

CHAPTER 6

RESEARCH DESIGN AND METHODOLOGY

6.1 INTRODUCTION

Parker (2002:400), on defining the future, said: *There is always a sense of wonder or awe when one attempts to define the future but there are also practical reasons for looking ahead*, and the IFAC (1994:3) commented that *[t]hose who do not anticipate the future may never experience it*. And, in anticipation of the future, change in the management accounting environment was defined as morphogenic in nature. Two questions were then formulated:

- What is the current situation regarding morphogenic change (see paragraph 4.3)?

- Where are management accountants heading?

This last question now requires further investigation.

Parker (2002:4) explored the second question (see paragraph 5.2) when he tried to describe the skills management accountants would need:

[t]his is no easy question to answer. Answers evolve from ... observing what management accountants presently do ... and asking employers what they require of management accountants ...

A comprehensive literature review revealed no information on the position of South African management accountants. In trying to determine where South African management accountants are heading, it was decided to investigate the strategic alignment of management accounting education with a changed business environment. In other words, is education delivering what is needed in

practice? Deliberations in paragraph 5.4 concluded that the balanced scorecard would be the most appropriate tool to measure this strategic alignment.

6.2 RESEARCH DESIGN

No research has meaning without proper validation. Details about the planning and execution of the research, being critical components of research design, are therefore presented in this chapter. According to Hussey and Hussey (1997:54), research design is the *overall approach to the research process, from the theoretical underpinning to the collection and analysis of the data.*

Saunders, Lewis and Thornhill (1997:72) state that the research design helps the researcher to:

- make an informed decision about the research methodology (The researcher has to decide how data are to be collected and analysed, and needs an overall configuration of the research process to ensure success.)
- adapt the research design to cater for limitations and constraints (These include limited access to data or insufficient knowledge of the subject or an inadequate understanding of the subject or time constraints.)
- determine which research methods would be appropriate for the particular study (Proper research methods should help to *explain the why's, how's and what's of the subject* (Saunders *et al* 1997:72).)

Saunders *et al* (1997:1) states that systematic research encompasses specific methods to collect data, deliberation on the significance of the results obtained, and an explanation of any limitations experienced. The primary focus of research should be to increase knowledge of a particular topic in order to help solve relevant problems.

6.3 RESEARCH OBJECTIVE

The main purpose of this research was to increase knowledge regarding the current performance of management accounting practitioners in meeting the challenges presented by a changing business environment. A methodology that best assesses the skills of currently practising management accountants therefore had to be determined.

6.4 METHODOLOGIES OF RESEARCH

These methodologies define different types of research and are concerned with the overall strategy the researcher chooses (Leedy & Ormrod 2005:86). Chapter 5 identified the balanced scorecard as the most suitable method of assessing performance. The next step was to determine which methodology would be most appropriate in obtaining accurate information for the balanced scorecard.

Most international studies of the balanced scorecard to assess performance have taken place in the private sector. Rompho (2004:900) reports that in the international educational environment the balanced scorecard has been mostly used in the administrative departments of universities. Documented evidence of research on the balanced scorecard in the South African context is limited, and no documented evidence could be found of research regarding the application of the balanced scorecard in South African universities (see annexure 9). None of the sources proved use of the balanced scorecard to evaluate higher education in a specific field (such as management accounting). Even in cases where the balanced scorecard was applied to entire universities, the performance measures were categorised into four prescribed perspectives that failed to provide a causal link to the strategic objectives of those measures (Rompho 2004:901).

This is therefore the first time that a scorecard of this nature will be developed in the field of tertiary education in South Africa, and the first time that academic performance in a specific field (management accounting) will be measured. This is also the first endeavour to test the relevance of management accounting education to industry in South Africa. Careful consideration of the research methodologies was therefore critical.

Saunders *et al* (1997:75) specifies that research strategies depend on:

- the type of research question
- the researcher's control over actual events
- focusing on contemporary as opposed to historical phenomena

Yin (1994:6) states that researchers may adopt several strategies to approach their research (see diagram 6.1):

Diagram 6.1: Different research strategies and their application

Strategy	Form of research question	Requires control over event	Focus on contemporary Events
Experiment	How, Why	Yes	Yes
Survey	Who, What, Where, How many, How much	No	Yes
Archival analysis	Who, What, Where, How many, How much	No	Yes/No
History	How, Why	No	No
Case study	How, Why	No	Yes

Source: Yin 1994:6

The proposed research has to enhance knowledge of the status of management accounting in South Africa. An attempt has been made to guide tertiary management accounting educators on how best to prepare students for the challenges they will face in a changing business environment. The balanced scorecard will be used to assess performance.

The proposed research therefore has to focus on a contemporary event that does not require control over the event. It also became clear that questions about the current skills of practising management accountants require answers. In terms of diagram 6.1, a survey research design would therefore be best suited to this research.

The data required for a balanced scorecard assessment were obtained during a survey with a questionnaire as the primary source of information (in view of the lack of existing information in this regard). The merits of using the balanced scorecard for this purpose have been discussed in chapter 5. The merits and features of the survey questionnaire are discussed in 6.7.

A choice had to be made between using a quantitative or qualitative approach to the study.

6.4.1 Quantitative versus qualitative approach to research

The debate between a qualitative or quantitative approach to research centres on the impact of various methodologies on the reliability and validity of the research results.

Those in favour of a quantitative approach, such as Mintzberg (1973) and Hodgson, Levison and Zaleznik (1965), base their arguments on the objectivity and internal validity of results obtained via a qualitative approach. They consider bias on the part of the researcher as an inescapable part of the qualitative

methodology. The validity of the results may therefore be questioned, and it would be difficult to compare the results of studies conducted by different researchers (Gill & Johnson 1997:156).

Supporters of the qualitative method, such as Neustadt (1960) and Burgess (1993), base their criticism of the quantitative approach on whether quantification is possible under all circumstances and the possibility of uncontrolled bias. Burgess (in Platt 1992:21) notes for example that *the prestige of statistics as the one scientific method has naturally often led ... to a naïve and uncritical application of quantitative measurement*". Sayer (1992:220) argues that bias is introduced in formalised questionnaires because they do not allow different interpretations of questions.

Cormack (1991:126) suggests the use of multiple methods in the face of these limitations: *... through triangulation, multiple research methods can be used ... in order to gain a total picture of some phenomena*. Triangulation occurs when two or more research methods are used. Saunders *et al* (1997:80) identify two major advantages of multiple research methods:

- Different methods may be used for different purposes.
- Different data collection methods may be used to provide convergent evidence (a process referred to as triangulation).

6.4.2 Qualitative research approach

Qualitative methods are designed to explore the human factor and cause-and-effect nuances. Qualitative research is best suited to accommodating factors that cannot be translated into number-based results. The results of qualitative research are influenced by interaction between the researcher and the subject. The skill and objectivity of the researcher must therefore be beyond reproach to ensure the validity of the findings.

Qualitative research may be used in conjunction with a descriptive technique in order to portray an accurate profile of events or situations. Saunders *et al* (1997:79) describe descriptive research as a *means to an end*, i.e. to be able to draw conclusions.

Descriptive research varies widely in scope and complexity and is often used for a literature review. Borg and Gall (in Saunders *et al* 1997:39) identify the purpose of a literature review as follows:

- further refinement of the research question
- discovering explicit recommendations for further research
- preventing the repetition of work that has already been done
- providing insight into potential research strategies and methodologies
- highlighting research possibilities that have been overlooked in the past

Descriptive research, based on a qualitative approach, was used in chapter 2 to record the historical development of management accounting. It was also used in chapters 3 and 4 to identify the different types of change in the business environment, and in chapter 5 to gain an understanding of balanced scorecard principles. For this purpose the following sources were used:

- text books
- articles in journals, magazines and newspapers
- articles on the internet
- thesis and dissertations
- information brochures
- conference proceedings
- personal interviews.

6.4.3 Quantitative research approach

Hussey and Hussey (1997:12) state that the quantitative research approach provides objective and unbiased results that have not been influenced by the researcher. Quantitative methods focus on numerical results and attempt to limit the influence of the human factor. An example is when large-scale, formalised questionnaires are distributed in an impersonal manner (by post or e-mail) and the responses are coded and statistically analysed.

Manheim and Rich (1995:132) mentions that quantitative research is directed towards gathering primary data directly from the sample to provide a basis for making inferences about the larger population.

This study has made use of a survey method that is predominantly quantitative in nature, although certain aspects identified in the IMA and IFAC studies (see paragraphs 4.4.1 & 4.4.2) necessitated a qualitative approach.

The next step in the research design was to formulate the research question, propositions and hypotheses (Hussey & Hussey 1997:115; Oppenheim 1992:7).

6.5 THE RESEARCH QUESTION

The balanced scorecard was used as a measurement tool to find answers to the primary research question and the secondary problems set out below.

The following research question was triggered by the comments of business leaders (see paragraph 5.3) and an investigation into the impact of changes in the business environment on the role of management accountants (chapters 3 and 4):

Do academic institutions provide management accountants with the necessary professional skills and competencies, and do management accountants display the required skills to meet the challenges of a changing business environment?

6.5.1 Statement of secondary problems

Subproblem 1:

Determine to what extent academics and practitioners consider the customer, internal business process, and learning and growth perspectives to represent adequate preparation for management accounting practice.

Subproblem 2:

Determine whether a gap exists between the perceptions of practitioners and those of academics in respect of the skills management accountants need to meet the challenges of a changing business environment.

Subproblem 3:

Determine to what extent the financial perspective meets the requirements of academics.

Subproblem 4:

Determine whether academics and practitioners have different opinions about the attributes management accountants need to meet the challenges of a changing business environment.

Subproblem 5:

Determine whether a gap exists between the perceptions of management accounting practitioners in the service industry and those in the manufacturing industry regarding the attributes management accountants need to meet the challenges of a changing business environment.

Subproblem 6:

Determine to what extent the utilisation of advanced management accounting systems in the service industry and the manufacturing industry differs.

Subproblem 7:

Determine whether management accounting practitioners in the service industry and those in the manufacturing industry view knowledge of advanced management accounting systems differently.

Subproblem 8:

Determine whether the utilisation of traditional management accounting systems is reported differently by practitioners in the service industry and those in the manufacturing industry.

6.5.2 Statement of propositions

Researchers use propositions to state their expected research results. A proposition is more qualitative and at a higher level than a hypothesis. Propositions are not tested statistically but are inferred qualitatively whereas hypotheses require data and measurements to enable the researcher to test them statistically. Propositions may be used to guide the formulation of hypotheses. Hypotheses may in turn be used to support or refute the researcher's propositions (Cooper & Schindler 2003:504).

In light of the primary problem statement, the subproblems were used to formulate the following ten research propositions:

Proposition 1a:

From a **customer perspective**, academics consider quality instruction, a highly valued programme, effective student placement and flexible scheduling adequate to meet the challenges of a changing business environment.

Proposition 1b:

From a **customer perspective**, management accounting practitioners consider quality instruction, a highly valued programme and effective student placement inadequate preparation to meet the challenges of a changing business environment.

Proposition 2a:

From an **internal business process perspective**, academics consider quality assurance, a unique curriculum, cost efficiency and optimal class size adequate preparation to meet the challenges of a changing business environment.

Proposition 2b:

From an **internal business process perspective**, practitioners consider quality assurance and a unique curriculum adequate preparation to meet the challenges of a changing business environment.

Proposition 3a:

From a **learning and growth perspective**, academics consider curriculum innovation, teaching innovation and professional growth of the faculty adequate preparation to meet the challenges of a changing business environment.

Proposition 3b:

From a **learning and growth perspective**, practitioners consider curriculum innovation, teaching innovation and professional growth of the faculty inadequate preparation to meet the challenges of a changing business environment.

Proposition 4 (a function of propositions 1a, 1b, 2a, 2b, 3a and 3c):

A significant gap exists between the perceptions of academics and those of practitioners of the skills management accountants need to meet the challenges of a changing business environment.

Proposition 5:

From a **financial perspective**, academics do not consider the educational environment for management accountants to be efficient and effective.

Proposition 6:

A significant gap exists between the perceptions of academics and those of practitioners of the attributes management accountants need to meet the challenges of a changing business environment.

Proposition 7:

A significant gap exists between the perceptions of service industry practitioners and those of manufacturing industry practitioners regarding the attributes management accountants need to meet the challenges of a changing business environment.

Propositions 8:

Service industry practitioners and manufacturing industry practitioners report differently on the utilisation of advanced management accounting systems in business.

Proposition 9:

Service industry practitioners and manufacturing industry practitioners have different views about knowledge of advanced management accounting systems.

Proposition 10:

Service industry practitioners and manufacturing industry practitioners report differently on the utilisation of traditional management accounting techniques.

6.6 The Research methodology

A measuring instrument is necessary to determine whether a gap exists between training and practice in the field of management accounting. A decision was made to use the balanced scorecard as a measuring tool, and data therefore had to be collected by means of a survey and/or a questionnaire.

Oppenheim (1992:7) lists the following tasks or steps in constructing a survey and/or a questionnaire:

- 1) Identify the study objectives and the hypotheses to be investigated.
- 2) Select a target population.
- 3) Select a research method and prepare the survey instrument.
- 4) Pretest the instrument.
- 5) Administer the survey.
- 6) Organise the data.
- 7) Analyse the data.
- 8) Interpret the data.
- 9) Reach conclusions.
- 10) Make recommendations based on the research findings.

The above steps identified by Oppenheim (1992:7) were covered in assessing the skills displayed by management accountants in a changing business environment:

- Step (1) was partially covered in 6.5, and the formulation of hypotheses is covered in 6.7.4.
- Steps (2) to (7) are covered in this chapter and discussed in more detail in 6.7.
- Steps (8) and (9) will be covered in chapter 7.
- Step (10) will be covered in chapter 8.

These steps are discussed below.

6.6.1 Rationale for selection of a target population

The population selected for this study of the capabilities South African management accountants comprises two very distinct groups, namely management accountants in practice (practitioners) and educators at tertiary institutions (academics)

The academics represent the group who is in a position to influence management accounting education. (The names of the participating universities are listed in appendix 10.) Each university was contacted telephonically to determine the head of department responsible for management accounting education, and a target group of 14 was obtained.

At the beginning of 2004 a number of formal tertiary institutions merged owing to changes effected by the South African Minister of Education (see details in annexure 11). Several former technikons merged with traditional universities.

The impact of these mergers on the research for this study was carefully considered. However, the effect of the mergers was deemed not to have any adverse effect on the study for the following reasons:

- The new universities included the traditional universities who have always been dominant players in the field of management accounting.
- As the study aimed to target the highest level of management accounting education at formal tertiary institutions, a phone call to the targeted institutions prevented confusion with former technikon education. Clarification of this aspect was important as universities have in the past received greater

recognition than technikons in terms of credits for the CIMA final examinations.

- For the same reason it was decided to exclude the newly formed Tshwane and Vaal Triangle Universities of Technology from the target population, as they were formerly technikons.
- As the targeted population for the academic questionnaire was small (only 14 universities), it was possible for the researcher to contact these institutions telephonically to ensure that the questionnaire was completed by the heads of departments.

The second target group of the study (the practitioners) was selected by identifying accountants employed in the field of management accounting. The rationale was that they worked as leaders in the field and were therefore in the best position to judge the capabilities of new university graduates. Selection of these practitioners was also based on information obtained from the ICIMA and ICMA in South Africa. It was reasoned that management accountants in practice would be aware of requirements and developments in their field and could therefore offer knowledgeable opinions on the skills required in South Africa. This target group consisted of 1 200 practising management accountants. (The CIMA has 66 000 members worldwide (Louis 2005).)

Hussey and Hussey (1997:148) and Robson (1993:139) agree that there is no ideal or prescribed sample size. They state that the sample size depends on the discipline, the level of confidence expected in the answers, and the anticipated response rate. It was consequently decided that 50% would be a practical and representative number of practicing management accountants. In accordance with relevant recommendations by Hussey and Hussey (1997:145), a random sample of 600 practicing members was selected according to a CIMA-generated computer program. Leedy and Ormrod (2005:208) have the following to say

about this sampling process: ... *the two elements that are more important than any others in survey research are randomization and bias.*

Although 600 e-mails were initially sent out, only 592 were delivered. This brought the targeted sample down to 49%, which was still regarded as significant enough to make inferences about the total population (Hussey & Hussey 1997:148).

Numerous researchers state that the choice of target groups should take the following factors into account:

- Rubin and Babbie (1997:193) consider the ability of the respondent to provide accurate information as an important measure.
- Saenger (1991:252) believes that being able to identify the addresses of potential respondents plays a role.
- Saenger (1991:252) also considers the ability to cover the target groups by means of an e-mailed questionnaire important in terms of an increased response rate.

These factors were duly taken into account.

6.6.2 Methodology for survey research

The qualitative and quantitative research methods utilised in this study have been described in 6.4. The second part of the study, namely the use of survey research (a questionnaire), is now discussed to determine whether management accountants display the capabilities required to meet the challenges of a changed business environment.

Bester (2001:1) simplifies a survey as a structured way to gather information, but Fink (1995:1) defines a survey as *a system for collecting information to describe, compare, or explain knowledge, attitudes and behaviour*. Kerlinger (1986:376) elaborates on this definition by describing surveyed research as studies of large and small populations *by selecting and studying samples chosen from the populations to discover the relative incidence, distribution and interrelations of sociological and psychological variables*.

Fink (1995:1) also refers to six key features of survey information systems:

- specific, measurable objectives
- a sound research design
- a sound choice of population and sample
- a reliable and valid instrument
- appropriate analysis of data
- accurate reporting of survey results

These key factors all apply to this research.

Questionnaires may be self-administered or interviewer-administered. This study used self-administered questionnaires in view of the geographical spread of the respondents.

Neuman (1997:38) lists two major advantages of self-administered questionnaires:

- The research can be conducted over a wide area and distance does not present a restriction.
- This type of questionnaire offers anonymity and avoids interviewer bias.

However, self-administered questionnaires are also subject to a number of disadvantages (Bourque & Fielder 1995:14; DeVaus 1996:108; Kerlinger 1986:387; Oppenheim 1992:102):

- There is no control over who responds to the questionnaire and whether or not that person “consults” with colleagues while completing it.
- The response rate may be low, giving rise to bias. In this regard Bourque and Fielder (1995:16) note that no more than a 20% response rate can be expected.
- Misunderstandings cannot be cleared up.
- Sampling is subject to error.

Measures were taken to overcome or minimise the disadvantages of self-administered questionnaires:

- Explanatory phone calls were made to identify the person who had to complete the questionnaire. It was particularly relevant to ensure that the appropriate person completed the questionnaire. The targeted population of academics was very small and the opinions of one person could have a significant impact on the results.
- The problem of a poor response rate was addressed by promising a copy of the results to the practitioners who completed the questionnaire.
- The questionnaire was pretested to identify problems and to avoid confusion in terms of the wording or layout.

- Capture errors were avoided by having the responses submitted via a special link to the internet and into a storage file.

All the above factors were considered to ensure sound scientific research. The questionnaire's content is described below.

6.7 THE SURVEY QUESTIONNAIRE

The validity and reliability of research very much depend on the measuring instrument. Saunders *et al* (1997:156) state that the validity and reliability of collected data depend on the design of the questions, the structure of the questionnaire, and the diligence of pilot testing.

The questionnaires were designed to achieve the research objective as well as to obtain additional information. This section provides a detailed description of the content and layout of the questionnaire as well as the reasons for the choice of questions. It also contains information on the pretesting and distribution of the questionnaires to the designated target groups.

6.7.1 Layout of the questionnaire

Two questionnaires were designed: one to academics in management accounting education (see annexure 13), and one to management accounting practitioners (see annexure 14). Some of the questions overlap in order to enable the researcher to corroborate information supplied in the questionnaires, and other questions were intended for further exploration of relevant items identified in the literature review.

Fink (1995:14) says that a questionnaire must provide usable data. The questionnaire was examined to ensure reliable and valid data. According to both Oppenheim (1992:144) and Kerlinger (1986:405), "reliability" means that the

selected measuring instrument must provide consistent results – again and again. As the target groups were sophisticated subpopulations, reliability was a given and the reliability measures prescribed by Oppenheim (1992:160) were not employed. The contents of the questionnaire were checked for validity (Fink 1995a:33). As the questions were straightforward and the responses reasonable, no other methods of ensuring validity were undertaken.

Question design is determined by the data to be collected (Saunders *et al* 1997:156). The questionnaires contained different types of purposeful questions, for example open-ended and closed-ended questions/statements.

Open-ended questions allow respondents to provide elaborate answers in their own way, whereas closed-ended questions/ statements expect the respondent to choose between a number of alternatives. Most questions/statements in this research were closed-ended, based on a five-point Likert scale. Closed-ended questions/statements elicit standard answers that can be analysed statistically (Fink 1995b:33). Open-ended questions were only used to determine issues around management accounting education that were not apparent from the literature review. It is important to remember that open-ended questions may reflect the personal opinions and bias of respondents. Information derived from the open-ended questions will be reported on in a qualitative manner.

The questionnaires were compiled and precoded with the aid of the Department of Computer Services at the University of South Africa (Unisa) and sent out via e-mail and a link to the Unisa website. As limited research was found on using e-mail to send out questionnaires, the researcher applied the same logic in respect of advantages and disadvantages as for postal questionnaires.

The questionnaire to academics was designed to produce data for the balanced scorecard according to its four critical performance perspectives, namely the

customer perspective, the learning and growth perspective, the internal business process perspective and the financial perspective.

6.7.2 Question selection: practice questionnaire

The practice questionnaires began with a request for biographical information. Some of this information could be cross-tabulated with other questions/statements to analyse phenomena in more detail.(see diagram 6.7)

The practitioners were questioned on the following:

- organisation size and type of industry
- qualifications of the head of the management accounting department
- years of experience of the respondent
- location of the management accounting department in the organisation
- location of management accountants in the organisation
- the name “management accountant” (see paragraph 4.4.1 & 4.4.2)

The questionnaire (see annexure 13) was constructed as follows to make sure that it was not too time-consuming and easy to understand:

- one section on practitioners’ perceptions of management accounting education
- eight subsections requesting more information from practitioners on their perceptions of management accounting education:
 - overall value of management accounting education (subsection B1)
 - management accounting instruction at universities (subsection B2)
 - requirements of management accountants in practice (subsection B3)
 - five crucial attributes of management accountants (subsection B4)

- knowledge and use of new management accounting systems (subsections B5, B6, B7)(also see paragraph 5.2)
- use of traditional management accounting techniques (subsection B8)

Some subsection questions / statements (see diagram 6.3) in the questionnaire for practitioners were linked to questions / statements in the questionnaire for academics.

6.7.2.1 Overall value of management accounting education

The respondents had to choose whether they “Strongly disagree” to “Strongly agree” with a statement.

The statements identified here after attempt to determine whether universities provide education that is relevant to the business world. The rationale behind these statements is that if educators were regularly in contact with alumni and employees, their education would be relevant. The statements tried to determine whether academics and practitioners were of the same opinion. Analysis of the information on statements B1.1, B1.2 and B1.3 would shed some light on one aspect of the hypothesis, namely does a gap exist between what educators teach and practice wants.

Statements B1.1, B1.2 and B1.3

B1.1	P	Universities approach alumni to determine what students think of their management education
B1.2	P	As a graduate, the university approached me to determine the quality of its management accounting education
B1.3	P	As an employee, universities have approached me regarding the quality of their management accounting education

Statements B1.4, B1.5 and B1.7 revolve around student placement. A significant demand for students with a university education would indicate whether the universities provided the kind of education that is required in practice. It could also refute the opinions found in the literature review (paragraph 5.1 & 5.3), namely that academics were out of touch with practical requirements.

Statements B1.4, B1.5 and B1.7

B1.4	P	Management accounting graduates are in big demand in my organisation
B1.5	P	Candidates with postgraduate qualifications in management accounting are in big demand in my organisation
B1.7	P	My organisation recruits new management accountants on South African campuses

According to paragraphs 2.6.1 and 2.6.2, a CIMA-based education has always represented the pinnacle of management accounting education. Benchmarking against the CIMA qualification provided the rationale for including a statement on the demand for CIMA-qualified practitioners.

Statement B1.6

B1.6	P	My organisation has a big demand for candidates who hold CIMA qualifications
-------------	----------	---

Student placement can contribute to an assessment of satisfaction with management accounting education. Analysis of this information would indicate performance in terms of the balanced scorecard's customer perspective.

Analysis of statements B1.8 would provide further answers to the quality aspect of management accounting education. Determining the basis for evaluation in practice could enhance academic understanding of this aspect.

Statement B1.8

B1.8	P	I evaluate the quality of tertiary management accounting education in terms of the number of students who pass compared to the number of students who enrol
-------------	----------	--

Where academics publish and if these publications are held in high esteem, management accounting education would be relevant, would meet practice's requirements and would facilitate management accounting innovation.

Statement B1.9

B1.9	P	Universities whose educators publish management accounting articles are held in greater esteem than others whose educators do not publish
-------------	----------	--

6.7.2.2 Management accounting instruction at universities

These statements were also based on information gained from the literature review. Some statements in the practitioners' questionnaire were linked to performance in terms of the different perspectives of the balanced scorecard (see diagram 5.6 & diagram 6.2).

It was important to establish the opinion of practitioners with regard to the suitability of management accounting education and whether university graduates were ready to meet practical demands. Clarity on this aspect would enable academics to evaluate the internal business process perspective.

Statements B2.1 and B2.5

B2.1	P	Management accounting education is applicable in the world of business
B2.5	P	Newly graduated employees are immediately suited to the world of business

Information technology has been identified (see paragraph 3.3.2) as a major driver of change in the business environment. If the respondents agreed with the statement B2.2 below, it would indicate that tertiary management accounting education was adequate and relevant to the needs of a changed business environment.

Statement B2.2

B2.2	P	New recruits are adequately prepared at university to make computer presentations by using the appropriate software (e.g. Excel for budgets)
-------------	----------	---

Research conducted in the IMA and IFAC studies (see paragraph 4.4.1 & 4.4.2) indicated a gap between what management accountants are taught and what is expected of them in practice. However, if the respondents agreed with the statement B2.3, the findings of these studies could be refuted. Evaluation of this aspect would support the internal business process perspective and would help universities determine whether the knowledge they taught was relevant.

Statement B2.3

B2.3	P	Academics' knowledge of management accounting practice is adequate
-------------	----------	---

It was concluded that future management accountants would need keen problem-solving abilities (see paragraph 4.4). The use of case studies for

teaching purposes would enhance the problem-solving capabilities of young management accountants. However, if academics denied the value of practical investigation as a major tool in transferring knowledge, this capability would not develop properly and management accounting education could not be fully relevant in the business world. This section would contribute information for the balanced scorecard's internal business process perspective.

Statement B2.4

B2.4	P	The problem-solving capabilities of new management accounting employees are adequate
-------------	----------	---

Statement B2.6 was set to determine whether practitioners believed that they had a financial responsibility to ensure that tertiary qualifications would be adequate.

Statement B2.6

B2.6	P	Business should increase their financial contributions to universities if they wanted more relevant qualifications in the business environment
-------------	----------	---

6.7.2.3 Requirements of management accountants in practice

The need for a highly skilled workforce in the changed business environment was indicated in paragraphs 3.3.3.1; 4.4.1 and 4.4.2, and a statement B3.1 on skills was therefore included.

Statement B3.1

B3.1	P	Skills and abilities are as important in business as theoretical knowledge
-------------	----------	---

The need for management accounting educators to change the manner in which they taught was emphasised in paragraph 4.4. Information collected from practitioners (see statement B3.2) would contribute to the third perspective of the balanced scorecard, namely innovation and learning.

Statement B3.2

B3.2	P	Management accounting education at universities should make more use of real-world case studies
-------------	----------	--

Curriculum innovation is linked to the innovation and learning perspective. An assessment of innovation in the curriculum would provide answers to statements about the relevance of tertiary management accounting education. It was stated in paragraph 4.3 that the modern management accountant has to be at the forefront of change. This provided the rationale for including statement B3.4.

The research indicated that management accounting practitioners developed innovative practices due to changing demands (see paragraph 5.1). The respondents' answers were used to assess learning and growth and to establish to what extent management accountants were ready for the changed business environment.

Statement B3.4

B3.4	P	Academics are leading practitioners in respect of management accounting innovation
-------------	----------	---

Communication technology and access to information have been identified as crucially important to the modern management accountant (see diagram 3.6 & paragraph 4.3.2). The inclusion of communication skills in the training of prospective management accountants had to be established before the learning and growth perspective could be assessed.

Statement B3.5

B3.5	P	Management accounting graduates are adequately prepared to write business reports
-------------	----------	--

Statement B3.6 in the respective questionnaires attempted to either support or refute the findings reported in paragraph 3.2, namely that management accounting is undergoing morphogenic change.

Statement B3.6

B3.6	P	In practice, management accounting has undergone radical change over the past five years
-------------	----------	---

6.7.2.4 Five crucial attributes of management accountants

The capabilities management accountants require to perform well in their jobs were discussed in paragraph 4.4. The relevance of these capabilities was validated by asking the respondents to list the five most significant capabilities (ranked from “Most important “ to “Least important”) of management accountants based on a list of attributes identified by Abdolmohammadi, Searfoss and Shanteau (2004:8)

Statement B4

Knowledge	Knowledge of operations, industry
Communication	Written and verbal
Technical skills	Accounting, maths, tax, management accounting
Experience	Experience
Leadership	Leadership, being a leader
Recognition	Well recognised, visible and reputable
Creativity	Creative, imaginative
People skills	Friendly, socially skilled
Adaptability	Adaptable, flexible
Intelligence	Intelligent, smart
Marketing skills	Marketing focus, sales
Problem solving	Solves problems
Current	Stay current, well read
Confident	Confident, mature
Inquisitive	Curious, questions
Analytical skills	Trend recognition
Quick thinker	Thinks quickly on feet
Logic	Logical, rational, common sense
Understanding	Understands business
Training skills	Train self and others

6.7.2.5 Knowledge and use of advanced management accounting systems

Advanced management accounting systems and their importance in the changed business environment were discussed in 5.2. It was stated that management accounting educators had to emphasise the practical value of these advanced management accounting systems this prompted the inclusion of statements B5 and B7.

Statements B5 and B7

Activity-based costing
Activity-based management (ABM)
Balanced scorecard
Life-cycle budgeting and target costing (LCBTC)
Competitor cost analysis (CCA)
Product life-cycle costing (PLCC)
Strategic cost management (SCM)
Customer and marketing channel analysis (CMCA)
Multiple performance measures (MPM)
Total cost of quality reporting
Just-in-time (JIT)
Throughput accounting
Back-flush costing

6.7.2.6 Use of traditional management accounting techniques

Prominent business leaders have stated that the existing management accounting techniques have become outdated and no longer provided the information required to make business decisions (see paragraphs 5.1 & 5.2). The practitioners were asked to comment on the use and suitability of traditional management accounting techniques. An overemphasis of these techniques in practice could mean that management accounting educators were not equipping candidates appropriately.

Statement B8 (questionnaire to practitioners)

Direct (variable) costing
Full costing
Standard costing
Budgeting

The questionnaire concluded by asking the respondents to provide other relevant information.

6.7.3 Reasons for question selection: questionnaire to academics

The questionnaire to academics also started with a request for biographical information. The academics were asked about the following:

- The size of the university and management accounting departments in terms of students and staff
- The qualifications of the respondents and the supervisor as well as the importance of the CIMA professional designation in the department
- The respondents' experience in academia and practice
- The place of management accounting in the department

The questionnaire was designed in terms of the four perspectives of the balanced scorecard. It was reasoned (see paragraph 5.4) that establishing conduct in terms of these perspectives (see below) would prove valuable in assessing performance.

- B1: customer perspective
- B2: internal business process perspective
- B3: innovation and learning perspective
- B4: financial perspective

The responses to statements were based on a 5-point Likert scale, ranging from “Strongly agree” to “Strongly disagree”.

6.7.3.1 *The customer perspective*

A focus on the customer perspective requires answers to statements on how customers see tertiary management accounting education. A number of areas were identified, namely quality instruction, effective student placement, flexible course scheduling, and highly valued programmes. The CIMA-based qualification has for many years served as a benchmark in management accounting education and a statement on the CIMA pass rate was therefore included in the questionnaire.

Statements discussed here after tried to establish to what extent academics took the view of customers into account when they assessed their ability to deliver well-prepared graduates.

Statements B1.1, B1.2, B1.3 and B1.4 (quality instruction)

B1.1	A	We use alumni evaluations to determine what students think of our management accounting education
B1.2	A	We use graduating student evaluations to determine what students think of our management accounting education
B1.3	A	We use business evaluations to determine what employers think of our management accounting education
B1.4	A	We use the CIMA pass rate of our students to determine the quality of our management accounting education

If students could readily find suitable work upon completion of their studies, it would indicate that tertiary management accounting education provided the skills required in the business environment and it would refute the opinion that academics were out of touch with practical demands. (see paragraph 4.4) This

information would provide clarity for the hypothesis that a gap existed between academia and practice.

Statements B1.6, B1.7 and B1.11 (effective student placement)

B1.6	A	Most of our undergraduates find suitable placement on completion of their first degree
B1.7	A	Most of our honours graduates find suitable placement on completion of their honours degree
B1.11	A	Many organisations recruit students on campus

The esteem in which tertiary management accounting education programmes are held would be revealed in the number of students who enrol. If the pass rate were for example used as a measure, financial matters (e.g. the government subsidy) could be more important than customer perceptions.

Statements B1.8, B1.9 and B1.10 (highly valued programmes)

B1.8	A	We evaluate the success of our programmes based on the number of students who enrol for them
B1.9	A	We evaluate the success of our education by the percentage enrolment compared to the total number of applications
B1.10	A	We evaluate the success of our education by the percentage students who pass compared to those who enrolled

Tertiary management accounting education should provide shorter and more flexible courses to meet customer needs (see paragraph 3.3.3.3). An attempt was by statement B1.5 to assess tertiary education's response in this area

Statement B1.5 (flexible course schedule)

B1.5	A	We should present the courses on offer more than once a year
-------------	---	--

6.7.3.2 *The internal business process perspective*

This perspective is used to identify critical processes in achieving customer and shareholder objectives (5.4.5.4). These objectives include providing a unique curriculum, addressing changing needs, cost-effective education as new education providers enter the market, and ensuring quality education.

Issues relating to the quality assurance of management accounting programmes are addressed by the following statements. Benchmarking the outcomes of university education against prerequisite pass or distinction rates may not be a true reflection of the quality of the education. If too few academic staff held the professional qualifications prescribed by the CIMA (see paragraph 2.6.1 and 2.6.2), management accounting education might not be accorded its rightful place in accounting education. Statements in respect of B2.9 would determine whether class size is optimal for delivering quality education. If the respondents endorsed the viewpoint presented in statement B2.10, it could indicate that educators are able to teach what practice wants.

Statements B2.1, B2.2, B2.8, B2.9 (a and b), and B2.10 (quality assurance)

B2.1	A	Between 45% and 65% of our undergraduate students usually pass
B2.2	A	Five per cent of our undergraduate students usually receive distinctions
B2.8	A	Too few of our staff hold professional management accounting qualifications
B2.9 (a)	A	Undergraduate class sizes are reasonable
B2.9 (b)	A	Postgraduate class sizes are reasonable
B2.10	A	Academics' practical knowledge of the subject matter is adequate

Some of the consequences of the changed business environment were identified in chapters 3 and 4. If management accounting education were to remain relevant in this environment, a unique curriculum that addressed these consequences would be needed. The answers of the respondents to the statements listed here after would provide information for the internal business process perspective of the balanced scorecard.

Information technology was identified (paragraph in 3.3.2) as a major driver of change in the business environment (hence statements B2.5 (a and b) and B2.11). The importance of communication skills was emphasised in paragraph 3.3.2.1 (hence statements B2.4 (a and b)).

The problem-solving abilities of management accountants were discussed in paragraph 4.4. If the academic respondents used case studies to enhance the practical problem-solving capabilities of students, it would be an indication of a unique curriculum. If the respondents included oral presentations, computer and investigative skills in their management accounting programmes, student evaluation can no longer be based on written tests only (hence statements B2.3 (a and b)). Statement B2.14 addresses the need for a highly skilled workforce.

Statements B2.3 to B2.6 (a and b), B2.11 to B2.14 (unique curriculum)

B2.3 (a)	A	Written tests and exam results are the major components of our final grading of undergraduate students
B2.3 (b)	A	Written tests and exam results are the major components of our final grading of postgraduate students
B2.4 (a)	A	Oral presentation of cases is a major component of the final grading of undergraduate students
B2.4 (b)	A	Oral presentation of cases is a major component of the final grading of postgraduate students
B2.5 (a)	A	Computer presentations are a major component of the final grading of undergraduate students

Statements continued		
B2.5 (b)	A	Computer presentations are a major component of the final grading of postgraduate students
B2.6 (a)	A	Practical investigations are a major component of the final Grading of undergraduate students
B2.6 (b)	A	Practical investigations are a major component of the final grading of postgraduate students
B2.11	A	Our computer facilities are considered adequate for delivering instruction
B2.12	A	Practical cases develop the students' problem-solving and communication skills
B2.13	A	Our courses are absolutely appropriate to the world of business
B2.14	A	Developing skills and abilities are as important as developing knowledge

Grading (quality assurance) and the development of critical skills to keep pace with morphogenic changes in the market were addressed in section B2.2 which requested respondents to indicate the extent to which the different items listed below are used for grading both undergraduate and postgraduate management accounting students:

Tests
Cases and problems
Attendance and participation
Homework
Exam papers
Student presentations
Computer presentations
Practical investigations (fieldwork)

In order to assess the cost efficiency of management accounting education, the respondents were asked to comment on staff/student ratios (statement B2.7) and optimal class sizes .

Statement B2.7 (a and b)(cost efficiency)

B2.7 (a)	A	Our student-to-staff ratio is a factor in delivering a quality education at undergraduate level
B2.7 (b)	A	Our student-to-staff ratio is a factor in delivering a quality education at postgraduate level

6.7.3.3 The learning and growth perspective

The learning and growth perspective of the balanced scorecard was discussed in paragraph 5.4.5.3. If management accounting education is to remain relevant in a changed and changing business environment, three important aspects apply:

- continued professional growth of academics
- incorporating technology in teaching
- innovative teaching and curricula

An assessment of curriculum innovation will provide answers regarding the relevance of tertiary management education in enabling modern management accountants to remain at the forefront of change (see paragraph 4.3).

**Statements B3.1 (a and b), B3.4 to B3.6 (a and b), B3.11 and B3.12
(curriculum innovation)**

B3.1 (a)	A	Undergraduate classes are mostly presented by explaining questions and answers
B3.1 (b)	A	Postgraduate classes are mostly presented by explaining cases
B3.4	A	Undergraduates conduct research on specific topics and write articles
B3.5	A	Creative written assignments are strongly encouraged
B3.6 (a)	A	New management accounting systems are a major component of our undergraduate syllabus
B3.6 (b)	A	New management accounting systems are a major component of our postgraduate syllabus
B3.11	A	The management accounting syllabi have been completely revised in the last two years
B3.12	A	We teach the same core body of management accounting knowledge as three years ago

Innovative teaching methods are also required to remain relevant Proving innovation in teaching could refute the perception of business leaders (see paragraph 4.4) that management accounting education is no longer in touch with the realities of the business environment.

Statements B3.2 (a and b), B3.3 (a and b) and B3.10 (teaching innovation)

B3.2 (a)	A	Undergraduate classes are mostly presented through the use of applicable/relevant computer software
B3.2 (b)	A	Postgraduate classes are mostly presented through the use of applicable/relevant computer software
B3.3 (a)	A	Undergraduate classes are presented in an interactive manner
B3.3 (b)	A	Postgraduate classes are presented in an interactive manner
B3.10	A	Most faculty members have been involved in teaching workshops during the past two years

Learning and growth also revolve around the professional growth of academics. This research revealed that innovative management accounting developed in practice and did not emanate from academia (see paragraph 5.3). If the respondents agreed with the statements B3.7, B3.8 and B3.9, it would indicate that academics were in fact leading practice.

Statements B3.7, B3.8 and B3.9 (professional growth of academics)

B3.7	A	Academia is leading practice in terms of management accounting innovation
B3.8	A	Every faculty member publishes articles on innovation in management accounting at least once a year
B3.9	A	Faculty members attend workshops on innovations in management accounting at least once a year

The effect of information technology on the changing role of management accountants was discussed in paragraph 4.3.2. Aspects related to this driver of change (see paragraph 3.3.2 & 4.3.2) were explored in more detail with respect to the learning and growth perspective. The information obtained in respect of teaching aids, text books and study aids were used to assess the use of

information technology (see paragraph 4.3.2), collaboration and communication skills (see paragraphs 3.3.2 & 4.3.3) in management accounting education.

Statement B3.3 (teaching aids)

Indicate by means of an approximate percentage the extent to which these teaching aids are used in management accounting education at both undergraduate and postgraduate levels:

Textbooks
Cases and projects
Problems
Group work
Student presentations
Readings
Videos
Internet assignments
Computer (not internet) assignments
Guest speakers

Statement B3.2 (management accounting textbooks)

List the standard management accounting textbooks used for undergraduate courses
List the standard management accounting textbooks used for postgraduate courses

Statement B3.4 (study aids)

Indicate by means of an approximate percentage the extent to which both undergraduate and postgraduate management accounting students use the listed study aids:

Standard management accounting textbooks
CIMA study guides
Practical cases
Management accounting standards
Software applications
Nonmanagement accounting textbooks

The literature review (see diagram 4.8) revealed that, in addition to knowledge, attributes such as confidence and leadership skills were important to management accountants. The respondents were asked to rank the top five attributes of management accounting practitioners from “Most important “ to “Least important”.

Statement B4 Attributes

Knowledge	Knowledge of operations, industry
Communication	Written and oral
Technical skills	Accounting, maths, tax, management accounting
Experience	Experience
Leadership	Leadership, leader
Recognition	Well recognised, visible and reputable
Creativity	Creative, imaginative
People skills	Friendly, socially skilled
Adaptability	Adaptable, flexible

Attributes continue	
Intelligence	Intelligent, smart
Marketing skills	Marketing focus, selling
Problem solving	Solves problems
Current	Stay current, well read
Confidence	Confident, mature
Inquisitive	Curious, questions
Analytical skills	Trend recognition
Quick thinker	Thinks quickly on feet
Logic	Logical, rational, common sense
Understanding	Understands business
Training skills	Train self and others

(Adapted from Abdolmohammadi, Searfoss and Shanteau 2004:8)

6.7.3.4 The financial perspective

It was stated in paragraph 5.4.5.5 that no assessment of performance can be complete without assessing the financial perspective. This perspective identifies how the education appears to the providers of financial resources (the government in South Africa) and was tested by means of statements B4.1-B4.3.

Statements B 4.1(a & b) B4.2 – B 4.7 Financial perspective (academic questionnaire)

B4.1 (a)	A	The expense per student at undergraduate level is low
B4.1 (b)	A	The expense per student ate postgraduate level is low
B4.2	A	The travel budget for conferences is adequate
B4.3	A	The bulk of the departmental budget is spent on innovation and keeping staff members abreast of changes
B4.4	A	The subsidy per student is adequate
B4.5	A	Staff have sufficient time to conduct research
B4.6	A	The department receives several annual donations from business
B4.7	A	The faculty/student ratio provides for quality instruction

6.7.4 Research hypotheses

Based on the information obtained hypotheses that can be tested will be formulated to address each proposition in 6.5.1. (see diagram1.1) A five-point Lifetree scale was used to measure the perceptions of respondents. All negatively phrased statements were recoded so that a higher score would have a positive meaning.

Scale reliability was determined by calculating the Cronbach (1955) coefficient alpha. An item analysis for all perception scores had to be conducted beforehand to eliminate unreliable items.

6.7.4.1 Hypotheses to be tested for propositions 1a, 1b, 2a, 2b, 3a and 3b

The mean perception of the eleven objectives to be evaluated by the academics will be significantly higher/lower than the midpoint 3 of the 5-point scale as indicated by the expectation next to the objective to be tested. Similarly, the

mean perception of the eight objectives to be evaluated by the practitioners will be significantly higher/lower than the midpoint 3 of the 5-point scale as indicated by the expectation next to the objective to be tested. The objectives to be tested and the accompanying statements have been summarised in diagram 6.2.

Diagram 6.2: Propositions and hypotheses

Proposition 1 (a and b): Customer perspective		
Perspective	Academics	Practitioners
Quality instruction	$H_0: \mu = 3$ $H_1: \mu < 3$	$H_0: \mu = 3$ $H_1: \mu > 3$
Quality instruction	B1.1, B1.2, B1.3, B1.4	B1.1, B1.2, B1.3
Effective student placement	$H_0: \mu = 3$ $H_1: \mu < 3$	$H_0: \mu = 3$ $H_1: \mu > 3$
Effective student placement	B1.6, B1.7, B1.11	B1.4, B1.7, B2.5
Highly valued programme	$H_0: \mu = 3$ $H_1: \mu < 3$	$H_0: \mu = 3$ $H_1: \mu < 3$
Highly valued programme	B1.8, B1.9, B1.10	B1.8, B1.9
Flexible scheduling	$H_0: \mu = 3$ $H_1: \mu > 3$	
Flexible scheduling	B1.5	
Proposition 2 (a and b): Internal business process perspective		
Perspective	Academics	Practitioners
Quality assurance	$H_0: \mu = 3$ $H_1: \mu < 3$	$H_0: \mu = 3$ $H_1: \mu < 3$
Quality assurance	B2.1, B2.2, B2.8, B2.10	B1.5, B1.6
Unique curriculum	$H_0: \mu = 3$ $H_1: \mu > 3$	$H_0: \mu = 3$ $H_1: \mu > 3$
Unique curriculum	B2.3 (a, b), B2.4 (a, b), B2.5 (a, b), B2.6 (a, b), B2.11, B2.12, B2.13, B2.14	B2.1

Proposition 2 (a and b) continued: Internal business process perspective		
Perspective	Academics	Practitioners
Cost efficiency	H ₀ : $\mu = 3$ H ₁ : $\mu < 3$	
Cost efficiency	B2.7 (a, b)	
Optimal class size	H ₀ : $\mu = 3$ H ₁ : $\mu > 3$	
Optimal class size	B 2.9 (a, b)	
Proposition 3 (a and b): Learning and growth perspective		
Perspective	Academics	Practitioners
Curriculum innovation	H ₀ : $\mu = 3$ H ₁ : $\mu > 3$	H ₀ : $\mu = 3$ H ₁ : $\mu > 3$
Curriculum innovation	B3.1 (a, b), B3.4, B3.5, B3.6 (a, b); B3.11, B3.12	B2.4, B3.1, B3.5, B3.6
Teaching innovation	H ₀ : $\mu = 3$ H ₁ : $\mu > 3$	H ₀ : $\mu = 3$ H ₁ : $\mu > 3$
Teaching innovation	B 3.2 (a, b), B3.3 (a, b), B3.10	B2.2, B3.3
Faculty professional growth	H ₀ : $\mu = 3$ H ₁ : $\mu > 3$	H ₀ : $\mu = 3$ H ₁ : $\mu > 3$
Faculty professional growth	B 3.7, B3.8, B3.9	B2.3, B3.4

Since the sample for academics is very small, the non-parametric Kolmogorov-Smirnov one-sample test was used to test the hypotheses for academics (Steyn, Smit, Du Toit & Strasheim 1994:421;585). The sample for practitioners was much larger and a normal distribution was assumed for sample means. The one-sample t-test was used to test the hypotheses for academics (Steyn *et al* 1994:410).

6.7.4.2 Hypotheses to be tested for proposition 4

Proposition 4 was stated as a function of propositions 1a, 1b, 2a, 2b, 3a and 3b. As can be seen from diagram 6.3, some statements were not relevant to practitioners. Proposition 4 was therefore evaluated in terms of comparable statements between the two groups of respondents. The statistical hypotheses and specific statements used for testing proposition 4 have been summarised in diagram 6.3.

Diagram 6.3: Proposition 4

There is a significant gap between the perceptions of academics and those of practitioners (using the balanced scorecard as a framework for analysis)

Academics (group 1) parameters	Practitioners (group 2) parameters	Null hypotheses	Alternative hypotheses
μ_1	μ_2	$H_0: \mu_1 = \mu_2$	$H_1: \mu_1 \neq \mu_2$
σ_1	σ_2	$H_0: \sigma_1 = \sigma_2$	$H_1: \sigma_1 \neq \sigma_2$
Academics statements	Practitioners statements	Balanced scorecard perspective	Topic
B1.1	B1.1	Customer	Quality instruction
B1.2	B1.2	Customer	Quality instruction
B1.3	B1.3	Customer	Quality instruction
B1.11	B1.7	Customer	Effective student placement
B1.10	B1.8	Customer	Quality instruction
B2.13	B2.1	Internal business	Unique curriculum
B2.10	B2.3	Internal business	Quality assurance
B2.14	B3.1	Internal business	Unique curriculum
B3.8	B3.4	Learning and growth	Professional growth of faculty members
B3.12	B3.6	Learning and growth	Curriculum innovation
B3.4	B4	Learning and growth	Curriculum and teaching innovation

Subscales were used where possible to obtain aggregate scores for the customer perspective, the internal business process perspective and the learning and growth perspective. A one-sample t-test and the Mann-Whitney U-test were used to test for significant differences between the views of academics and practitioners (Steyn *et al* 1994:431, 433, 443). The non-parametric alternative was used due to the large difference in sample sizes and the subsequent probable violation of the assumption of equal variances for the parametric testing. Both parametric and non-parametric results are reported.

As management accounting education departments at South African universities are not profit centres but cost centres, it was not possible to compare the financial perspective to external financial perspectives (hence the omission of the financial perspective from diagram 6.37).

6.7.4.3 Hypotheses to be tested for propositions 5 to 10

The hypotheses to be tested for propositions 5 to 10 are presented in diagrams 6.4 to 6.9.

Diagram 6.4: Proposition 5	
Financial perspective: academics do not perceive the educational environment for training management accountants to be efficient and effective	
Null hypothesis	$H_0: \mu = 3$
Alternative hypothesis	$H_0: \mu < 3$
Financial perspective	
Educational expense, subsidy and donations	B4.1-1(a) and B4.1-1(b), B4.1-4 and B4.1-6
Faculty development	B4.1-2, B4.1-3, B4.1-5, B4.1-7

Subscales were used where possible to obtain aggregate scores. The non-parametric Kolmogorov-Smirnov one-sample test was used to test proposition 5 for academics (Steyn *et al* 1994:421, 585).

Diagram 6.5: Proposition 6

A significant gap exists between the perceptions of practitioners and those of academics regarding the attributes management accountants need to meet the challenges in a changing business environment			
Academics (group 1) parameters	Practitioners (group 2) parameters	Null hypothesis	Alternative hypothesis
μ_1	μ_2	$H_0: \mu_1 = \mu_2$	$H_1: \mu_1 \neq \mu_2$
Academics statements	Practitioners statements	Attributes	
B3.4 Z1-1 to Z1-20	B4 B4-1 to B4-20	Factors of attributes were obtained through exploratory factor analysis	

Subscales were used where possible to obtain aggregate scores for the factors identified through factor analysis. The independent sample t-test and the non-parametric Mann-Whitney U-test were used to test for significant differences between the views of academics and practitioners (Steyn *et al* 1994:429, 591).

Diagram 6.6: Proposition 7

A significant gap exists between the perceptions of service industry practitioners and those of manufacturing industry practitioners about the attributes management accountants need to meet the challenges in a changed business environment			
Service industry (group S) parameters	Manufacturing industry (group M) parameters	Null hypothesis	Alternative hypothesis
μ_S	μ_M	$H_0: \mu_S = \mu_M$	$H_1: \mu_S \neq \mu_M$
Statements	B4	Attributes	
B4-1 to B4-20		Factors of attributes were obtained through exploratory factor analysis	

Subscales were used where possible to obtain aggregate scores for the factors identified through factor analysis in B4 for practitioners. These subscales and the t-test for two independent large samples were used to test for significant differences between service industry and manufacturing industry practitioners. However, since only five of the options from B4 (questionnaire for practitioners) were rated, the sample size per group was sometimes rather small. In this case the Mann-Whitney U-test results are also reported (Steyn *et al* 1994:429).

Diagram 6.7: Proposition 8

The application of advanced management accounting systems in business is reported differently by manufacturing and service industries			
Service industry (group S) parameters	Manufacturing industry (group M) parameters	Null hypothesis	Alternative hypothesis
μ_S	μ_M	$H_0: \mu_S = \mu_M$	$H_1: \mu_S \neq \mu_M$
Statements	B5	Attributes	
B5-1-0 to B5-1-12		Factors of attributes were obtained through exploratory factor analysis	

Subscales were used where possible to obtain aggregate scores for the factors identified through factor analysis of B5 for practitioners. These subscales and the t-test were used for two independent large samples to test for significant differences between service industry and manufacturing industry practitioners (Steyn *et al* 1994:429)

Diagram 6.8: Proposition 9

Manufacturing and service industry practitioners view knowledge of advanced management accounting systems differently			
Service industry (group S) parameters	Manufacturing industry (group M) parameters	Null hypothesis	Alternative hypothesis
μ_S	μ_M	$H_0: \mu_S = \mu_M$	$H_1: \mu_S \neq \mu_M$
Statements	B7	Attributes	
B7-1 to B7-13		Factors of attributes were obtained through exploratory factor analysis	

Subscales were used to obtain aggregate scores for the factors identified through factor analysis of B7 for practitioners. These subscales were used to perform the t-test for two independent large samples to test for significant differences between service industry and manufacturing industry practitioners (Steyn *et al* 1994:429)

Diagram 6.9: Proposition 10

Manufacturing and service industries report differently on the use of traditional management accounting techniques			
Service industry (group S) parameters	Manufacturing industry (group M) parameters	Null hypothesis	Alternative hypothesis
μ_S	μ_M	$H_0: \mu_S = \mu_M$	$H_1: \mu_S \neq \mu_M$
Statements	B8		
B8-1 to B8-4			

No subscales were calculated, and the rank sum test and the t-test were used for two independent large samples to test for significant differences between service industry and manufacturing industry practitioners (Steyn *et al* 1994:429; 591)

6.7.5 Covering letter

Each questionnaire was sent with a covering letter from the researcher (see annexure 12 & 13) explaining the following:

- the importance of the research to the management accounting profession
- the importance of the respondents' opinions on the accuracy and validity of the survey results
- the simplicity of both questionnaires
- the ease of completing the questionnaire electronically
- the confidentiality of the information
- contact details for enquiries about the survey

The covering letter was impersonal as research by Cooper and Emory (1995:283) suggested that personal greetings had no noticeable advantages in terms of the response rate. The respondents were warned to expect the questionnaire in their inboxes before the questionnaire was despatched via e-mail. To prevent the respondents from perceiving the e-mail as junk mail, the questionnaire for practitioners was mailed from the CIMA data bank, and the Unisa address list was used to send the questionnaire for academics. A follow-up e-mail was sent two weeks later to encourage completion of the questionnaire, and a third e-mail was sent two weeks after the second e-mail.

6.7.6 Pilot testing

Pilot testing of a questionnaire is an important step in conducting successful questionnaire research. The pilot test or pretesting was accomplished by sending the practice questionnaire to five MBA students who were working as management accountants in their respective organisations. The academic questionnaire was pretested by two colleagues, one at the Unisa School of Business Leadership and the other at the Department of Accounting at the University of Johannesburg. After feedback was received, the questionnaire was changed to clear up misunderstandings.

Bourque and Fielder (1995:89) state that a pilot test enables researchers to determine how well their questions and instructions are understood. In this case the pilot test was conducted among representative candidates of the intended populations, and suggestions by these respondents were subsequently taken into account.

6.7.7 Questionnaire distribution

The questionnaires were e-mailed to the two target groups. The addresses of practitioners were obtained from the ICMA 2004 database. The addresses of academics were obtained from the Unisa database of accounting departments at the identified universities.

The questionnaires were e-mailed in January and followed up by two e-mail messages two weeks apart.

Major advantages of the e-mail questionnaires:

- The respondents could complete the questionnaire in their own time (Collecting data the e-mail way 1992:52).
- E-mail questionnaires are known for a fast response rate (Opperman 1995:29).
- Delivery of an e-mail document is secure (Collecting data... 1992:53; Opperman 1995:32).
- The cost of e-mail is reasonable (Collecting data... 1992:53).

However, Collecting data... (1992:53) also lists a few constraints in this regard:

- All the respondents had to have access to e-mail. In this research it was not a problem as the sample was finite and chosen from an existing e-mail database.

- Human factors exist, for example negative feelings about e-mail. This was not considered important as all practitioners and academics frequently use e-mail as a means of communication.

Diagram 6.10: Details of e-mail postings

After	Target group	Responses	Target group	Total
1 st e-mail	ICMA practitioners	72	University academics	3
2 nd e-mail	ICMA practitioners	26	University academics	6
3 rd e-mail	ICMA practitioners	7	University academics	2
Total		105		11

Source: Own diagram

6.8 RESPONSE RATE

The response rate was 79% from academic institutions and 18% from practitioners.

Oppenheim (1992:23) notes that no response could indicate bias in the sample. However, the response rate was deemed acceptable compared to studies conducted elsewhere (Konar, 1989:243). Bias is therefore disregarded in the analysis of the results (see chapter 7).

6.9 DATA PROCESSING

This project was registered as departmental at the Department of Computer Services at Unisa. The results were therefore processed by the Department of Computer Services. The SAS statistical program was used for analysis purposes. The SAS programme was established in 1976 in partnership with IBM and is one of the most powerful statistical analysis programs in the world (SAS 2005). The software is a comprehensive statistical analysis and data management system.

Hussey and Hussey (1997:187) define statistical analysis as *a body of methods and theory that is applied to quantitative data when making decisions*. According to Rowntree (1991:186), statistical analysis helps to recognise errors when working with quantitative data and enables the researcher to make inferences about the larger group. The SAS program provides extensive statistical capabilities and deals with a wide range of statistical analyses (e.g. analyses of variance, regression, categorical data, and multivariate analysis).

The data were collected directly from the database created for this purpose by the programmers at the Unisa School of Business Leadership. Collecting the data directly helped to eliminate processing errors. Errors such as duplication or punching in data incorrectly were therefore avoided.

The data were analysed according to:

- the two subpopulations
- biographic information of the populations which provided more detail on some issues.

The analysis results are summarised in chapter 7.

6.10 STATISTICAL ANALYSIS AND DATA PRESENTATION

The research design was conceptualised to facilitate statistical analysis of the research findings. Kerlinger (1986 175) says that statistics is:

the theory and method of analysing quantitative data obtained from a sample of observations in order to study and compare sources of various phenomena, to help make decisions to accept or reject hypothesised relationships between the phenomena, and to aid in making reliable inferences from empirical observations.

Most of the data were summarised by means of parametric exploratory and inferential statistical data analysis. Parametric statistics may be defined as statistics that *compare sample statistics with population parameters ... for data that display a normal distribution* (Hussey & Hussey 1997:244). Hussey and Hussey (1997:189) also state that exploratory data analysis not only describes the data but also summarises the data in tables, charts or graphs in order to *enable patterns and relationships to be discerned which are not apparent in the raw data*. Leedy and Ormrod (2005:30) define inferential data analysis as a statistical procedure to draw conclusions about a population by using the quantitative data collected from a sample. The parametric statistics used for this analysis were frequency distribution and a measure of central tendency.

Hussey and Hussey (1997:189) mention that frequency tests are done to represent the number of observations for a variable under-investigation. In this study, frequencies were mostly represented by means of charts or graphs. Central tendency or location is a useful way to describe a large frequency distribution and was used here by calculating the arithmetic mean. The arithmetic mean is the ordinary average and is defined as $x/n = (x_1 + \dots + x_n)/n$ (Cooper & Weekes 1983:3).

Non-parametric statistics included the Wilcoxon rank sum test and the Corr procedure test. Leedy and Ormrod (2005:257) state that non-parametric statistical techniques are used when rankings are studied (e.g. where the respondents had to rank the top five attributes of management accountants). The Wilcoxon rank sum test is used (Leedy & Ormrod 2005:274) when:

measures are expressed as ranked data in order to test the hypothesis that the samples are from a common population whose distribution of the measures is the same as that of the samples.

An appropriate statistical test was used to test the null hypothesis (see Diagram 1.1). As two samples were involved, it had to be considered whether individual cases were independent or related and whether the measurement scale was nominal, ordinal, interval or ratio (Cooper & Emory 1995:444). The relationship between the perceptions of the two subpopulations was studied and as there were no ordering values, the measurement scale was nominal (Cooper & Weekes 1983:38). For tests based on a decision tree, as suggested by Martins, Loubser and Van Wyk (1996:323), it was decided to use the chi-squared test of independence. The chi-squared test, tests for significant differences between the observed distribution of data between the two subpopulations and the expected distribution based upon the null hypothesis were used (Martins *et al* 1996:342).

The researcher explored whether the responses to questions in the practice questionnaire were dependent on specific characteristics, for example the type of industry where the management accountant was employed.

The statements dealing with the five most important attributes in both questionnaires were analysed by summing the scores of each item, obtaining an overall score for the item, and ranking it according to the highest score.

Where possible, pie charts and histograms were used to present the data visually. Where feasible, open-ended questions were reported on in a qualitative manner.

The in-depth statistical analysis of each proposition helped to report significant differences between practical requirements and what educators teach.

6.11 LIMITATIONS OF THE RESEARCH

The limitations of the research have to be discussed before the chapter is concluded. The study used self-administered questionnaires that were sent out via e-mail. Both aspects presented limitations that were discussed in paragraphs 6.4.3 and 6.5.5.

The target group of practitioners was randomly selected from the CIMA's database on practising members in South Africa. The target group for academics was predetermined as the heads of management accounting departments at South African universities. As this was a small group, the whole population was included in the survey. The target groups were selected on the basis of identifiable characteristics (e.g. ICMA members were identifiable as management accountants), so that the groups would be representative of all management accountants (e.g. CA (SA) members practising as management accountants).

Another limitation was possibly the fact that the biographical information was placed first in the questionnaire. Collecting data... (1992:54) found that placing biographical information last encouraged respondents to complete the topical questions before they get tired. However, the biographical information was deemed important for the one-way variance analysis.

The response rate could represent a limitation, but as no predetermined norms exist, the researcher did not consider the response rate in this study a problem. Newly merged institutions presented a problem, but this limitation was carefully considered. The fact that the former technikons were not specifically targeted would not have a significant effect as they formed part of the merged institutions.

Provided that the above limitations are clearly understood, they will not detract from the results.

6.12 CONCLUSION

This chapter examined the significance of the research methodology. The research was undertaken as no empirical data on the relationship between education and the practical requirements of management accountants are available in South Africa. This study therefore extends the existing knowledge and provides new information on the topic of relevant management accounting education.

The research used self-administered questionnaires addressed to two targeted groups, namely management accounting practitioners and management accounting educators.

As the fundamental nature of the research suggested performance measurement, the balanced scorecard was used as a strategic performance measurement tool.

Data capturing took place directly into a repository from which the Department of Computer Services at Unisa processed the data. This chapter also discussed the selection of appropriate statistical tests for analysis purposes. Possible limitations of the research were also listed.

Chapter 7 analyses the collected data in order to either support or dispute the basic hypothesis of the study.