the literature review of section 2.

Note that the section 4 structure suggested in the two paragraphs above does not include tests for response bias or tests of the assumptions of regression or similar statistical procedures. Some students may like to include them in section 4, but they could be discussed in section 3 for they refer primarily to the methodology rather than to the data analysis which will be directly used to test research questions or hypotheses.

In section 4, the data should not be merely presented and the *examiner* expected to analyse it. One way of ensuring adequate analysis is done by the *student* is to have words describing the data followed by numbers placed in brackets, for example, 'most respondents (69 percent)'. For the same reason, test statistics, degrees of freedom or sample size (to allow the examiner to check figures in tables, if he or she wishes) and p values should be explained in words that show the student knows what they mean, followed by their values placed in brackets. An example of an appropriate analysis is:

Question 9 explored attitudes to product quality and respondent's answers are summarised in table 4.6. Most respondents (59.2 percent) agreed that the product quality was important, but a sizeable minority (27.8 percent) had no view about product quality - a somewhat surprising finding which will also be discussed within the context of the literature in section 5.4.3... A t-test was used to discern the relationship between attitudes to product quality and price (section

4.9), because both were measured with an interval scale. No significant difference between the means of attitudes to the two variables was found ($t = 1.56$, $\text{dof} = 23$, $p = 0.35$). A practical implication of this finding is that the shoppers considered product quality and price separately.

Most researchers in reputable journals do not provide precise p values when reporting the analysis of their data and merely say whether the test statistic is significant at a certain level, for example, ' $p < 0.05$ '. However, other researchers consider that this procedure does not provide all the information offered by modern computer programs and so prefer to report the precise p value, as was done in the example above. One compromise between these two positions would be to use a particular level in the text, for example, ' $p < 0.01$ ', and have the precise p levels listed in a table.

All patterns of results in section 4 must be supported by the evidence unearthed by the procedures described in section 3. That is, a reader should be able to check findings by looking at tables or figures. So each table or figure should be referred to in the body of the section, with the reason for its presence. As the example in the previous paragraph showed, a topic should be introduced in words and the main findings presented; *then* the table or figure referred to and evidence from it should be introduced in one or two sentences; and then the highlights of the table or figure should be discussed more fully, together with a brief description of what the reader will look for in the table or figure when he or she turns to it. In other words, a reader should not be expected to develop the links between the words in section 4 and a table or figure by himself or herself. Indeed, the reader should be able to grasp the meaning by reading *either* the words *or* the figures without reference to the other.

When figures are used, the table of data used to construct the figure should be in an appendix. All tables and figures should have a number and title at the top and their source at the bottom, for example, 'Source: analysis of survey data'. If there no source is listed, the examiner will assume the researcher's mind is the source, but a listing such as 'Source: developed for this research from section 2' might reinforce the originality of the student's work. The title of a table or graph should contain enough information that its findings can be discerned without referring to the text, for example, 'Relationship marketing propensity among Overseas Chinese and Australians: they are similar despite cultural differences'.

5 CONCLUSIONS AND IMPLICATIONS

5.1 Introduction

Section 5 is the most important section of the thesis, for after ensuring the methodology and research processes are sound, the examiners will spend much time studying section 5. But the section is often marked by fatigue and Phillips and Pugh (1994, p.60) note that 'in our experience its inadequacy is the single most common reason for requiring students to resubmit their theses after first presentation'. So the student must discover springs of interest and creativity to make his or her section 5 worthy of the rest of the thesis, and make it clearly show that the research does make a distinct contribution to the body of knowledge. Thus the research's contributions to knowledge should be the *explicit* theme of sections 5.2 to 5.4.

Actually, identifying what is a distinct contribution to knowledge can bewilder some students, as Phillips (1992, p.128) found in a survey of Australian academics and students. Nevertheless, making a distinct contribution to knowledge 'would not go beyond the goal of stretching the body of knowledge slightly' by using a relatively new methodology in a field, using a methodology in a country where it has not been used before, or making a synthesis or interpretation that has not been made before'. So this task should not be too difficult if the research and the preceding sections have been carefully designed and executed as explained in these notes.

A jigsaw puzzle analogy is useful for understanding what section 5 is about. Research begins like a jumbled jigsaw puzzle about the research problem. Section 2's literature review starts putting the pieces together to uncover a picture, but shows that some pieces are missing and so the complete picture cannot be known. Then sections 3 and 4 describe the hunt for the missing pieces. The section 5 returns to the puzzle, briefly summarising what the picture looked like at the end of section 2 and then explaining how the new pieces fit in to make the *whole* picture clear.

Do remember that the introduction to section 5.1 is longer than the introduction of other sections, as the section above titled 'Links between sections' noted.

5.2 Conclusions about research questions or hypotheses

Findings for each research question or hypothesis are summarised from section 4 and explained *within the context of this and prior research examined in section 2*; for example, with which of the researchers discussed in

section 2 does this research agree or disagree, and why? For each research question/hypothesis, the agreement or disagreement of the results of a numbered section in section 4 with the literature should be made clear and the reason for disagreement thought through. For example, the disagreement might be because some previous research was done in Asia and this research was done in Australia. Disagreement suggests the Ph.D. research is making a contribution to knowledge and this *contribution of the research* should be clearly developed. Each research question or hypothesis would have its own subsection, that is, 5.2.1, 5.2.2 and so on, and each section will have a reference to the appropriate section of section 4 so that the examiner can clearly see that the conclusions come from the findings in section 4; of course, each section will also have many references to the writers discussed in section 2.

A brief example of one of these discussions is:

The final set of factors in the initial conceptual framework of this research illustrated in figure 2.10 was the strategic objectives of the firm. The interaction between entry mode choice and strategic objectives has attracted considerable attention in the literature (Jones, 1991; Anderson & Gatignon, 1986; Hwang, 1988; Hill et al, 1990). For example, Minor, Wu and Choi (1991) argue that entry mode choice is based on strategic objectives when considered in tandem with ...

This research had varied results about these factors. Section 4.3.5's findings were that innovation learning and whether firms consider a global strategy, are unimportant. These findings are *inconsistent* with the literature. The reasons for this inconsistency appear to be the small size of the firms in this survey and their industry. Jones (1991) surveyed firms with turnovers above \$1 million in the pharmaceutical industry, and Hwang (1988) surveyed... In contrast, Australian small jewelers are... Presumably, they are more entrepreneurial and have less at stake than larger firms and ...

5.3 Conclusions about the research problem

Based on section 5.2, implications of the research for furthering understanding of the research problem are explored. The section goes beyond the mere number-crunching of section 4 and *incorporates qualitative findings about the research problem developed during the research*, including those insights discovered during interviews in qualitative research which had never even

been considered in the literature reviewed in section 2. Again the contribution of the research to the body of knowledge should be clearly developed.

You are warned that examiners are careful that conclusions are based on *findings* alone, and will dispute conclusions not clearly based on the research results. That is, there is a difference between the *conclusions* of the research findings in sections 5.2 and 5.3 and *implications* drawn from them later in sections 5.4 and 5.5. For example, if a qualitative methodology is used with limited claims for generalisability, the conclusions must refer specifically to the people interviewed in the past - 'the Hong Kong managers placed small value on advertising' rather than the present tense of 'Hong Kong managers place small value on price'.

This section may sometimes be quite small if the hypotheses or research questions dealt with in the previous sections cover the area of the research problem in a comprehensive way. Nevertheless, the section is usually worth including for it provides a conclusion to the *whole* research effort. Moreover, I suggest that this section conclude with a summary listing of the contributions of the research together with justifications for calling them 'contributions'. As noted earlier, the examiner is looking for these and it makes his or her task easier if the student explicitly lists them after introducing them in earlier parts of this section.

This section should be especially important for qualitative, *theory-building* research for it will show the final theory that is developed, and have a model of it and propositions which later researchers can use to test the theory. That is, the section must have 'a rigorously developed conceptual framework with clearly defined and measurable variables, and empirically testable research propositions' (Varadarajan, 1996, p. 6). Reference to these propositions will be made in the later 'Implications for further research' section.

In a report of non-thesis research such as a journal article or a high-level consulting report, this section might be the 'conclusion' of the report, but a thesis must also discuss parent and other disciplines (Nightingale, 1984), as outlined in the next section.

5.4 Implications for theory

The *full* picture of the research's findings within the body of knowledge is provided in section 5.4, that is, it provides the theoretical implications of the research. This section aims to convince examiners that the Ph.D. research has not only made a significant contribution to

knowledge in its immediate discipline/field as outlined in sections 5.2 and 5.3, but also has implications for the wider body of knowledge, including the parent disciplines/fields but also among other related disciplines that were not even mentioned among the few parent disciplines/fields of section 2; the broad range of disciplines mentioned in section 1.1 might suggest some of these related disciplines. For example, in a Ph.D. thesis with a research problem involving customer service, section 5.4 might refer not only to the parent disciplines/fields of services marketing but also to consumer behaviour, personality characteristics and psychological motivations.

If one or more of the models developed in section 2 have to be modified because of the research findings, then the modified model should be developed in section 5.3 or 5.4, with the modifications clearly marked in bold on the figure. Indeed, development of a modified model of the classification or analytical models developed in section 2 is an excellent summary of how the research has added to the body of knowledge, and is strongly recommended.

In brief, sections 5.3 and 5.4 are the 'conclusion' to the whole thesis (Phillips and Pugh, 1994) and are the student's complete answer to the research problem.

5.5 Implications for policy and practice

Practical implications for private sector managers are covered in section 5.5.1 and implications for public sector analysts and managers are covered in section 5.5.2. Needs for training or new government policies are often raised here. Examiners may be impressed if this section develops a checklist of procedures for managers which incorporates the research findings, and this may help to fulfill justification iv of section 1.3.

5.6 Limitations

Section 1.7 has previously outlined major limitations of the research that were a deliberate part of the research (for example, industry boundaries to the research problem). This section discusses other limitations that became apparent during the progress of the research, for example, questionnaire results may indicate that age of respondents is a limitation. Often, this section is unnecessary. Indeed, do not make too much of any limitations, for too much discussion here will make the examiner think the research was poorly designed and any conclusions are not worth awarding a degree for.

5.7 Implications for further research

This final section is written to help students and other researchers in selection and design of future research. Further research could refer to both topics and to methodologies or to both. A case study methodology thesis should mention the need for positivist survey research to generalise the findings. Removing some delimitations mentioned and justified in section 1.7 usually provides opportunities for further research, for example, different regions or countries, different industries and different levels of management. This section is enhanced by the development of the actual propositions or research issues that a follow up researcher could use to start his or her research design stage.

A final sentence or short paragraph could summarise and tie the whole thesis together. For example, a thesis might end with 'The literature suggests that the marketing/entrepreneurship interface is direct and similar to the marketing/organisation interface of large firms. This theory-building research showed the marketing/entrepreneurship interface is more complex than the literature suggests and set a foundation for further research about the interface.'

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